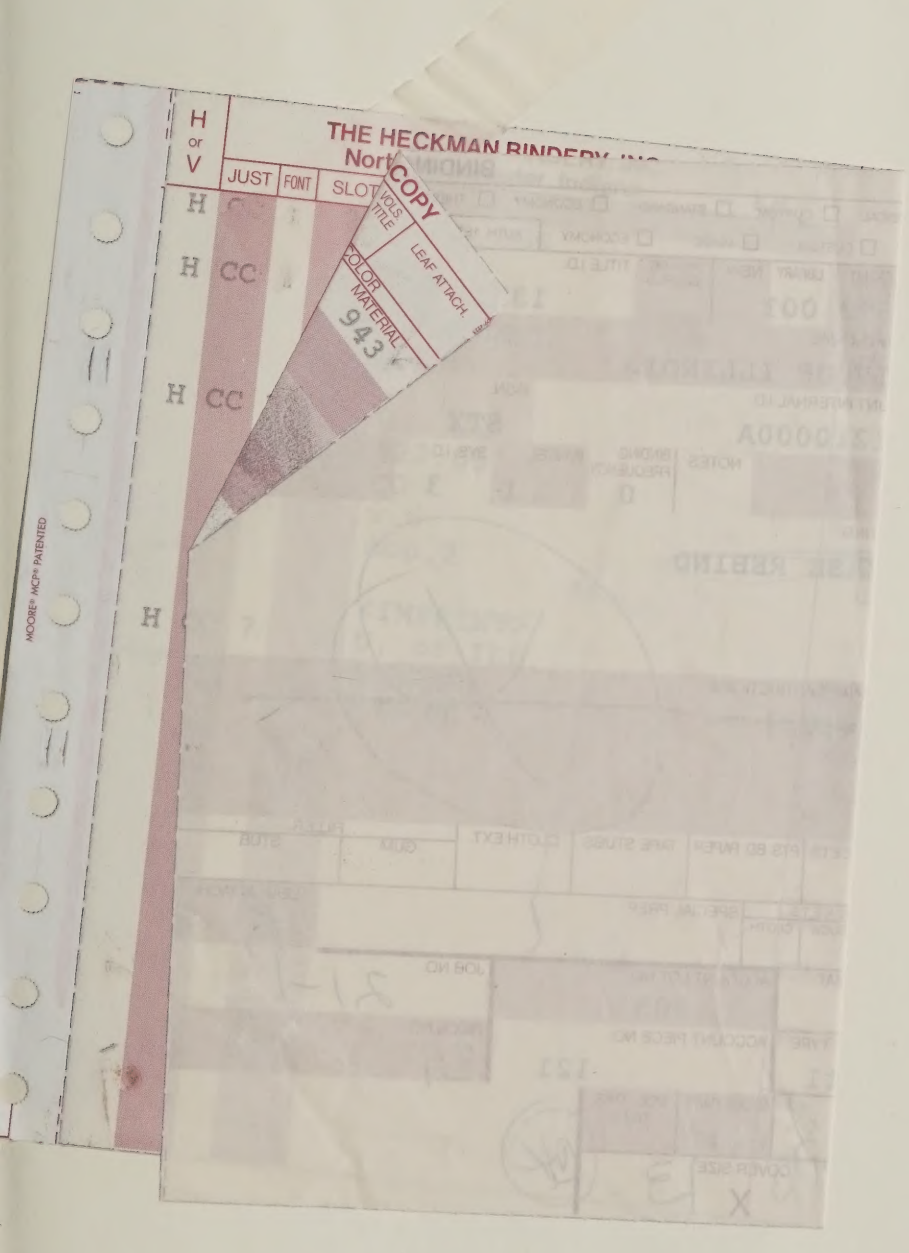
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COAL AGE

Vol. 6 NEW YORK, JULY 4, 1914 No. 1

Brothers

By Berton Braley

Written expressly for Coal Age

When things seem peaceful-like and calm
The racial ructions rise,
The Polack mixes with the Greek
The Lithuanian tries
To beat his Russian brother up
And bung the Austrian's eyes.

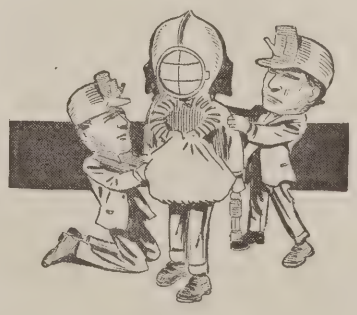


There's trouble twixt the Dutch and French
And all their kith and kin,
The Irish battle with the Swedes
The Croatian with the Finn,
And all the mine and camp is filled
With Inter-racial din!



But when disaster strikes the mine
And women wail their woe,
When fire or gas or dynamite
Has dealt a deadly blow,
When there's a call for volunteers
To dare the Hell below,

THEN Russ and Hun and Celt and Gaul
Lay by their racial pride,
To rescue those who still may live,
And bring up those who died,
The foes in many a long fought feud
Work nobly side by side.



And when the hero list is made
Of those who dared the flame,
There will be men of every race
And every sort of name,
For Austrian, Bulgar, Finn or Russ,
Brave hearts are just the same!

Ideas and Suggestions

Stopping the Leaks

SYNOPSIS—You don't get good results from your automobile engine when there is a loss of compression. It means the cylinders are leaking. Your business is just like that. Every little leak takes that much power and profit out of your organization.

Carefully gathered figures were recently presented in an article in COAL AGE showing the average net earnings of all coal-mining concerns in the United States to be less than 5 per cent. No doubt many individual companies could present statements showing a much better return than this; but, on the other hand, entirely too many concerns are making showings not even as good as 5 per cent., year in and year out.

The advertisers in COAL AGE are continually pointing out to coal-mining men that it pays to be alert and alive to the opportunities for increased production and economy afforded by the use of modern and up-to-date equipment.

In almost any journal the mining man may pick up, "Scientific Management" and "Efficiency" are preached to him until he no doubt wonders whether some of the expert advisors really believe or know anything about what they preach.

I wonder if you coal-mine managers, superintendents and auditors who were surprised to learn that the average earnings of all coal-mine concerns is less than 5 per cent. net, stopped to think of how much the total of small leaks in your own company contributed to this result? Maybe you took it for granted that your corporation was not a contributor because your last annual statement was very good looking. If so, YOU are the very man these remarks are intended to reach.

PROFIT BY THE MISTAKES OF OTHERS

Managing a mining enterprise or running a coal mine is very much like running your own business. You have a lot of experience, hear and read a lot about the other fellows' troubles, and get a world of advice; however, out of it all you take only what you like and use it. As your attention is called to leaks disclosed in the other man's business, such as payroll losses, storehouse shortages and accumulations of excess and obsolete stock, you think, "Well, we're all right there," and let it go at that. It's easy to get advice, but so hard to take it. The man who is profiting by the mistakes of others is hard to find. Those who prove that they can are holding down good jobs. If you find one running loose, it will pay you to hire him.

Take your payroll; it is the largest single item of your operating expenses. Have you ever considered that you ought to safeguard your timekeeper and your payroll in every possible way? Do you let your timekeeper make up your roll and pay it, too? If you do, change your method as soon as you can. It's asking too much of a man who usually doesn't draw a princely salary anyway to do this kind of thing month in and month out. It resolves itself into a condition where the plan itself insistently urges a man to become dishonest with little fear of detection. It isn't fair to the man to permit such a condition to exist, to say nothing of the possible loss to your business.

THE REMEDY

Don't let a timekeeper pay his own roll. Have some one check his work thoroughly, and have still another man do the paying.

Let us look at your supply house. Are you keeping any kind of daily, weekly or monthly inventory of what you are carrying? Is your stock classified so you can have statements drawn off which will exhibit the amount of material of any class on hand, average used per month and number of months' supply on hand?

You don't want to carry two kinds of packing of the same size and grade, do you? Maybe you'll find you are. Your new master mechanic won't use the brand of packing your former master mechanic liked, so he has put in a good stock of his particular brand. The old kind may stay on the shelves and deteriorate or rot. *The remedy for this*: Standardize your packing, along with a lot of other material which can be standardized, and make the soliciting agents go direct to your purchasing department when they want to sell you stuff.

Remember, it costs good money to keep a storehouse full of mine spares, especially in this day of costly electrical equipment. Excess stock will soon tie up a sum of money, the interest on which will pay the manager or superintendent who has learned how to avoid this—the kind of man who knows how to profit by the other fellow's mistakes.

APPOINT AN INVESTIGATING COMMITTEE.

Think it over, and don't dismiss this idea of getting after the small leaks until you have at least formulated a plan for discovering whether they exist in your business. *How can you do it?* One good way would be to appoint a standing committee of members of your departments, your storehouse keeper included. Frequent visits to the storehouse by a committee like this will bring to light stock that is in excess of requirements or apparently obsolete. The same committee may canvass other features successfully, such as the study of production figures, etc. Quarterly or semi-annual inventories of machinery and material inside the mine will also bring to light many items that may be used in such a way as to accomplish a real money saving.

[*This is an important subject. Cannot some of the* COAL AGE *readers tell us how they have stopped leaks in their own companies?—ED.*]

The gallery at the Rotherham rescue station in Yorkshire is so arranged that two teams may be at work at once, while the instructors, through a glass partition and door, can see exactly everything that is happening and ventilate at once in case of necessity; the equipment includes a powerful exhaust fan driven by electricity.

Applying the Methods of Scientific Management to Coal Mining

By H. Alexander Dean*

SYNOPSIS—There is no reason why scientific management, which has accomplished much in industrial works and processes, should not be applied with equal benefit to coal mining. An outline is here given of how this application might be made.

In an article entitled, "Does Bituminous Mining Pay?" published in Coal Age for Sept. 20, 1913, and reprinted in the *Electric Journal* for November, 1913, which attracted much attention and favorable comment at the time, A. E. Rickards, general manager of the Industrial Engineering Co., of Pittsburgh, said in part:

> To make a profit with the low selling price and the continual increase in the cost to produce coal is indeed a problem. One solution is to increase the output.
>
> Mr. Edward W. Parker states that "the present bituminous mines of the United States are capable of producing 600 millions to 700 millions of tons per year without opening another new working." To do this, of course, requires ample transportation facilities and plentiful labor supply.
>
> . . . From the foregoing it is seen that the capital account has reached such proportions that the future profits must be obtained through greater output and greater economies in the operation of the workings, and the investment must be kept down to a minimum.

The above quoted article is a lucid and powerful argument for the reduction of operating costs by the use of central-station electric power for all requirements about the workings.

The same reasoning and the same statistics, so far as they show a decreasing margin between cost of production and selling price of the product, are equally potent as arguments for the application of the principles of scientific management, which have been so successful in realizing economies in a great variety of manufacturing industries, to the mining of coal.

It is my purpose to sketch briefly a few of the most obvious practical applications of some of these well known principles to the operations in and about coal mines.

The latest available statistics of the coal-mining industry (those of 1912), give a total production of bituminous coal of 450,000,000 tons, with a total production cost per ton as follows:

Direct labor per ton	$0.5425
Indirect labor (day work)	0.2383
Salaries	0.0575
Supplies	0.1305
Royalties	0.0320
Miscellaneous expenses	0.0530
Total per ton	$1.0538

Assuming that as claimed by competent authorities, the output from the same workings might have been 600,000,000 tons, an increase of 33⅓ per cent., with little advance in the expenditures, let us see how this increase in output would affect the production cost per ton.

Direct labor and royalties probably would remain about as before, but the other expense items would show a reduction due to the increased output about as follows:

Direct labor per ton	$0.5425
Indirect labor (day work)	0.1790
Salaries	0.0432
Supplies	0.0978
Royalties	0.0320
Miscellaneous expenses	0.0400
Total per ton	$0.9345

This shows a decrease in production cost per ton of $0.1193, or 11.4 per cent., due simply to increase of tonnage produced.

The question is immediately asked by the practical mine manager as to the possibilities of getting out such an increased tonnage without large increases in operating expense.

The answer to this question in regard to the increased production of coal is the same as that given to plant managers regarding increased production of castings from a foundry or finished parts from a machine shop, viz.: *competent counsel.*

The practical mine manager is doubtless an expert as regards methods of cutting coal, getting it out of the mine and marketing the product. But counsel is necessary regarding the economical handling of labor; the planning in advance of work so as to avoid delays which invariably mean added expense; the setting, so far as possible, of standard tasks, and the payment of extra inducements to the workers for attaining these standards. The *square deal* on the part of the management toward the workers is essential that there may be harmonious coöperation instead of discontent, insubordination and distrust.

Production Must Not Be Interrupted

The mine must go on producing coal while these various innovations in the management methods are being worked out, and in order to save time and expensive mistakes in starting the work, a competent efficiency engineer should be employed to take charge of the new work and organize a production department, which will, in time, become a permanent part of the organization.

It is a fact verified by reliable investigators in thousands of observations, that the manual laborer seldom, if ever, delivers over 60 per cent. of the output of work of which he is reasonably capable, unless some special provision is made by the management for rewarding him for the extra effort and for avoiding delays in the continuity of his work.

Hence arises the necessity for a production department, which shall plan the work for each man or gang, standardize as far as possible the tasks to be performed, record the individual performance of workmen under these standards, and see that the workers receive a proper share of the benefits that accrue from the increased production.

In the first place production is kept far below the possible maximum by the lack of advance planning of the work in the mine. Each day a plan sheet should be prepared covering the proposed operations in the mine for the succeeding day, which plan sheet should show the number and location of each working chamber or room with the name or check number of the miner working therein, and the allotment of cars for that day.

In a large mine the workings may be divided into sections of a convenient size, and a plan sheet made out for each section.

A service card containing the above information should be issued to each miner as he enters the mine and stamped with the time of starting work. This should be taken up when the miner comes out, the clerk stamping on the card the quitting time and entering the number of cars reported as loaded by the miner, as a check on the reports from the tipple.

After the plan sheet is made out, the next item in im-

*Sewickley, Penn.

portance is a cutting schedule for the machine men, which should be arranged by the pit boss in such a manner as to be most economical of time in the movement of the cutting machines from room to room.

The next point in order is the preparation of a car-delivery schedule, which should be worked out in detail so that each working room receives its proper quota of cars as needed, taking into account the operations of the machine-cutting gangs, for it is obvious that no cars will be needed at a room during the hour that the cutting gang is working there.

This schedule distribution of cars should be handled by a car dispatcher, located where the trips of empties are made up, and he should have before him constantly a dispatching sheet, on which to note down the cars sent in to each room and the number of loaded cars brought out by the haulage men. The haulage crews should receive from the dispatcher instructions as to the disposition of each trip of empties taken in.

This plan properly worked out as to details will give the maximum use of the available cars in the mine insuring that the miners in the working chambers are supplied with cars at regular intervals and in sufficient number, and above all it should provide a constant and ample stream of loaded cars at the foot of the hoist, or at the dump, so that alternating periods of congestion and idleness will be avoided.

The car dispatcher's tally sheet should record all the trips of the haulage crews, showing time started, number of empty cars taken in, with their destination, time returned, number of loaded cars brought out, elapsed time for the trip, and causes for any delays.

A constant check on the work of the haulage crews with the necessity for adequate explanation of all delays will work wonders in securing promptness and continuity of service in this all-important division of the work.

A thorough study of the work of the cutting-machine gangs will soon enable the production supervisor to standardize their operations and offer a bonus inducement for saving time, particularly in moving from room to room and in setting up their machines, thus securing a greater output from these productive units.

The method so far outlined will, if developed and applied with care and judgment, result in large increases in the output of the workers, who are primarily responsible for the amount of coal produced, and the same careful study devoted to the use of the nonproductive labor about the workings will reveal many opportunities for savings.

All material and supplies should be kept in the charge of a storekeeper and issued only on requisition signed by a responsible authority, and stating the use for which the supplies are drawn and the account to which they are to be charged.

In order that the mine manager may at all times keep in close touch with the production costs in his mine, he should receive, at least once a week, a statement from the cost department, showing the following details of operation:

(1) Number cars coal hoisted.
(2) Number cars slate hoisted.
(3) Tons of coal shipped.
(4) Mining labor per ton.
(5) Inside nonproductive labor per ton.
(6) Tipple labor per ton.
(7) Repair labor per ton.
(8) Power-plant charges per ton.
(9) Supervision and office per ton.
(10) Materials and supplies per ton.

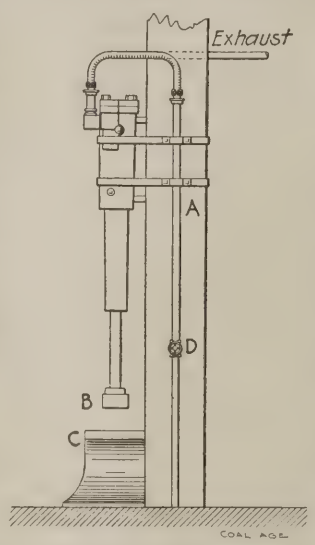
The manager should himself plot these results on graphic charts, so that the relation of these items in his cost of production are brought sharply to his attention and any undue rise in any item may be immediately investigated and the cause remedied.

The practical working out of the system, as outlined above, will not require the addition to the payroll of a large number of nonproductive clerks or timekeepers, or the introduction of large quantities of useless red-tape, but, on the contrary, can probably be worked out by utilizing men already on the payroll, simply by changing the character of the work they are doing, under the direction of a competent efficiency engineer.

A Novel Steam Hammer

One of the important elements that enter into the successful operation of a coal mine is the ability to utilize material that has outlived its usefulness in the place or for the work it was originally designed to accomplish.

An example of this recently occurred at our mine, in the adaptation of a discarded coal puncher for use as a steam hammer, in the blacksmith shop. A large coal-punching machine, which was no longer needed in the mine, was taken into the shop on the surface, where it was strapped and bolted to an upright beam or pillar *A*, as shown in the accompanying sketch. A tool-steel hammer head *B* was fitted to the end of the cutter shaft and an anvil *C* placed underneath this to receive the blows.



COAL PUNCHER USED AS A STEAM HAMMER

This improvised steam hammer was found to be very powerful and proved the means of saving much time and labor. The hammer is operated by steam from the boiler house and its action controlled by the small globe valve *D*. I thought that this item might be of interest to some coal operator who may find it of advantage to make similar use of a discarded machine.

BY THE WAY

Saving is a greater art than gaining.

It is better to do well than to say well.

The way to be safe is never to feel secure.

The man that parleys has half surrendered.

It's foolish to try and fly like an eagle with the wings of a wren.

He who has lost his reputation, is a dead man among the living.

It's unfortunate when a man's palate has quicker sensations than his heart.

Prosperity tries the human heart with the deepest probe and brings forth the hidden character.

Coking Possibilities from Different Viewpoints

By H. S. Geismer*

SYNOPSIS—Notes on the methods, troubles, misunderstandings and squabbles of those who furnish the coal, those who make the coke and those who employ it in metallurgical processes.

The man in charge of a coking operation can appreciate the expression "between the Devil and the deep blue sea."

Between the blast-furnace manager who is calling for better and cheaper coke and the coal-mine manager, who is always calling for better weights and less rigid inspection, he finds his time well occupied. Even where one operating company has charge of the mines, ovens and furnaces, disputes are not entirely eliminated, but, under such circumstances, it is at least possible to arrive at the most economical basis for the combined operation.

To intelligently criticize the results obtained from any coking operation, three tabulations are required: "A," cost; "B," yield; "C," quality.

In what follows when we refer to cost, we mean total cost of coke, including that of the coal used: by yield, we signify yield of coke expresed as a percentage of coal charged.

In judging a coking operation, three different interests must be considered:

1. The blast-furnace man who uses the coke; he is principally concerned with quality.

2. The plant manager, who has charge of manufacturing the coke; he is principally concerned with cost. His cost, however, is largely a question of yield.

3. The coal-mine manager, who furnishes the coal to the ovens; he is principally concerned with the yield since his tipple weights are largely judged by tons of coke produced, especially when there is no chance to check coal weights as charged to ovens. As a matter of course, the quality of coke depends largely upon the quality of the coal furnished, but the mine manager dodges that issue whenever possible.

As most coke complaints originate at the furnace, we will consider the furnace-man's troubles first:



An Alabama Coking Operation

At a certain furnace plant, a coke was tried that, according to analysis, should have given fairly good results, but it was noticed that whenever the admixture of this fuel in the furnace exceeded 50 per cent. of the coke charge, the furnace began to "stick." The manager suggested that in some way, this coke was evidently running up the percentage of alumina in the burden. An analysis of the ash in the coke was then made and the percentage of alumina was found to be extremely high.

Since the alumina in a coke can only be introduced through ash in the coal, an investigation was begun at the mine and it was found that the coal was not being properly prepared. Much slate was being loaded by the miners and the washer was not giving a good product. After correcting these evils, the coke produced gave satisfactory results in the furnace.

At another time, at this same furnace, the coke con-

*Birmingham, Ala.

sumption (pounds of coke required per pound of pig iron produced) began to climb, and careful examination of this fuel, as it was being unloaded from the railroad cars, indicated that it contained a large percentage of spongy ends and jamb coke, as well as too much breeze and pieces of firebrick. Such irregularities are supposed to originate only at the ovens and the investigation was continued to that point of the company's property. Strange to say, most of the blame was not chargeable in this case to the coke-oven superintendent.

Too Much Rash Made Spongy Coke

It was found that the coal, as charged to the ovens, contained a large amount of rash and "mother coal," and these impurities did not unite with the rest of the charge to form a firm coke, but produced instead spongy masses that were easily broken up into small pieces of breeze. These inferior masses of coke were very noticeable around the door jambs of the ovens. The mine superintendent tried to lay the blame on his washer man, but it was found that the washer would not eliminate a large percentage of the impurities.

Rules were then adopted, putting it up to the mines to leave these impurities underground. Of course, it is not possible to depend upon miners to load absolutely clean coal, but enough improvement was accomplished to make a marked difference in the quality of the coke.

After the blast-furnace management became satisfied with the quality of the coke, the company auditor began to ask curious questions about the cost thereof.

High cost of coke may be chargeable to several different conditions, but generally, low yield is the governing factor.

Charles Catlett contributed an excellent paper to the American Institute of Mining Engineers, at the New Haven meeting, in October, 1902, which covers the question of yield very fully, and Newell G. Alford, in his paper in Coal Age, of June 7, 1913, also brings out several points bearing on this phase of coke making, but in this particular instance, the high cost was simply a book-keeper's cost. It was found, after careful investigation, that the ovens were being charged with very wet coal (13 per cent.), while only 4 per cent. was being allowed for moisture content. This shifting of the figures did not help the final cost of coke, as chargeable to the furnace, but it put the blame where it belonged.



Loading Coke Into Cars with Automatic Shovel

Occasionally differences arise between the coke-oven and the blast-furnace men, as to what constitutes best practice. For instance; some furnace men prefer 72-hr. coke, while others prefer 48-hr. Now it is quite possible that while the furnace man prefers the 72-hr. coke, the superintendent of the ovens might find it more economical to produce 48-hr. coke.

Again, the blast-furnace man will always contend for the lowest possible limit to ash in coke, because every per cent. of ash that he succeeds in eliminating from the

fuel, cuts down his cost on pig iron approximately 25c. per ton. But it is possible to overdo this. Sometimes it is better to leave a little more ash in the washed coal rather than introduce an undue waste, in an effort to obtain too low an ash in the washed product.

When one company controls the mines, ovens and furnace, it is easy to arrive at the most economical basis for the handling of the combined operation, and it is then simply a question of "laying down the law" to the various operating heads, but, under different conditions there will always be more or less wrangling. All parties cannot be satisfied.

From the standpoint of the coking superintendent, the question of uniform operations and output is of supreme importance, yet he can get little sympathy from the blast-furnace man in this matter. When the blast furnace begins to "act up," and refuses to take its burden, it is much easier to stop the supply of raw material at its source than to begin work on the stock piles and the coke-oven men receive orders over night to bank ovens.

This constant banking and starting adds a considerable amount to the cost sheets of many coking operators, besides affecting quality by increasing ash in the product. At times the delays call for more than "banking," and in that case the expense of firing up the ovens brings about even more serious additions to the cost sheet.

Rules for Good Results in Firing Up

There are several different methods of firing up ovens. The following instructions, written out a number of years ago, have always been found to give good results:

Preparation—Have all wood and kindling in place on yard. Begin at midnight to put fire in the ovens.

Method—Put up half door, leave hole in bottom about 6 in. square. Put in two ties as a sort of flue, extending on the bottom of the oven toward trunnel head. Build fire opposite hole in door and between ties, using plenty of kindling, enough to fire coke. Use plenty of coke, a cart-load or two (black jack will answer), placing just inside of door, on top of kindling.

When coke is well caught up, which may take four or five hours, charge with 5½ tons of coal. Level this and then put in all the old ties or other wood you can get in at the door. Put up the door, sealing it tight where you usually draft, but leave two holes level with the top of coal in the ovens. This will give a draft at bottom for the kindling and coke and a draft higher up for the ties after ignition. There should be a competent man to keep these holes cleared out as ashes form.

When the coal has fired as it should and it is considered safe to do so, seal the three holes and draft at top of door, only the latter must be much lighter than usually given to ovens in service. Someone used to drafting and with some judgment is needed here. Many of these ovens, nearly all of them, will burn in all right, giving no more trouble and making good coke, but some will need the crust broken and other attention. We usually blame this on the man looking after the ovens, but the truth is that some ovens will do well and others the reverse.

Even Loading May Become a Bone of Contention

Determining the best method for loading coke from beehive ovens presents another problem for the coke-oven superintendent and in this he again comes in conflict with the blast-furnace manager.

There are two things to be considered—labor and waste.

The four photographs show four different ways of accomplishing this work. The old original method of hand forking and throwing each forkful up over the side of the car, probably yields the best results considered from the viewpoint of the blast-furnace man, as it gives him clean coke almost free from breeze.

But this method is far from satisfactory to the coke-oven operator. It introduces an acute labor problem since it is becoming more difficult each year to keep a complement of coke pullers, and furthermore the waste of fine coke with the breeze is always noticeable.

The photograph showing the runway suggests a method that overcomes, to an extent, the shortage of labor, as one good coke puller can use two ordinary laborers to wheel up the coke and thus accomplish as much as three trained men. This method also reduces the loss of fine material



A Modern Coke-Loading Machine at an Alabama Plant

and breeze, as the coke can be dragged directly from the oven door into the iron wheelbarrow, thus avoiding one handling. Here again the blast-furnace manager will register a kick if the men are not closely watched to prevent ashes and breeze being loaded.

One runway will serve seven ovens. The top of platform is so arranged that the wheelbarrow will dump over the top of car sides without an effort on the part of the laborer.

This brings us to a consideration of the third party—the coal-mine superintendent.



A Runway Can Be Made to Serve Seven Ovens. This Effects a Considerable Saving in Labor

As a rule, the coal-mine superintendent gets little credit for improvement in coke, and yet the quality is almost entirely dependent upon his product. The only possible way to keep peace between the coal man and the coke man, is to eliminate all guesswork in computing their weights and then base price entirely upon quality of coal delivered.

Where one company operates both the ovens and the mines, the mine official should be given his share of the credit whenever quality of coke is improved.

The Ohio Labor Situation

Nothing has been accomplished towards negotiating a wage scale for Ohio mines. Conferences between operators and miners started June 23 and lasted for the greater part of last week. After failing to reach an agreement, operators from Eastern Ohio and Cambridge withdrew, saying that it was useless to confer longer. The best that the eastern operators would offer was 41.12c., and this the miners refused point-blank to accept.

After their withdrawal, operators and miners of the Hocking Valley, Jackson, Crooksville, Pomeroy Bend and a part of the Bergholz districts resumed negotiations. The operators, after a general meeting, offered a scale of 44.61c. for machine-mined coal on the mine-run basis. This was made in the form of an ultimatum and was refused by the miners. The final conference for the week was held June 27, and an adjournment *sine die* was taken.

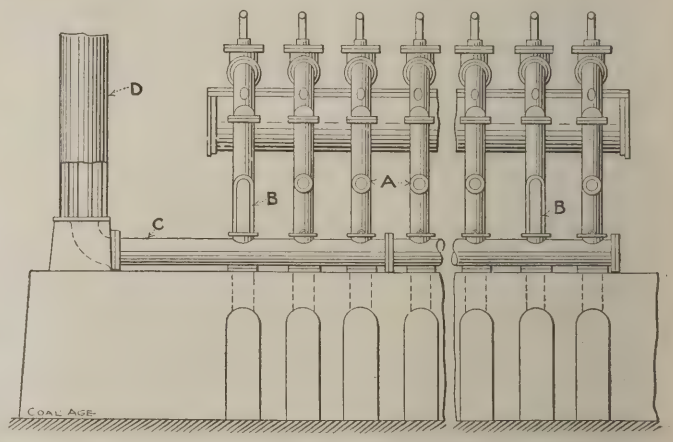
Senator William Green, author of the mine-run law, hearing of the adjournment, rushed to the meeting and succeeded in having that action rescinded and an adjournment until 10 a.m. June 30 was taken.

Operators in every section of the state have little hopes for an early adjustment of the wage question. The miners' officials have a firm hold on the rank and file, and, despite certain dissatisfaction, are holding them in line. It will probably be necessary to have another general miners' meeting before a less scale than 49.64c. will be accepted by the miners.

Device for Rendering Coke Oven Gases Harmless*

At the Colonial shaft of the Mansfield mine in Langendreer, Germany, experiments have been made with a process for rendering harmless the vapors and gases escaping from byproduct coke ovens when they are charged. Since the results of the trials have been good in every respect, the works management has arranged for the installation of this device for a group of fifty ovens.

As shown by the accompanying figure, the riser pipes are each provided with a branch, *A*, which, whenever the several chambers are to be charged, is put in communication, through a sheet-metal bend *B*, with the horizontal conduit *C* over the ovens. This conduit ends in a furnace *D*, about 30 ft. high, in which the vapors and gases, as they pass through, inflame and are consumed. The draft caused by the high temperature is so strong that gases are sucked in from a distance of about 170 feet.



Sketch of the Waste-Gas Consumer

Electrification of the Bearcreek Coal Field in Montana—One of the most important new deals just consummated is the entry of the Montana Power Co. into the Bearcreek coal field in the southeastern part of the state, to supply the mines and towns with electric power and light. This is one of the leading coal fields in Montana. The coal mines at Sand Coulee and Stockett, a few miles from Great Falls, have for some time found it cheaper to buy hydro-electric power than to utilize their own boilers and coal for steam, but the Bearcreek district is the first instance in the history of the world where electric power has been shipped any considerable distance to supplant steam power at coal mines themselves. The Bearcreek field is being reached from Billings by a 60-mile line, which will tap Joliet, Fromberg, Bridge and Bearcreek. The power will come chiefly from the new Great Falls plant, some 300 miles distant. It is expected that 4000 to 5000 hp. will be consumed in the Bearcreek district by 1915, netting the Montana Power Co. approximately $100,000 per year.—"Boston News Bureau."

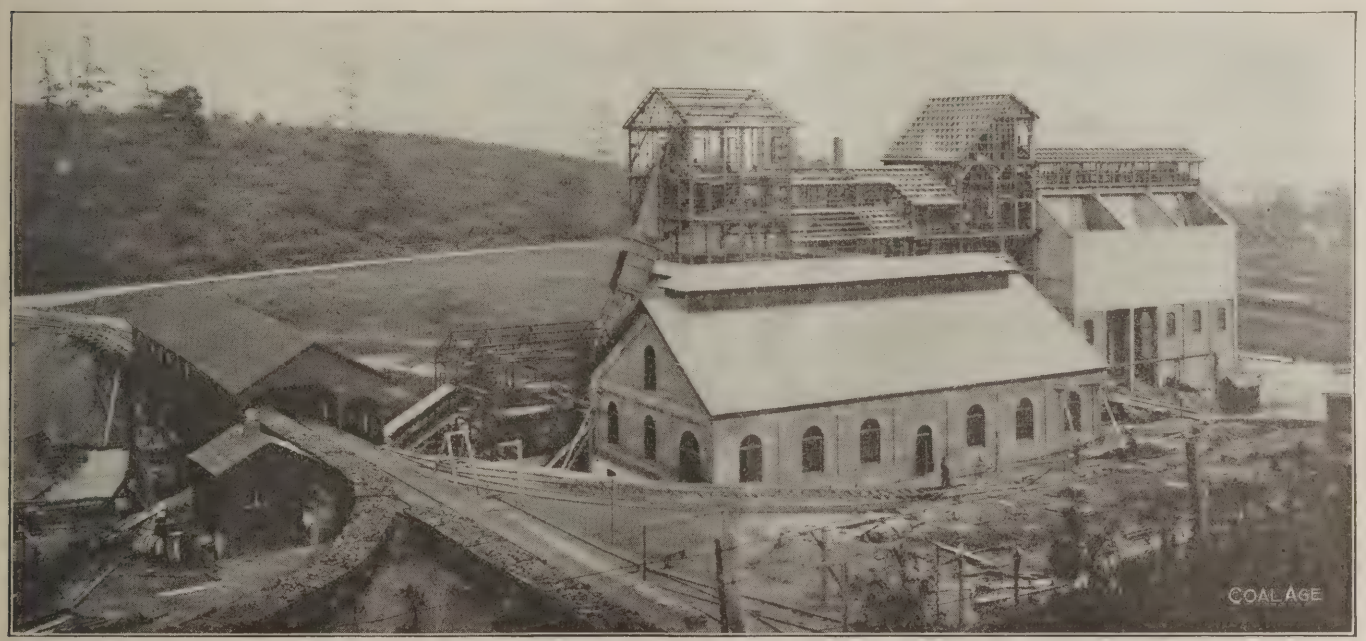
*Translated from "Glückauf."

The Huron Plant of The Keystone Coal Company

By Edward Colston Taylor*

SYNOPSIS—The efficiency of the Huron washery plant is exhibited in the excellence of its washing, in the small number of men employed, in its freedom from breakdowns and the speed with which such difficulties are corrected. In regard to the former, which the author does not treat, it said that less than 4 per cent. of what should be re-wash coal, as determined by the float-and-sink test, finds its way to the refuse pile. Three men run the washer and rewashers which handle 150 tons of coal per hour and 13 men operate 100 Belgian ovens. Three men take care of the boiler house, the ashes being removed by flushing with water.

The Huron plant of the Keystone Coal & Coke Co. is situated on the Alexandria Branch of the Pennsylvania R.R. The shipping point is Dundale, and the post office New Alexandria, Penn.



View of Plant as Seen from Above the Drift Mouth

The coal seam is the Pittsburgh, with an average height of 7 ft. 2 in. This is a good steam coal and burns into excellent coke.

The washery and coking plant were put into operation in 1910 and have been in continuous service ever since; the coke commanding a ready market even in dull times. Beside furnishing washed coal for the ovens, the washery prepares fuel which is shipped for use in byproduct ovens and for smithing purposes.

The original mine opening was made in 1899 by the Huron Coal Co., which built the present tipple and dwelling houses, but shipped only run-of-mine coal. In 1907 the Keystone Coal & Coke Co. acquired the property and immediately began to plan for the erection of a washery and coke ovens.

*Superintendent, Keystone Coal & Coke Co., New Alexandria, Penn.

Two Plants with a Single Supply House

The workings and plant being adjacent to the Salem mine of the same company, the two plants were put under the same management, so that full advantage could be taken of the experience gained at Salem in washing and coking this coal and in the handling of such equipment as the management intended to use at both operations. Salem being equipped with a complete machine shop and an efficient supply warehouse and storage yard, there was no necessity of duplicating this equipment at the proposed workings. The same office force by the addition of one man handles the mine records for the two places.

From the autumn of 1907 until the autumn of 1909 nothing in the way of construction was attempted. During this time the management gave close attention to the operation of the Salem plant with a view of determining any changes which might be desirable in designing the new plant, in visiting other plants in this and other fields and in working out tentative plans. The information thus acquired was of inestimable value in working out the design.

It was the desire of the management if possible to produce a plant which would be a model of efficiency and at the same time which embodied no radical departures from conservative engineering. They desired to depend on the careful working out of details along well established lines.

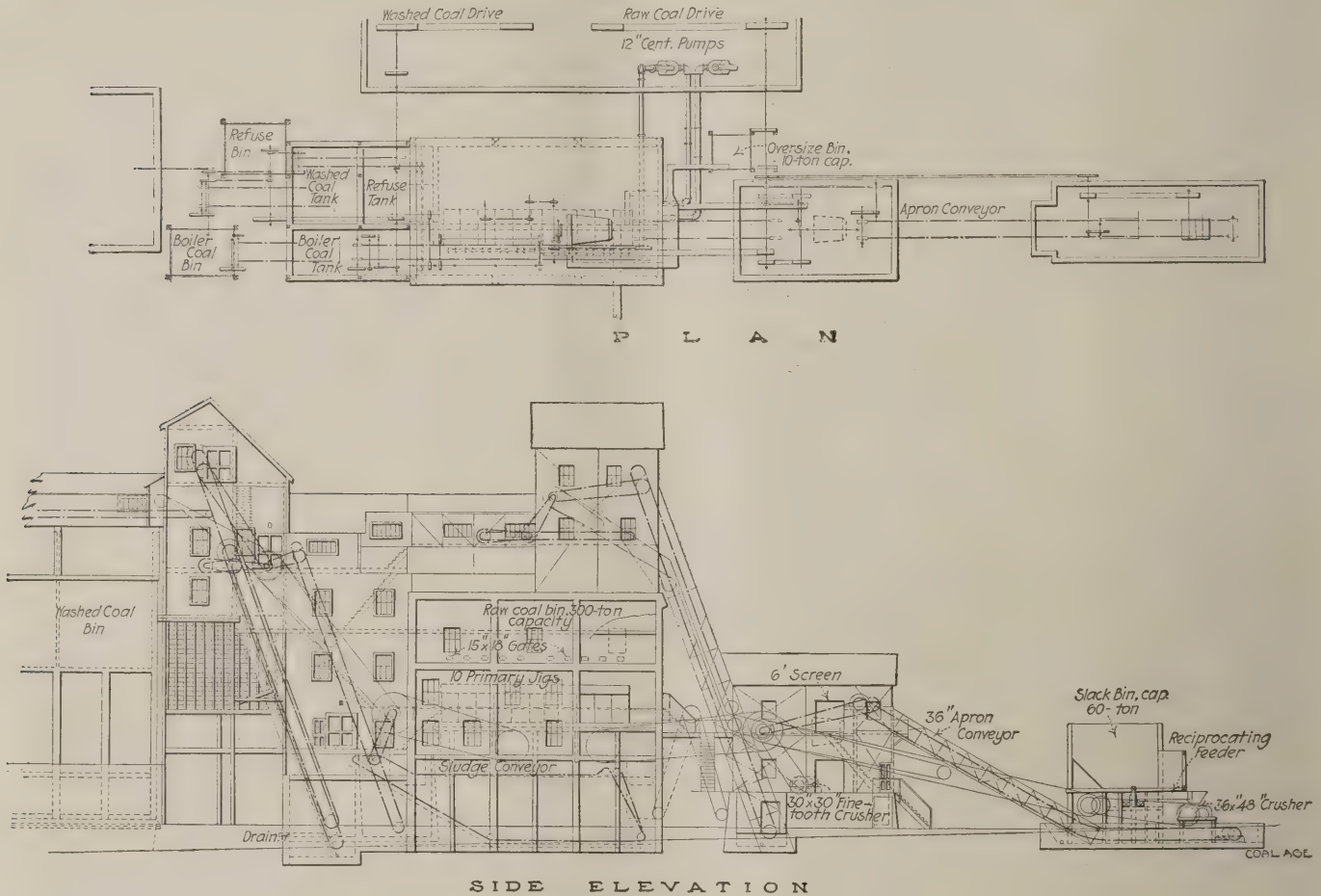
Eliminating and Anticipating Breakdowns

All buildings are well lighted and ventilated. Especial attention was paid to insure the accessibility of all machinery for repairs and to insure the comfort and convenience of all workmen. All machinery was designed

just large enough to insure the longest possible life in performing a given amount of work.

In the washery, stairs of easy slope are provided and safe-guarded by substantial railings. Windows are so arranged that there are no dark corners in the whole structure. The building is heated throughout with steam.

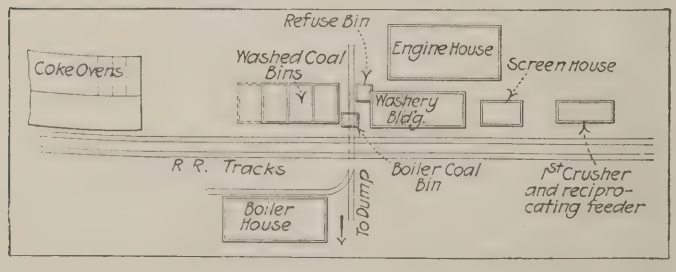
All the heavier machinery is provided with special breaking pins which are easily replaced and thus many disastrous wrecks are avoided. All elevating and conveying machinery is large and heavy, so as to be slow moving for a given capacity. Where any two or more like pieces of machinery were required of nearly equal capacity,



General Plan and Section Elevation of the Huron Washery

Every floor is provided with water lines for fire protection and for convenience in washing out the building.

All dusty places are sealed off, but at the same time left light and roomy so that in case of making repairs there are no casings to tear out nor close places in which to work. Around the heads of all elevators ample space is provided, the flooring around these places being sufficiently heavy to bear the weight of any repair parts. Care is also taken to provide ample light in such places and beams are projected from the building above every part which may need replacing, so that the heaviest machinery may be lowered, and repair parts hoisted into place in a few minutes.



General Plan of Plant

units of the same size were chosen so that the equipment is standardized and fewer repair parts need be carried in stock.

A Three-Man Washery Plant

The benefit derived from this careful and generous design has been marked. The washery easily has a capacity of 150 tons per hour. The washery proper is operated by two men, one man on the jigs and one man for oiling and general inspection of machinery. The only other man connected with the direct operation of the washery is under the tipple; he attends to the crushing and screening plant.

Although a complete stock of repair parts is provided, few replacements have been necessary. The machinery was furnished and the washery erected by the Link-Belt Co.

The raw coal is crushed so that the largest size passes through 1¼-in. round perforations. It is then elevated to a 300-ton capacity reinforced-concrete storage bin, which is a part of the washery building. From this bin the coal is fed into a battery of 10 jigs by means of revolving feeders. The washed coal is sluiced into a large elevator boot. The water from this boot is drawn off in a

thin stream, every effort being made to insure settling. Though 150 tons of coal per hour is taken out of this boot, 12,000 gal. of water are drawn off in the same time with the loss of only such material as will pass through a 60-mesh screen.

The Inferior Coal Is Saved for the Boilers

The primary refuse, consisting of 10 per cent. of the product, is sluiced to two rewashing jigs, which take out about half of the material for plant fuel and throw one-half into the final refuse elevator boot. The water from the boots of the elevators which lift refuse and washed coal, respectively, is sluiced into a large settling tank provided with a slowly moving scraper, which recovers the sludge below 60-mesh and places it in an elevator boot, where it is mixed with the best product from the rewashing jigs, and thence is elevated and sent to the boiler house for fuel.

The water is circulated by means of a centrifugal pump furnished by the Blackall & Baldwin Co. This pump is set in the cellar of the main engine house. The washed coal is stored in reinforced-concrete bins divided into six compartments, each of 200 tons capacity. Thence it can be run into the charging larry for the ovens or direct into railroad cars for shipment.

Almost Entirely of Fireproof Construction

In the construction of the washery building, various materials were used to meet each special condition. In the dry coal or preparatory end, structural steel was used set on heavy concrete foundations, this being advisable on account of the rapidly moving machinery. In the central portion of the building, where are located the settling tanks of concrete and the jigs and the raw-coal storage bin, reinforced concrete was used.

The wet-coal elevator towers are of yellow pine and made a part of the main building. The reinforced concrete was erected by the Baltimore-Ferro Concrete Co. The structural steel and frame part of the building is covered with Asbestos Protected Metal, as is also the roof.

The original tipple was left standing unchanged except for the additional bins and the crushing and conveying machinery for handling the washery coal. It is of frame construction, equipped with a Phillips cross-over dump. The mine cars which hold 1½ tons are fed to the dump by gravity and the empties run away in the same manner.

The coal is hauled outside by one 15-ton and one 10-ton General Electric locomotive. Six men and boys man the tipple.

Boiler-House Economies and Appliances

The boiler house is of brick with steel roof trusses, the roof covering being asbestos protected metal. The equipment of the boiler house consists of two 300-hp., class E Stirling boilers, equipped with McClave shaker grates and Argand blowers. The boiler house is set in a hollow across the railroad tracks from the other buildings of the plant. This was done so that the fuel could be delivered in mine cars or in special dump cars from the washer at sufficient height to allow of ample storage and so that the wet washery fuel may have steep slopes to slide on.



The Huron Power House, Washery, Boiler House and Coke Ovens in Process of Construction. The Tipple Is Seen on Left in the Rear

Advantage was taken of a small stream in the hollow, the water from which is passed under the boilers. Aided by some fresh water it flushes the ashes away without handling. The feed pumps and feed-water heater are set in a wing of the boiler house sealed off from the main building. There are two single-plunger Yough feed pumps, 16x8x18 in., one of which is held in reserve. The heater is set high above the pumps and is of open type 1200 hp., and was furnished by the Platt Iron Works.

In this room is also set a small Ingersoll-Sergeant air compressor, which operates a Lagonda boiler-flue cleaner. The water forms a scale so that it is economical to clean boilers about once every six weeks. The fuel from the washer is sufficient to supply requirements at all times, no run-of-mine coal being used. Two firemen in daylight and one at night man the boiler house. Space is provided for two additional boilers.

Engine House

The engine house is set parallel and adjacent to the washery and is of brick with steel roof trusses, covered with slate. In this building is located one 150-hp., 250-volt Westinghouse direct-current generator, which furnishes all power for mine and coke yard. Two 200-hp. Erie City twin engines drive separately by means of rope transmission and shafts through the washery building the dry coal or preparatory machinery and the wet coal or actual washing equipment. The engine, which drives the washing machinery, also drives the circulating pump mentioned above. There is space in this building for two additional generators Thus practically all the power for the plant is developed in the one building and is tended by one man. When the generator has to be run at night the plant watchman attends it.

Repair Shop

The carpenter and blacksmith shop is the original frame building, equipped with a 7½-hp. motor and light shafting for small drills, saws, etc. The repair men are in charge of the master mechanic and consist of one machinist, three carpenters and a blacksmith and helper. A considerable part of these men's time is taken up in filling temporary vacancies of regular men in other parts of the work. The carpenters are also used at the Salem plant in emergencies.

Belgian Ovens Discharged and Coke Loaded by Machinery

The coking plant consists of 100 Belgian ovens, 5 ft. wide by 34 ft. long and 8 ft. high at the crown. The brick for these ovens were furnished by the Harbison-Walker Refractories Co. The frames of the doors are of cast iron and are lined with firebrick furnished by Hay & Rule. The charging larry was supplied by the Phillips Mine & Mill Supply Co., and was specially designed for the safety and convenience of the charger. The coke is watered by a machine, designed and built at the plant. This machine quenches 50 ovens in 8 hours with one attendant.

The coal charged in an oven is leveled by a machine in 2 min.; the ram pushes out a charge of coke in 1½ min. A pan is set at the opposite end of the oven to receive the charge of coke. This pan is provided with a screen set 12 in. off the bottom, which allows the ashes and breeze to drop through. A gantry crane picks up the pan and dumps the contents into the railroad cars. After every fourth oven, the ashes are dumped into mine cars running on a track on the yard.

Thirteen Men Run One Hundred Ovens

The leveler, pusher and loader were furnished by the Alliance Machine Co. When fully manned, this machinery is capable of handling 100 ovens per day, or an average of 600 tons. There being at present only 100 ovens, or 50 to draw each day, the labor force had to be arranged so that the men double up on machines. The man who runs the crane also runs the larry; one man runs both the leveler and the ram. In this way the labor cost is low. The total force consists of 13 men, including the foreman, a coke burner, a mason and an attendant.

Water is supplied from a large reservoir 5 miles away, the storage capacity of which is 300,000,000 gal. The water flows by gravity to the Salem plant and is pumped thence to storage tanks above Huron.



View of Power House, Washery and Storage Pockets



Float Demonstrating Washer Constructed for Greensburg Centenary

New Coaling Equipment on the Great Lakes—The formal opening of the $2,000,000 docks and terminals of the Hocking Valley R.R. is scheduled for July 1. The docks are built entirely of concrete and have the largest coal and ore handling equipment at this end of the lakes. With the opening of the docks, the Hocking Valley will have many times its present coal and ore handling capacity. It will therefore be prepared to meet the increased coal tonnage when the Chesapeake & Ohio builds its proposed line from Portsmouth to Columbus, thus giving it the shortest route from the coal fields of West Virginia and Kentucky to Toledo.

The proposed new route of the C. & O. will parallel the tracks of the Norfolk & Western but according to the published announcement the former will not compete for the local traffic, the extension being used only for through traffic. When the new docks are opened the Pennsylvania will take over the dock machinery and other equipment on lower Summit St., heretofore used jointly by the two roads. The new terminals and docks of the Pennsylvania Co., at Sandusky are expected to be ready for use by July 15. A force of 400 men are now busily at work on these improvements. In making room for the new tracks it was necessary to make a fill nearly a half mile long and 20 ft. deep. Seven tracks are being laid to the new loading machine, five for loaded cars and two for empties. All the time the work of improvement has been going on the docks have been used to their full capacity. When the new docks are completed the capacity will be trebled. The present dumping machine has a capacity of a car every three minutes while the new one will handle a car every minute and a half, the two machines taking a car a minute or a train of 60 cars every hour.

The opening of the new Wheeling ore hoists at Huron has been delayed because of defective parts found in the machinery. Under hydraulic pressure, defects, due to sandholes in the casting developed and it was necessary to dismantle part of the structure and the new parts are now being awaited.

Development and Present Status of Byproduct Coking in the U. S.

By W. H. Blauvelt*

SYNOPSIS—Byproduct coke is forging rapidly to the head, the production more than doubling during the interval from 1909 to 1913. Some of the enormous losses incident to beehive practice. Popular misconceptions regarding the high first cost of the byproduct ovens, and inferior quality of the product. American practice excels European.

The first byproduct coke in America was pushed from a plant of 12 Semet-Solvay ovens in Syracuse, N. Y., in December 1892, and the following year 12,850 tons of coke were produced. The following table shows the growth of the industry since that time in short tons:

Year	Beehive Coke	Byproduct Coke, Short Tons	Byproduct Coke, % of Total
1893.....	9,464,730	12,850	0.14
1901.....	20,615,983	1,179,900	5.41
1907.....	35,171,665	5,607,899	13.75
1908.....	21,832,292	4,201,p26	16.14
1909.....	33,060,421	6,254,644	15.91
1910.....	34,570,076	7,138,734	17.12
1911.....	27,703,644	7,847,845	22.07
1912.....	32,868,435	11,115,164	25.27
1913.....	33,596,669	12,714,700	27.45

The tonnage of byproduct coke produced in 1913 is over twice that for 1909. On the other hand, the production of beehive coke in 1913 was exceeded in the years 1907 and 1910.

Losses Incurred in the Beehive Oven

The waste of coal in the manufacture of coke has long been a reproach to this country, as compared with some of the European countries, and long after Germany had practically forgotten the wasteful beehive oven, a large percentage of the coke made in the United States has been produced by that process. Not only does the beehive oven destroy all the byproducts, gas, tar, ammonia, etc., but it also produces a smaller yield of coke.

Taking the average value per ton of the coal coked in the beehive oven, as given by the United States Geological Survey for the year 1912, $1.01 per ton, the loss of coal values that may said to have been destroyed in the beehive oven during the six years ending with 1912 amounted to $42,110,000. Using the United States Geological Survey figures again for the value of the byproducts, the total return from the byproducts that would have been recovered if this coke had been made in byproduct instead of beehive ovens, would have been $266,700,000. This makes a total waste in the six years of $308,810,000, or an average waste per year of over $50,000,000 of the country's mineral wealth. This enormous waste is a most serious matter from the point of view of the conservation of our country's resources, yet it is gratifying to note the rapidly increasing percentage of coke produced in the byproduct oven, so that this economic loss bids fair to be eliminated before many years.

To an owner of deposits of coking coal it is interesting to note the Geological Survey's statement that the average yield of coke from coal in byproduct ovens in 1912 was 74.9 per cent. and in beehive ovens 64.7 per cent., a difference in favor of the byproduct ovens of 10.6 points, or 16.4 per cent. In the coking of low volatile coals, such as those obtained from the Pocahontas field, this difference is even greater. The actual yields of coke from Pocahontas coal in the beehive oven are usually not over 60 per cent., while in the byproduct oven the yield is 80 per cent. or more. This means that any given acreage of coking coal of this quality will yield one-third more coke if byproduct ovens are substituted for beehives; or, if a given acreage will supply a blast furnace with coke from beehive ovens for 20 years, the substitution of byproduct ovens will add 6⅔ years to the life of the acreage.

Cost of the Byproduct Oven

It has been the general impression in many places that byproduct plants are very costly. A high authority, familiar with both beehive- and byproduct-oven practice, has worked out the following comparison from a careful analysis of many installations. In a coking field like the Connellsville, or other fields where the coal is well adapted to beehive oven conditions, the cost of a complete plant of beehive ovens, including all the accessories of railroad sidings, water supply, workmen's houses, etc., would be somewhat less than the cost of a byproduct-oven plant correspondingly equipped. In the Pocahontas district, on the other hand, where the coking process in the beehive oven is more wasteful, the byproduct plant can be installed at a smaller cost than the beehive.

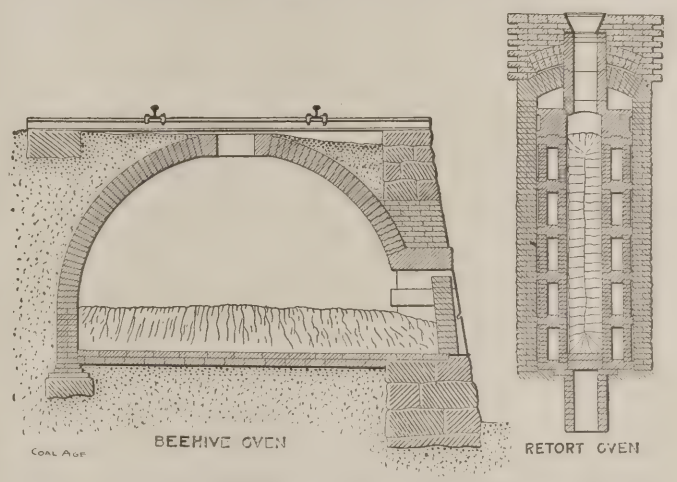


Fig. 1. Coke Structure in the Beehive and Retort Oven

There are now between 40 and 45 plants of byproduct ovens in the United States. In almost every case these plants are located at the point of consumption of the coke, rather than at the coal mines, as distinguished from the almost universal practice with regard to beehive plants. This fact, together with the very general practice in byproduct ovens of mixing two or more coals for the purpose of making a better quality of coke than could be made from either of the coals alone, has made available for coking purposes many coal deposits which could not otherwise have been utilized. As a result, many coal deposits are now recognized as yielding excellent coking coal which were formerly not so rated.

*Consulting engineer, Semet-Solvay Co., Syracuse, N. Y.

A Comparison of Byproduct and Beehive Cokes

The process of coking coal in beehive and byproduct ovens differs in one essential particular. The beehive oven is a circular chamber with a dome-shaped top, which gives the oven its name; it is usually about 12 ft. in diameter and 6 ft. high. The coal is charged into the oven through a hole in the top and levelled off into a layer about 30 in. deep. The coal is fired from the heat remaining in the walls from the previous charge, air being admitted through a side door, and the coking of the coal is effected by the combustion of the volatile matter with a partial consumption of the fixed carbon. The combustion is regulated by the amount of air admitted at the door and all of the volatile matter is consumed in the process, see Fig. 1.

The outside quenching removes the carbon glaze, familiar to all users of beehive coke, and in the early days the absence of this was counted a great objection to byproduct coke. This objection is no longer raised, and a prominent authority in blast-furnace work has recently published a statement that "today byproduct coke, which surpasses in quality most of our beehive product, and rivals the best, is made at several American plants." In the foundry trade byproduct coke has won an enviable position, and hundreds of thousands of tons of it are now being sold annually at a premium of from 50c. to 75c. above the standard grades of beehive coke.

Requirements of Good Coke and Difference in the Byproduct and Beehive Products

The development of the best cell structure is of the highest importance in the production of the best metallurgical coke. A well developed cell structure presents a large surface to the air, producing rapid combustion, while a strong cell wall prevents crushing and maintains an open fuel bed. Moreover, the relation of cell wall to cell space must be properly developed, in order that when the coke reaches the furnace tuyeres it can be attacked promptly by the oxygen in the air, with resulting rapid and intense combustion. A soft thick cell wall is objectional in blast-furnace coke, since it permits the oxidizing action of CO_2 gases in the upper part of the furnace by which the coke is wasted and the furnace top temperature increased.

But in foundry work it is more desirable to have a coke with a softer cell wall, smaller cell space, and a strong, tough structure. This permits the air to burn the coke immediately to carbon dioxide, with the production of the highest temperature in the melting zone of the cupola, and the weight of the charge is easily supported. This present practice seems to indicate that somewhat different treatments are required for producing the coke best suited to furnace and foundry practice.

The essential differences in the appearance of byproduct and beehive coke are first, the duller appearance of the former, on account of its being quenched outside of the oven, and second, the byproduct coke is produced in shorter, blockier pieces, as compared with the long finger-like pieces typical of the beehive coke. This difference is due to the method of applying the heat in the different types of ovens, see Fig. 1. In the beehive oven, the coking process works from the top downward, so that sometimes pieces are produced equal in length to the full depth of the charge. In the byproduct oven the coking process starts from both sides of the chamber, which averages from 18 to 20 in. wide, and proceeds toward the middle, so that the pieces will always be somewhat shorter than half the width of the oven.

It is natural that in the 21 years, during which the byproduct oven has been developed in this country, many improvements have been made, and in some respects, American practice has advanced beyond the latest progress in Europe. One of the most notable improvements has been the increase in the output per oven unit and per man employed. When the first ovens were brought over from Europe they had a capacity of 4.4 tons of coal per day, and one crew of of men was capable of handling about 25 ovens. This gave a capacity of 110 tons of coal per day with a unit crew. Today the most modern ovens have a capacity of 20 tons of coal per day, and improved organization and modern machinery permit practically the same crew to handle from 50 to 60 of these ovens, thereby coking from 1000 to 1200 tons, instead of the original 110 tons.

The use of silica material in all portions of the oven structure subjected to high temperatures has also brought improved results, as compared with European practice. The European brick makers have not as yet successfully adapted silica material to oven construction. The higher refractoriness and greater conductivity of silica has been one of the important factors in the larger output of the American oven, and the abiltiy to maintain higher coking temperatures has been a material help in developing the best coke structure from the various coals employed. The modern American oven cokes from one-third to one-half faster than ordinary European practice, and as stated above, the improvement in the quality of the coke from the American furnace man's point of view is quite as important as the larger output by the shortened coking time.

The Modern American Byproduct Oven

A typical modern byproduct oven is illustrated in Fig. 2. Each oven is equipped with a pair of regenerators which preheat the air to about 1100 deg. C. Since the oven gas used for heating carries from 500 to 600 B.t.u. per ft., the temperatures in the heating flues can be maintained quite as high as even the refractory silica brick can stand. The gas is admitted at several points in the series of flues, and by this means, it is possible to maintain the entire surface of the oven walls at a uniform and high temperature.

To control the temperature in all parts of the oven is of the greatest importance since any comparatively cool spots delay the operation, and part of the coal is overcoked, while the cooler portions are finishing their work. The operation of the regenerator is, in general similar to that of an open-hearth furnace except that an entire block of 60 or more ovens is reversed at one operation by means of reversing dampers arranged at the end of the block. The air enters at the bottom of the regenerator, rises and passes through the flue system, meeting the gas at the several burners arranged at the ends of the combustion flues. On reversal the air enters the other regenerator, rises through the air flue, shown in dotted lines at the left of the illustration, and descends through the horizontal combustion flues, meeting the gas as before. The products of combustion pass out through the other regenerator to the reversing damper and the stack

in the usual manner. By this system the entire series of combustion flues is swept by all of the air required for combustion, as well as by the products of the burning gas, so that hot spots are prevented, and a uniform temperature is maintained throughout.

Fig. 2 also shows the charging car on top of the oven with openings for delivering the coal into the oven, and at the left an opening providing for carrying away the gases to the apparatus for recovering the byproducts. On the left is shown the head of the pusher for discharging the coke, and on the right the car standing ready to receive the coke as it is pushed out, and in which the coke is quenched.

Recovery of the Byproducts

The byproducts recovered from the coking of coal in a byproduct oven consist mainly of ammonia, tar, benzol and gas. When the gases are driven off from the coal by the heat of the oven they are usually cooled and then scrubbed in a suitable apparatus. The cooling takes out the water vapor, together with part of the ammonia and most of the tar. This cooling is usually done in large cylindrical vessels where water is used as the cooling agent, either passing through tubes arranged like a vertical boiler, or the water is showered over a series of grids in direct contact with the gas.

The scrubbing of the gas is effected in similar vessels arranged in series. As water has a strong affinity for ammonia, it is a very effective scrubbing agent. In this method the ammonia is recovered in the form of a weak impure solution of ammonia and water, the ammonia averaging about 1 per cent. This weak ammonia liquor is then distilled with steam, and purified and condensed into the ammonia of commerce, or else the ammonia gas from the stills is passed through sulphuric acid to form sulphate of ammonia, largely used in the manufacture of fertilizers. The tar is separated from the weak ammonia liquor by gravity, and is then ready for shipment or for distillation into pitch and tar oils.

In some of the latest byproduct oven plants the ammonia is recovered by what is known as the direct process. In this process the tar is first removed either by cooling the gas or by a scrubbing process, and the tar-freed heated gas, is passed through large vessels so arranged that the gas is forced through sulphuric acid, thereby removing the ammonia, with the direct formation of sulphate of ammonia. In this process it is essential that the tar be removed as thoroughly as possible, in order that the quality of the sulphate of ammonia may not be contaminated by the tar. After the tar and ammonia have been removed the benzol products are recovered by passing the gas in intimate contact with the heavy oil, which absorbs the benzols. The gas is then ready for use as a fuel, or in gas engines. In case the gas is to be sold for illuminating purposes the benzol is not removed. The utilization of coke-oven gas for illuminating purposes has developed much farther in America than in Europe. Several important cities use coke-oven gas as their only supply, while in a number of others it forms an important portion of the gas supply. From 50,000,000 to 60,000,000 ft. of oven-gas per day is sold for illuminating purposes in the United States.

Production and Marketing of the Benzol Products

In the recovery of the benzols, these products are removed from the heavy scrubbing oil described above, by distillation with steam, and are then separated by a fractionating process and purified. The benzol products are used largely in Europe for making dyes, and latterly also for motor fuel in place of gasoline. A recent British publication contained a list of over 400 towns and villages in the United Kingdom in which supplies of motor benzol can now be obtained. In America benzol products are only used to a small extent for motor fuel, but where used they have been very satisfactory, as they are more efficient than gasoline. With the rapidly growing demand for motor fuel, benzols promise to become an important factor in this trade.

The pure benzol products as produced from coke-oven gas are benzol, toluol, xylol and solvent naphtha, all of which have important uses in the arts. Owing largely to tariff conditions, the manufacture of chemical products from the benzols has not been developed to any important extent in America. The policy of taxing intermediate

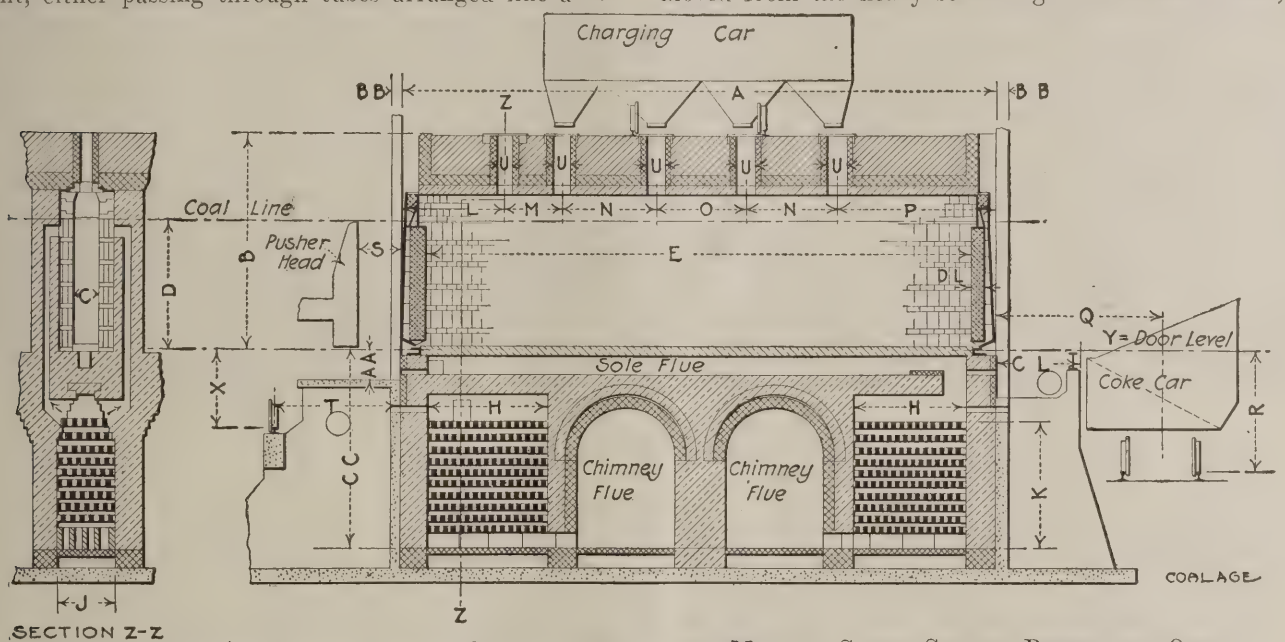


Fig. 2. End and Longitudinal Elevations of the Modern Semet-Solvay Byproduct Oven

products, while having the finished products, on which much labor has been expended, admitted free, has produced a condition which does not encourage the chemical manufacturers to invest in the necessary plants for this class of product.

The operation of the byproduct oven calls for a high grade of technical skill and a combination of mechanical, metallurgical and chemical engineering. But the advance from the old beehive process is in accord with the progress that has been made in other technical industries, and in the conservation of our natural resources the byproduct oven has a place which is surpassed by few of our manufacturing processes and presents still further possibilities along this line.

Some Types of Coke Oven Doors

SYNOPSIS—The large doors of the rectangular (Mitchell or Belgian type) oven are expensive to brick up. Doors mudded around the edges have replaced them, but the life of these stoppings was at first short. This article describes the steps taken to make this necessary accessory as durable as the lining of the oven. The new asbestos-clay daub for oven doors is described.

The square of the beehive-oven door measured about 2 ft. 9 in. by 2 ft. 9 in. Above this square was a low arch with a spring of 9 in. Thus roughly about 9 sq.ft. had to be bricked up or mudded every time a charge was coked at suitable periods during the progress of burning.



THE OVEN DOORS AT THE ACME PLANT, NEAR BENTLEYVILLE, PENN.

The introduction of the Mitchell or Belgian ovens, in which there are two doors, and each of these is merely one end of the oven and has dimensions equal to those of the oven cross-section, made the cost of building doors an item of much interest. The Mitchell oven was adopted by those people who were looking for decreased cost of production and they naturally viewed the two large doors with great disfavor.

THE DOOR BUILDING OF THE MITCHELL OVEN COST FOUR TIMES THAT OF THE BEEHIVE

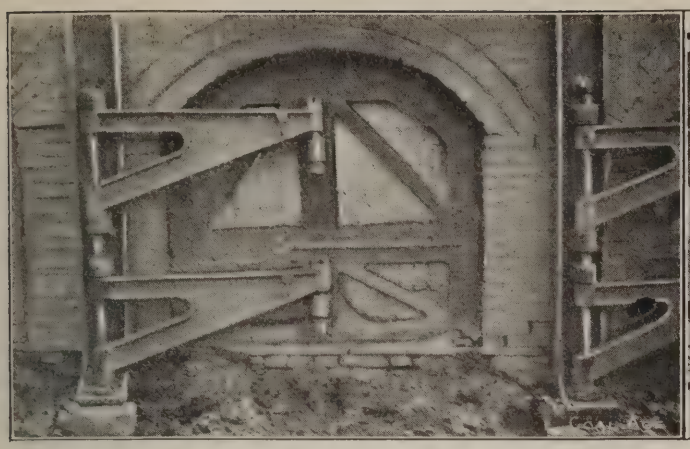
For instance, the door openings at the Acme No. 2 plant of the Pittsburgh-Westmoreland Coal Co., Bentleyville, Penn., illustrated herewith, are 4 ft. 10 in. to 5 ft. wide and at the top of the arch are 4 ft. 7 in. high. Thus 42 sq.ft. of opening approximately has to be filled and torn down with each recharging. It has been estimated that the cost of this work, including the mixing of the clay and coke breeze for making the door airtight, would be about 50c. per oven. However, whatever may be the cost, the filling up of the doors of a Mitchell oven with brick would be 4.6 times as expensive as the closing of the single opening in an oven of the beehive type.

To save this expense, doors were introduced, but they were found most expensive to keep in repair. They were barely put in commission before they had to be renewed. Now, however, there are several doors giving effective service. The difficulties to be met were four—to discover a door which would stand the heat, one which would not be too heavy to handle, one which would not rack itself by its own weight, and one with such favorable conditions for expansion and contraction that heating and cooling would be without evil effect.

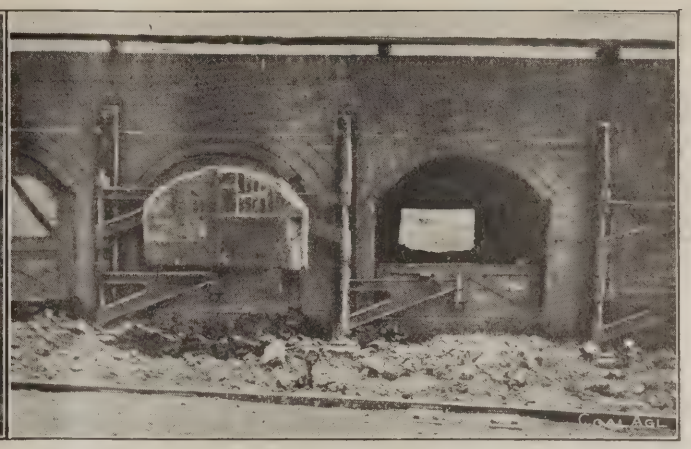
THE OVEN DOORS AT BENTLEYVILLE, PENN.

It will be seen that the door is so arranged, as are, indeed, all successful doors, so that its iron framework does not come in contact with the fire, but is protected by 2 in. of firebrick, which is kept in place by being molded integrally with a wedge-shaped back, which fits into the door frame. The whole face of the door between the iron work is usually plastered with clay and this prevents air from passing through the door between the loosely fitting firebrick. The iron in the door castings is specified as No. 1 Bessemer or Cherry Valley foundry iron.

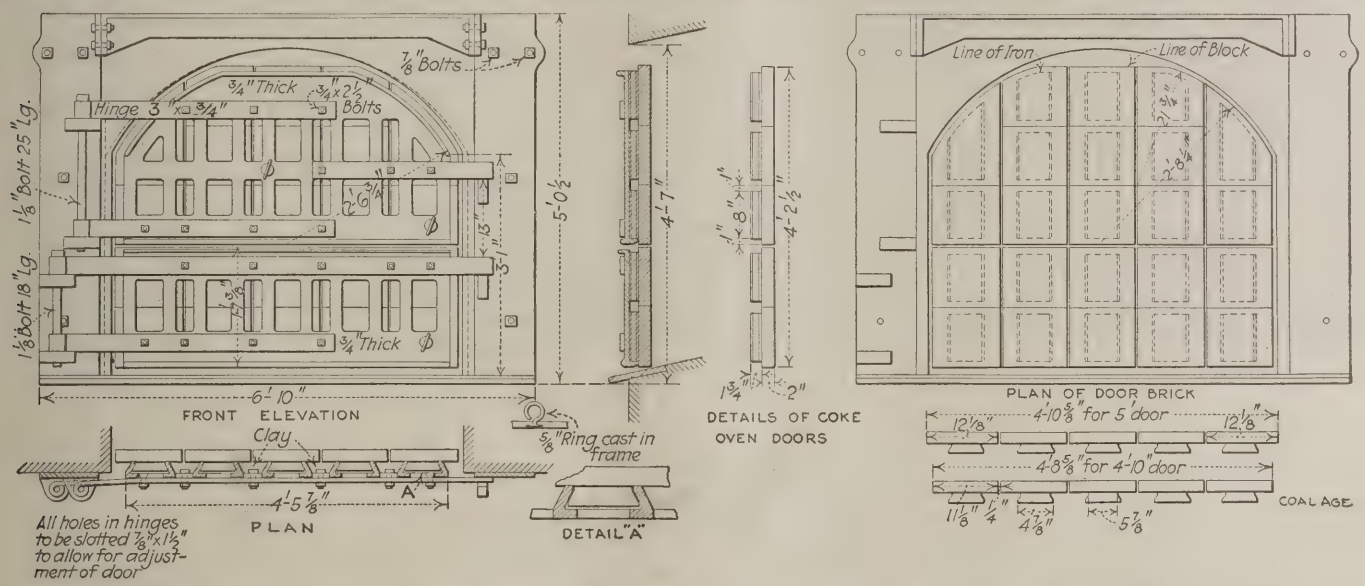
These doors have been in use about three years and they have given complete satisfaction. It will be seen that they are made in two parts. The lower half reaches to the level of the top of the charge and is closed before the coal is run into the oven. The upper half is swung too, and is mudded later as the oven gets hot and all the cracks are carefully mudded so that the oven is as effectually closed as if walled in. Each part of the door is hinged on one side and has a latch by which it is secured, and in the lower half a ring by which the



Hay-Rule Door as Installed on the Pusher Side



The Same Door with Upper Leaf Swung Wide Open

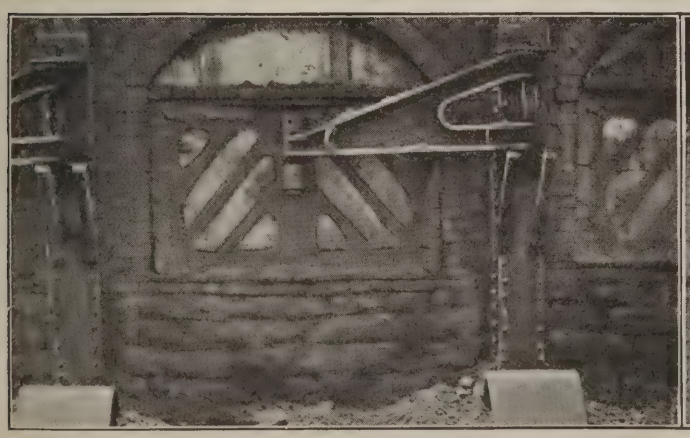


Coke-Oven Doors Installed at Acme Plant of Pittsburgh-Westmoreland Coal Co.

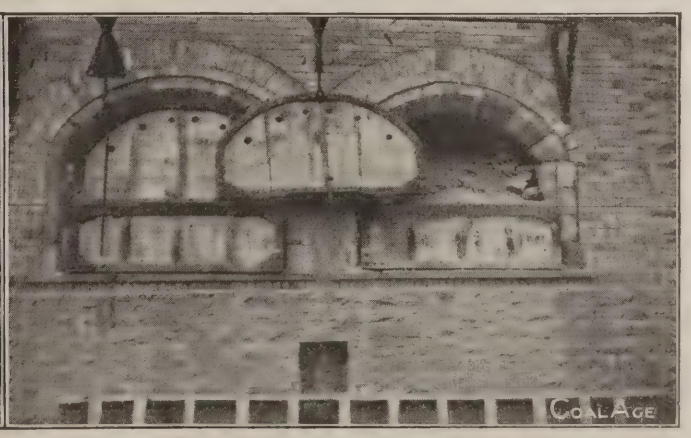
door may be swung open. Two laborers each mud 150 doors per day.

The Coke-Oven Doors at Denbo, Penn.

At the Denbo mine, at Reliance, a door is used which can be swung from a track, bracketed above the row of oven doors. This track projects somewhat, therefore, beyond the front of the oven wall. The suspension is by means of a hook attached to a small trolley wheel. This hook projects from the side of a bar and can be pushed into a hole at the top of the door and secured in place by passing the end of the bar into a catch on the lower part of the frame of the upper half of the door. The lower half of the door can be attached to the upper half, so that both can be swung from the track above, as has been described.



A Door for the Gantry End of an Oven at the Huron Plant near New Alexandria, Penn.



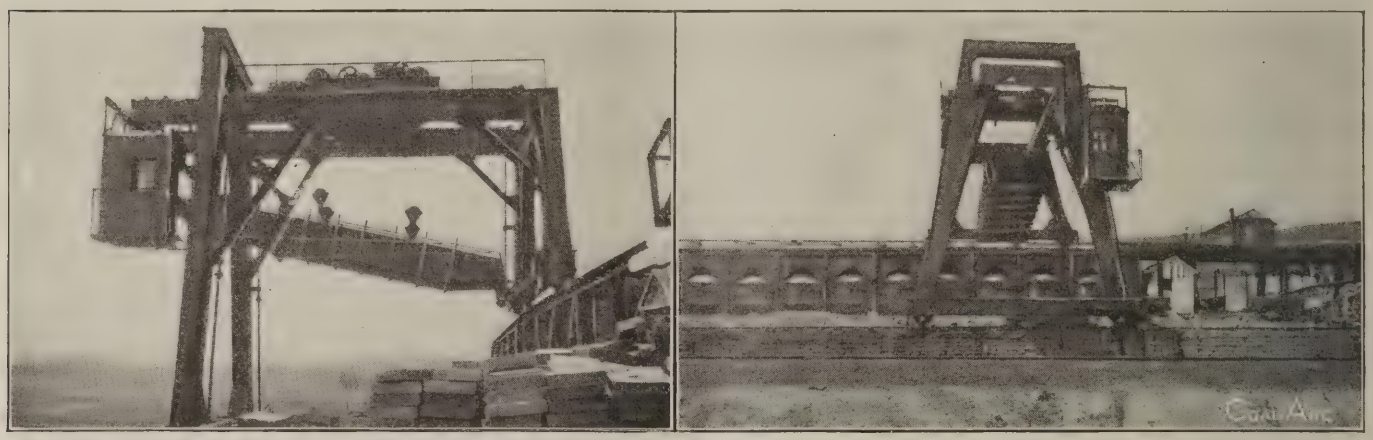
Oven Doors at Denbo Plant of Reliance Coke Co. near Brownsville, Penn.

The lower half of the door is none too heavy and is sometimes pushed out when, the leveler being at work, a large pile of coal runs forward onto the door. The round holes for airing the oven will be plainly noted. The one in the center line of the door and near the top is used for attaching the lifting hook. The oven wall, being on a slight batter, the weight of the door rests on the jambs and keeps the door in place. These doors have been in use at Denbo less than a year, but, so far, they are giving perfect satisfaction.

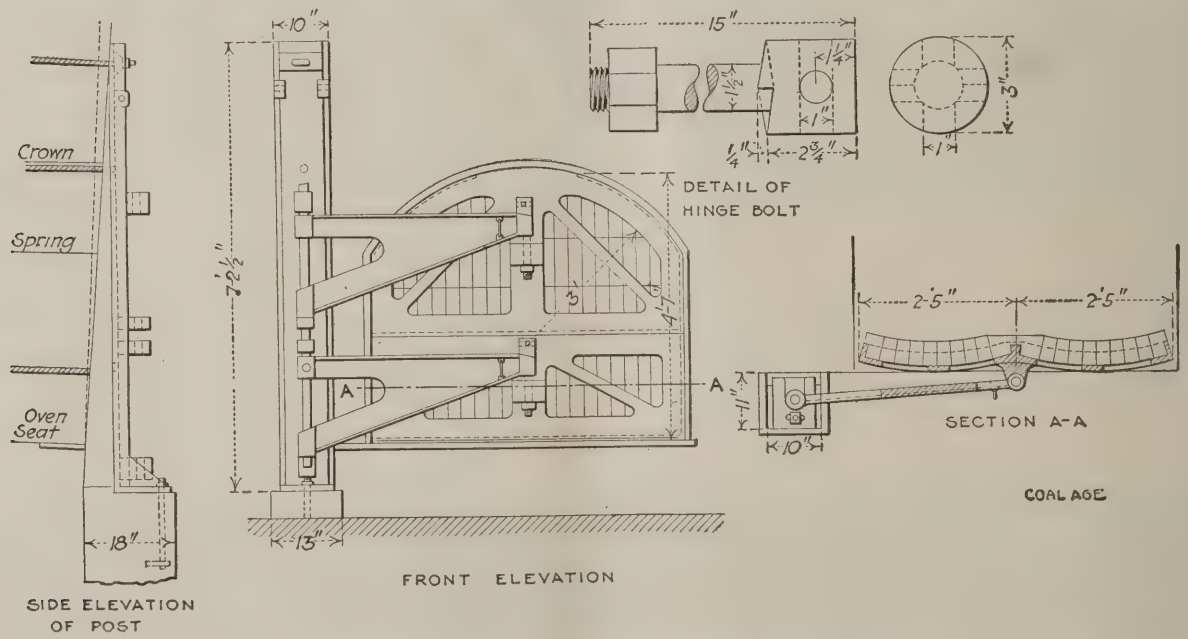
The Hay-Rule Door

The Huron plant, of the Keystone Coal & Coke Co., is using patented doors of R. Hay and P. B. Rule. by a cast-iron post, which rests on a small concrete base. The hinges are fastened to the post by a wrought-iron pipe and to the door section by a hinge bolt. The base of this hinge joint is in the shape of a helical screw, and as the supporting end of the hinge is made in a corresponding manner, it will be seen that a half turn of the bolt will raise the door, allowing it to be swung out.

On the crane side there is only one section to the door and this reaches almost up to the spring line of the opening. The balance of the door is filled with firebrick resting on an iron plate. The cast-iron posts which support the open doors on the pusher side are here replaced by posts, which are intended mainly to sustain an 80-



Two Views of the Gantry at the Huron Plant of the Keystone Coal & Coke Co.



Hay-Rule Door as Built for Pusher Face of Oven

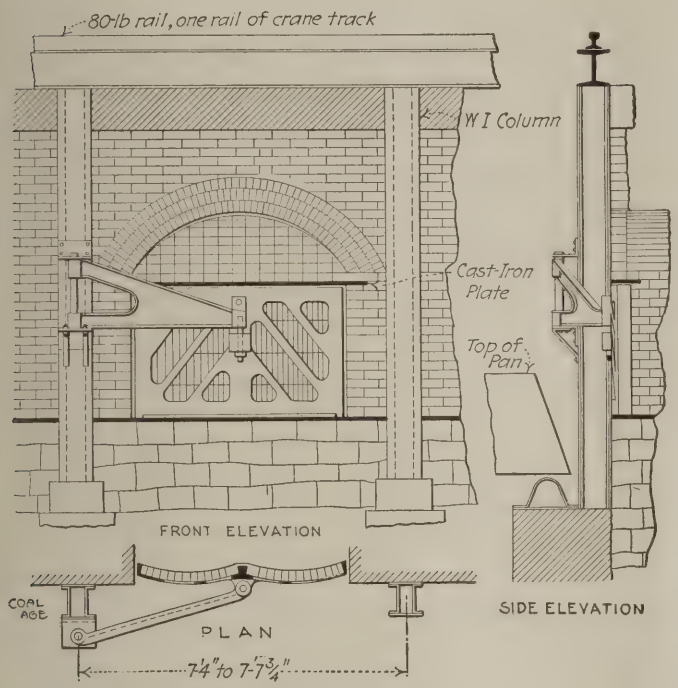
There are two types of these doors, those on the pusher and those on the crane or receiving side. The frames of the doors are constructed of cast iron, which holds the lining of arch firebrick. The door on the pusher side, when closed, occupies all the opening except about an inch on either side and a small segment on the top. These side spaces are closed entirely and the top space is arranged to be just enough to permit the charge in the oven the requisite quantity of air.

The door is supported when swung away from the oven lb. T-rail. On this rail the forward end of the crane for handling the coke travels.

The whole arrangement on both sides was installed three years ago and has given satisfaction. The doors on the pusher side and the upper segment on the crane side have needed few replacements and none of the doors on the crane side have had to be renewed. It will be seen that the doors "fit" snugly at the bottom and at the line common to both sections. The only extended mudding to be done is at the sides and top.

The Campbell Asbestos-Clay Daub

J. R. Campbell, chief chemist of the H. C. Frick Coke Co., has invented and patented an asbestos daubing material for coke ovens, and the Taylor Coal & Coke Co. has almost one hundred of them in service, some of which have been in operation since August. They are used with doors of the McMurray type. There are 12 doors at Lemont No. 2 of that type, and they are daubed with the asbestos-fireclay mixture.



Hay-Rule Door, Gantry End of Oven

It may be stated for those who do not know this type of door that it consists of a cast-iron plate with finger protrusions on which the asbestos-clay mixture is daubed. It was invented by William McMurray, superintendent of the Mount Pleasant Coke Company.

The material used is described as a special mixture of fireclay and asbestos, shipped out in the plastic state ready to be applied to the door. It must be well tamped into place and, if possible, the door should be allowed to dry out before being placed in service. However, that is not essential. A "green" door may be used without any harm being done. About 200 lb. is needed for an ordinary beehive-oven machine door. It is thought that one application, with a few occasional repairs, will last two or three years, though, of course, this will have to be ascertained in practice. So far the longest service has been for one year, at the Taylor Coal & Coke Co.'s Searight plant.

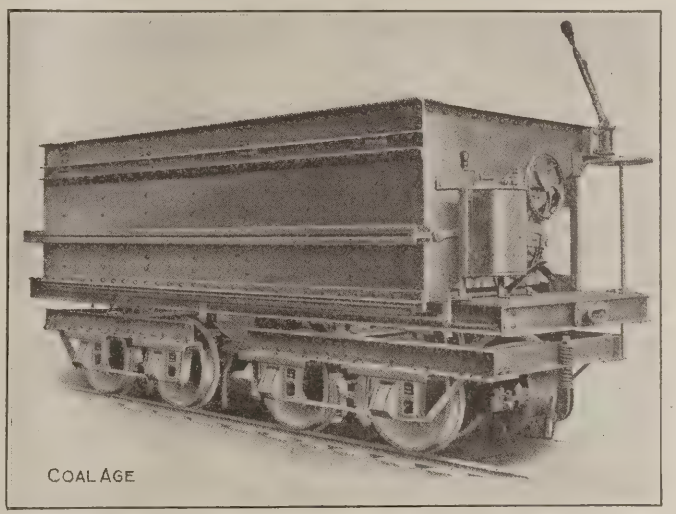
The material is made by the Harbison-Walker Co., and costs $10 per ton, f.o.b. cars, in minimum carload lots. In less than carload lots but in bulk, the cost is $12 per ton. If sent packed it will cost $4 to $5 more per ton.

A Slate Disposal Car

At many mines the disposal of slate and mine refuse from the tipple is a serious problem. Frequently mules are used for this purpose, while in some cases main and tail rope haulage is employed to move the slate cars on the dump.

The Atlas Car & Manufacturing Co., of Cleveland, Ohio, has brought out a line of self-propelled cars which appear to be admirably adapted to purposes of slate disposal, one of which is shown in the accompanying illustration.

The car shown, as may be clearly seen, is arranged for side dumping. It has double trucks built up of structural shapes. Two enclosed motors are supplied, operated from a drum type controller.



A Double-Truck, Side-Dump, Self-Propelled Mine Car for Slate Disposal

The car shown has a capacity of 200 cu.ft. The height above rail is 7 ft. 6 in., the width and length over all being 7 ft. 6 in. and 18 ft., respectively.

These cars may be made in many different sizes and types. Although the car illustrated is supplied with a trolley pole, it might with equal facility be equipped for operation by means of a third rail or be supplied with a storage battery. This latter arrangement would probably be the most convenient motive power for slate disposal.

Coal Freight Rates in Idaho—Freight rates on coal are to be made the basis of a suit before the Interstate Commerce Commission on behalf of the citizens of Boise and southwestern Idaho against the Oregon Short Line according to reports. The freight department of the road has been advised that the statements made by the coal dealers of Boise in respect to freight charged on coal from the Wyoming fields has caused much dissatisfaction.

The controversy is an outgrowth of the fight between the Boise school commissioners and coal dealers. Bids were asked for storage of coal, and as was the case in Salt Lake, all were the same. The coal dealers admit that they charge high prices, but insist that the Oregon Short Line refuses to weigh the cars at destination and that they have to charge for coal lost in transit.

According to the reports the utilities commission will bring suit before the Interstate Commerce Commission in the name of an individual, as the commission is said not to have the power to prosecute in its own name suits outside of the state courts. It will ask that the freight rates on coal from Wyoming points be reduced $1 a ton. The suit will also ask for the removal of the differential of 50c. a ton placed against Utah coal at American Falls. The coal dealers of southwestern Idaho say that this differential prohibits the shipment of coal from Utah into Idaho at a price low enough to compete with Wyoming coal. It will also be set up in the suit, that the Union Pacific owns the coal mines in Wyoming and that the differential is placed on the Utah coal at American Falls in order to bar Utah coal, most of which is mined by a subsidiary of the Denver & Rio Grande.

The Hillcrest Explosion

The explosion at Hillcrest is perhaps the worst mining disaster that ever occurred in Canada. Out of a total of 237 men who went down into the mine on the morning of the accident, only 41 were saved.

As the rescuers neared the seat of the explosion in the underground workings, the terrible force of the accident became more plainly visible; some of the bodies were literally torn to pieces.

It is probable that if General Manager Brown had not reversed the fan at the time he did, none of the 41 survivers would have been saved. Mr. Brown realized, immediately after the explosion occurred, that the first thought of the survivors would be to make their escape by means of the stope to mine No. 2. This conviction caused him to immediately reverse the course of the air. "When I felt that whiff of fresh air, I knew I was saved," is the statement of several survivors. They were about ready to give up in their fight for life when the fresh air came upon them.

Three of the rescue gang were overcome by gas and had to be carried out. The helmet men found bodies strewn in every direction and lying in every conceivable position. One man was found in a kneeling position with pick in hand ready to strike; when he was brought out, his arms were so rigid they had to be broken before they could be folded.

Joe Atchinson, a miner, was brought out and had every appearance of being dead. Some slight evidence of life, however, caused the doctors to work over him with artificial respiration methods. After some time, a faint flush appeared under the dust on his cheeks, and the doctors redoubled their efforts. The miner fought against them, and in his dazed state seemed determined to die, but after three hours he recovered and was soon able to assist in the rescue work.

Another miner by the name of Madison on his rush to safety passed many men who had just been overcome. One miner was struggling with his shoe, which had become fastened in a frog of the track. He finally succeeded in cutting the shoe from his foot and came out of the mouth of the stope with but one shoe. Madison, himself, says he felt inclined to lie down, but did not yield to the inclination and finally walked to safety.

The survivors have advanced different theories as to the cause of the accident. One man says it was a defective lamp; another believes it was a defective shot, while a third miner claims that a pocket of gas was liberated. All of these ideas are mere guesses, as none of the survivors was near the seat of the trouble. It is a fact, however, that for two days previous to the explosion, the mine had been idle, owing to slackness of business. During that time, gas may have collected in sufficient quantities to explode. Against this theory stands the favorable report of the fireboss who made his rounds before the men went to work.

Description of Hillcrest Colliery

Concerning the mine where the disaster occurred, W. J. Dick, Ottawa, Canada, has this to say: 'The mine is situated on a hill 1½ miles from Hillcrest Station. The mine tipple is on the valley level and is connected with the Canadian Pacific Railway by a spur track. The coal is brought from the mine to the tipple by means of a conveyor. There are three seams, of which only the upper one is being worked. The strike of the coal is northeast, and the dip 28 deg. to the west. The seams are badly broken by faults, and the coal is cut off by a fault at the face of the main entry, 4000 ft. from the entrance.

The room-and-pillar system of mining is used. Chutes 14 ft. wide and varying in length from 400 to 800 ft. are run up the dip. Room pillars are 50 ft. wide. The crosscuts are driven at intervals of 50 ft. An extraction of 65 per cent. is obtained. The pillars are removed by slicing on each side of the chute.

Gas has been found in the mine and Wolf safety lamps are used. The main road for 2000 ft. is lighted by electricity, 250 volts being used. All blasting is done under the supervision of shotfirers. Monobel powder, No. 6 detonators and fuse are used for shooting the coal. Holes are tamped with clay sent in from the surface. The mine is not subject to windy shots, nor has it experienced any previous explosion.

The mine has a capacity of 2000 tons a day, but only an actual average daily output of 800 tons.

The only other great accident in Alberta's coal-mining history occurred Dec. 9, 1910, when 31 men died in an accident at the Bellevue mine, not far fram Hillcrest. What the beneficiaries of the Hillcrest disaster will receive by way of compensation is a question that will come as an aftermath of the accident. The compensation act of Alberta decrees $1800 for each loss of life.

A Typical W. Va. Operation



Tipple over Railroad, and Retarding Conveyor for Lowering the Coal, Red Jacket Consolidated Coal & Coke Co., Red Jacket, W. Va.

Practically all of the machinery in this plant was furnished by the Jeffrey Manufacturing Co.

The Labor Situation

SYNOPSIS—Colorado is quiet but as the strike is not nearly settled and as the army may be removed before the militia regains its former strength, the prospects of trouble are imminent. In West Virginia peace seems insured. Some operators in Sebastian County, Arkansas, are trying to work without submitting to union dictation. In Ohio, there seems no hope of a wage settlement except in the lack of union funds. Iowa has agreed on a scale. In the anthracite region the certificating of mine foreman and the activity of safety inspectors are causing much trouble.

The fight between the Western Federation of Labor and the Industrial Workers of the World in the city of Butte, which is dominated by a Socialist administration, is convincing the world that dynamiting and murder are not always excusable avocations of a mining population. In this case there can be no talk of the iron heel of capital. If two factions of working men can so violently assault the other without excuse surely it is easy to conceive that one or either of them might assault another party, to wit capital equally without excuse. The Butte miners by their anarchy have weakened the sympathies of the whole country with the miners, whether of coal or copper, and disposed every one to accept the version of the operators concerning the Colorado trouble.

EMPLOYMENT OF MINE WORKERS

It is declared that the Colorado Fuel & Iron Co. is violating the proclaimed will of the Secretary of War and is bringing, into Colorado, men who are willing to work in its mines. This is not improbable seeing that the deliberate closing of certain of the plants and the crippling of others by governmental action is a high handed proceeding not at all justifiable under the circumstances and is obviously done not to preserve peace, but to legislate by force of arms. The autocratic manner in which this has been done would be more becoming in a mediaeval monarch than in a present-day appointee of the people.

GOVERNMENT HAS CLOSED NEARLY A SCORE OF MINES

The mines, the companies are endeavoring to recruit, are Sopris and Starkville. It is alleged that W. J. Gooden has smuggled men from New Mexico into Sopris under cover of darkness. It may be added that 19 coal mines are still closed down; Starkville, Santa Fé, Bowen, Empire, Thor, Southwestern, Wooten and Majestic in Las Animas County, Rockvale, Coal Creek and Fremont in Fremont County, Crested Butte in Gunnison, and Pictou, Maitland, Piñon, Rockland, Mutual, Gordon and McNally in Huerfano County. The strikers have driven the men out in the past and now the U. S. troops secure to the illegal forces of the union the ground they have gained in violation of the law, making the government a bulwark of violence and disorder.

SMALLER COMPANIES FACING FINANCIAL DISASTER

The chief sufferers appear to be the smaller companies. Their tonnage amounts to little, as far as the public is concerned, but much to themselves and they have registered a protest to the President. On June 18, J. A. Ownbey saw the President on behalf of the independent operators and represented that the closing of their mines by the union and the U. S. Army had made the financial difficulties so severe that the probabilities were that the stronger companies would eventually absorb them. And indeed reviewing the list of idle mines it is clear that the smaller mines have suffered most.

THE OWENS-KEATING RESOLUTION

The President is repeatedly stated to be about to compel arbitration and the Owens-Keating resolution in the House provides for a committtee to that end appointed by the president containing a mining engineer, a navy and army engineer, a man familiar with the handling of coal as merchandise, a sociologist and an employer of labor.

We doubt whether Congress has power to pass a law to determine wage and working conditions in any of the states of the union. It is hard to know what can be done by martial law because its limitations are ill defined, but constitutional law is less nebulous and a special law to regulate a specific industry at a special time in a certain section of the country and not applying specifically to interstate business is easily seen to be in conflict with our national constitution.

Mother Jones was finally admitted to Canada. The authorities were duly moved by clamor from the Canadian unionists and Mother Jones has been enabled and has fully availed herself of the opportunity to stir up strife between two friendly nations. She visited Nanaimo, Cumberland, South Wellington, Victoria and Vancouver. It is reported that she will speak in Charleroi, Penn., June 29.

Statements have been circulated that the pay-rolls of the Colorado Fuel & Iron Co. have been found to be heavily padded and that among the present miners there is a large amount of dissatisfaction. It is stated that they were given on entering the employ of the company places of such a character that large earnings could be made with but little labor. These places are now exhausted and the men are being moved to points where to get a large wage involves more work.

THE MILITIA'S DEMORALIZED CONDITION

The militia of the state of Colorado is not in condition to take the field, should the army be withdrawn. The 4 per cent. bonds for their payment and further expenses have not proved desirable to the public especially as the bonds must be marketed at par. They have been advertised in New York, Chicago and in Colorado without success.

The militia men are still resenting the one-sided truce called after the Ludlow battle and fear that the weakness displayed at that time may again put their lives in needless jeopardy. The strikers repeatedly broke their obligation. Gov. Ammons, despite this fact, kept his agreement, and as a result the militia was easily outnumbered by the movement of the strkers and the bands of militiamen were unable to go to one another's assistance. In all probability 35 officers will resign.

The report of the court martial of the Ludlow militiamen is not yet made public (June 23). All the men in troop A at Ludlow, including the 124 coal operators' employees, have received their pay. Governor Ammons, State Treasurer Leddy and Attorney-General Farrar voting for payment and Secretary of State Pearce and Auditor Kenehan voting against it. Company B has also been paid.

OPERATORS CONCEDE CHECK-OFF IN WEST VIRGINIA

In West Virginia a marked change has taken place. The operators who could not well be compelled by the arbitrating committee to pay a check-off, for some reason conceded it, stipulating that the amount collectible should not exceed $1.10 per man per month. The vote was taken on the proposition of the federal board of conciliation on the evening of the 22d and 23d, but the result is now declared irregular and the vote must be taken again.

It might be well to quote in full the recommendations of the commissioners, prefacing them with the remark that the public cannot expect the operators to defend them against iniquities such as the check-off. The people support such conspiracies by their influence and grumble whenever the effects are violence and slaughter and even the Department of Labor fully realizes that the most popular work it can perform is to aid the agitators to obtain funds for such desperate enterprises.

THE RECOMMENDATIONS OF THE COMMISSION

The following are the recommendations of the Commissioners of Conciliation who took under advisement the strike situation in West Virginia:

To the miners and operators of the Kanawha District of West Virginia, who are now in dispute and whose mines are idle and men are on strike:

We, the undersigned, Commissioners of Conciliation, duly appointed by the Secretary of Labor, recommend:

First. That the mines resume at once and the scale of 1912 be renewed for a period of two years, for the reason that we do not believe that there should be any change made in the terms and conditions of that agreement at this time or under the present business conditions.

In the event that either party is unwilling to adopt this recommendation we would then recommend that the miners return to work at once under the following conditions:

First. That the same wages be paid as were paid when the mines were closed down.

Second. That the operators pay the check-off for dues and assessments, not to exceed $1.10 in any one month, to the treasurer of the Local Union of the United Mine Workers of America, deducting the same from the wages of their employees for whom a scale agreement is made, when authority for such deduction is made in writing and releases the company from liability.

Third. That a Commission consisting of three persons, one to be selected by the miners, one by the operators, these two to select a third, and, in the event of their failure to select a third, then ten days from date the third member to be appointed by the Secretary of Labor from a list of five names jointly agreed upon to be transmitted to him within five days from the date of this recommendation, and, in the event that no list is transmitted the Secretary of Labor shall then appoint the third member of the Commission; this Commission shall be empowered to investigate and determine the actual wages paid for all classes of labor, and the tonnage rates, including such yardage as was provided for in the last scale agreement, in any and all mines which mine the same grades and character of coal, and which ship to the same markets at the same freight rate in competition with the coal mined by the operators of the Kanawha district of West Virginia.

Fourth. The Commission shall also be empowered, upon completion of its investigation, to fix the wages for all such labor ,and tonnage rates, including yardage, which shall be paid by the Kanawha Operators' Association to the miners in their employ during the life of a scale agreement which shall be immediately entered into by the Kanawha Operators' Association and the United Mine Workers of America, District No. 17, upon receipt of the finding of a majority of the Commission.

Fifth. The Commission shall render a decision within thirty days after its selection and the expenses of the Commission shall be paid jointly by the United Mine Workers and the Kanawha Operators' Association.

Sixth. The scale agreement signed upon receipt of the decision of the majority of the Commission shall be retroactive and cover the wages paid from the date of resumption.

We also recommend that rules shall be formulated in the new contract which shall provide for the settlement of disputes which may arise through Commissioners from the parties to the contract, who failing to settle a dispute, shall refer the matter in dispute to a Board of Arbitration; and that a further rule shall be made which shall enforce the carrying out of the contract by both parties thereto.

Respectfully submitted,

PATRICK GILDAY,
CHAS. W. MILLS,
A. L. FAULKNER,
Commissioners of Conciliation.

The second of these recommendations was accepted by the executive board of District No. 17 U. M. W. of A. and by the operators of the Kanawha district, but up to date it is not certain what the result of the referendum will be, the vote being exceedingly close, but probably in favor of that proposal of conciliation board, which the officials have seen fit to submit for consideration. The first which omitted the check-off did not meet with their approval. The second which may cause a reduction in wage is unsatisfactory to the men. They do not like to sacrifice wages for the privilege of having a check-off.

The fact that only the second of the two recommendations was submitted to the miners for ballot, has created much discontent. Thomas Haggerty, the international board member, received a telegram, June 4, from Secretary of Labor Wilson expressing surprise that the miners had not been given their choice of accepting either of the two propositions, or of rejecting both. Haggerty and Cairns in reply declared that both had been submitted.

Haggerty is extremely wrathful that the proposition he favors is not more popular and accuses some of the union men of collusion with the operators and as a result there has been a heated correspondence between Secretary Evans, of the Kanawha Coal Operators' Association and himself. In any event the strike cannot long continue. The union has neither funds nor harmony.

SUIT AGAINST MINERS' UNION WITHDRAWN

We are glad to note that the suit again John P. White and the other mine leaders is withdrawn because we do not like actions against the union to be entered except for the purpose of preventing them from performing illegal actions or to punish them for actual and not technical crimes. But the attorney's reasons for withdrawing the action and seeking a nolle prosequi are amusing if they are as related by the "Charleston Mail."

He is said to have pointed out that "while the organization might have affected competition in interstate commerce indirectly, it was not such as could be classed as a violation of the Sherman anti-trust law, the provisions of which are only applicable in cases where an agreement is made for the primary purpose of restricting interstate commerce to the advantages of one class and the detriment of another."

COMMENDABLE INACTION FOR A STRANGE REASON

Who ever violated the Sherman Act for the primary purpose of breaking its provisions? Does not every rich man who violates it, do so to make more money? Similiarly the miners were breaking it that they might make bigger wages. If this is an excuse, murder is not a crime because no one violates the law for the purpose of breaking it, but with the idea of killing his man. We are glad the miners are not to be prosecuted, but we are sorry that such a flimsy excuse has been taken for doing nothing. As a matter of fact, everyone believes that there is a need for winking at some technical faults in working men which are barely excusable in men of large property. Hardly anyone believes that the union, though a trust, should be suppressed. Beside faith in the Sherman act even for the rich is on a decline.

FOUR STATES AND MILBURN COAL COMPANIES

The Four States Coal Co., at Dorothy, W. Va., on Coal River has so far not settled its dispute. The rate at this mine has hitherto been 26½c. per ton for machine work and 31½c. for pick work, which latter rate is only operative in the drawing of pillars. The miners think the price should be equal to that paid for mining the Coalburg seam, which is 32½c. for machine loading in rooms and 56½c. for pick mining. They also want the check-off, though the ton rate is the main burden of their requirement. They also desire a shorter day and a 9-hr. day has been conceded by the company to take effect when the scale shall be signed in place of the 10-hr. day now worked.

The Milburn Coal Co., operating at the head of Paint Creek and mining gas coal desires a rate of 25c. a ton for machine-mined coal as in the present contract. The miners would raise this rate to 26c. The company produces no pick coal. The miners are on strike though the Union officials promised to keep them working until the Kanawha scale was settled.

THE TROUBLE IN ARKANSAS

The Bache interests in Sebastian County, Arkansas, some months ago, concluded to abrogate their contract with the union on the ground that they could not operate successfully under the scale in force. We do not know the nature of the agreement, but if it was for a specified time and did not give the Bache interests the right to nullify it at will, then the action which they took must subject them to the strongest criticism, though it must be conceded the unwillingness of the union to abide by its bargain and its frequent violation of its agreement furnished an excuse for nullifying the contract as was the case in central Pennsylvania. It is stated that the reason why the mining of coal was not profitable was because the mines were not properly operated, at least, Labor Commissioner J. C. Clary makes this statement in his report to Governor George W. Hays.

TROOPS BEFORE TROUBLE

Frank A. Youmans, of the federal court, enjoined the union not to interfere with the reopening of the Prairie Creek Mine No. 4 of the Mammoth Vein Coal Co., at Midland, Ark., on the St. Louis and San Francisco R.R. and the district attorney requested Franklin Bache not to begin hoisting coal until sufficient force was secured to assure them that the injunction would not be violated. On June 3, between 40 and 50 armed deputy United States marshals left for Midland to establish a guard about the property. According to U. S. Marshal Frank Mayes, none of the men who were employed by him had served as mine guards for the company.

On June 5, J. V. Bourland, the U. S. District Attorney, was ordered by Attorney General McReynolds to withdraw the deputies.

OHIO WAGE SCALE

So far no agreement has been effected in the state of Ohio and none may be expected for some time. On June 25, the eastern Ohio and Cambridge district operators withdrew from the joint-wage conference. The tonnage of these operators is about 20,000,000 tons or nearly 60 per cent. of the whole Ohio output. Still the conference continued in session, the Hocking, Pomeroy, Jackson, Crooksville and a part of the Bergholz districts trying to effect an agreement.

The operators offered a rate of 43c., which was an increase of 1.88c. on the 41.12c. previously offered. The operators insisted that if an agreement was made, no contract should be made thereafter with any other Ohio district at a lower figure and to this National Secretary-Treasurer Green alone assented.

The operators in five subdistricts mentioned, on the 26th inst. delivered an ultimatum stating that they would pay 44.69c. a ton for machine-mined coal on the mine-run basis, which is virtually the same as the mine-run rate in the Pittsburgh district, and 3.57c. more than the original offer. The miners want 49.65c. for machine and 71 3/7c. for pick-mined coal feeling that they are entitled to a better rate than Pittsburgh miners because of the cleaning which must be done,

because the coal has several bands of impurity. On the other hand, the operators having to compete with Pittsburgh coal feel unable to concede such a differential.

The Industrial Workers of the World have been organizing and urging the miners of Ohio to stop the passage of West Virginia coal through the disaffected districts, as this coal is replacing the Ohio coal on the markets. The method of "direct action" is openly advocated and the miners are urged to blow up railroad bridges and tie up traffic. The trains in Belmont County are moving slowly and guards have been placed on duty at the Little Grave Creek bridges above the Baltimore & Ohio R.R. passenger station, at Moundsville, W. Va., and at the Big Grave Creek bridge just near that city. The Benwood-Bellaire bridge is also being guarded.

IOWA WAGE AGREEMENT SETTLED

About 17,000 miners composing the Iowa district No. 13, voted on the 16th whether to accept or reject the wage scale under which they were working. The vote carried by 6136 to 3624, only 9760 out of 17,000 voting.

ANTHRACITE TROUBLES

The attitude of the Unions relative to the certificating of mine foremen will be noted editorially in our next issue, but we may say here that in accordance with the demand of the unions at the recent Pottsville meeting, on June 25 a suit was brought to restrain James E. Roderick, chief of the State Department of Mines from issuing certificates to 139 mine foremen and assistant mine foremen who passed the examinations held at Pottsville on May 25 and 26. James Matthews, president of district No. 9 brings the suit.

The Delaware, Lackawanna & Western R.R. coal department has had a dispute with its men who claim that the safety patrolmen have been making note of and reporting whether the men worked or not and have not confined themselves to their duties of protecting the men from the dangers of the industry. The miners desire that the patrolmen enter the union and declare these officials are underpaid. On the 24th the grievance committee of the 26 collieries, David W. Fowler, president, met Colonel Phillips, C. E. Tobey, P. J. Williams, Harry Davis, David Lloyd and Harry Harris and discussed the difficulty. It is said patrolmen will be told to restrict their activities to protection of the lives of the miners.

VANCOUVER NEWS

Robert Foster, president of District No. 28, notified the striking Vancouver miners that they must not be surprised if strike benefits were stopped at any time as the funds of the organization have been depleted. The organization had been paying them $15,000 weekly and $35,000 weekly to the Colorado strikers. Consequently it has been impossible to give relief to the Ohio strikers. Strike benefits might continue a week or even six weeks, but the men must not be surprised of a discontinuance at any time.

Notwithstanding the prospect of an early stoppage of strike pay the miners decided by 1467 to 274 in favor of a continuance of the suspension. It is interesting to note how few adherents the union in Vancouver now has. Meanwhile the mines in the district have all the men they can employ, the Western Fuel Co. having a waiting list of 100 men. No. 1 shaft at Esplanade in the middle of June hoisted 1121 tons, all the coal coming from the north side of the mine, the south side having been flooded when a fire started a year ago. The union would not permit the miners to wall off that part of the mine.

Attention should be called to the fact that the statement made by M. D. Foster, chairman of the House Committee of Mines and Mining relative to William Green, and published in our issue of May 9, p. 775, was declared by Green himself to be untrue. He stated, on being questioned by the Illinois District Mine Convention at Peoria, Ill., May 2: "I am not responsible at all times for what appears in the press reports, and take this opportunity of denying the article. I never agreed under any circumstances to waive recognition of our organization in Colorado."



How They Look to Each Other in Relative Importance

The Del Monte Process

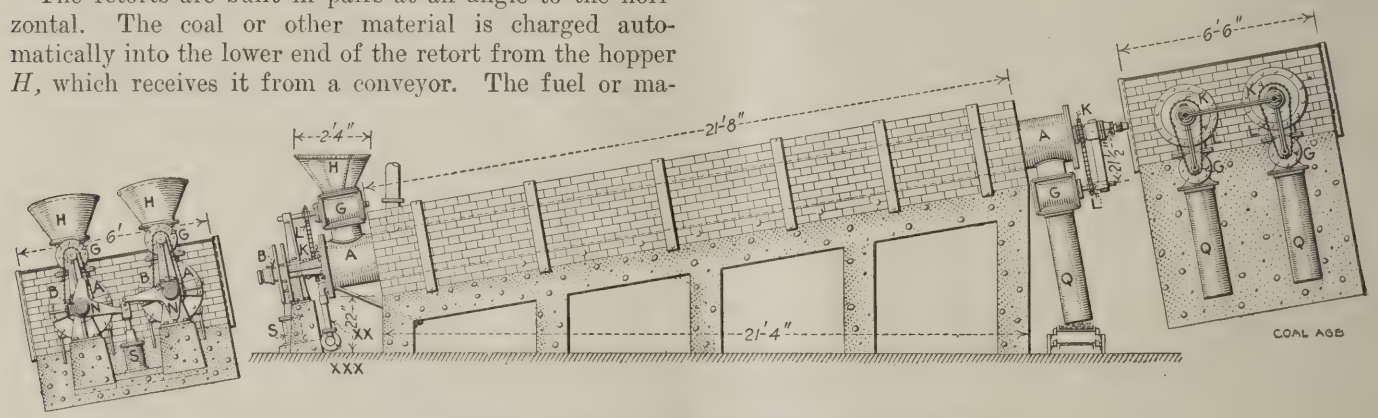
By Samuel Dean*

SYNOPSIS—By this process, oil, gasoline and paraffin wax are secured as byproducts in coke making as well as tar, gas and ammonium sulphate.

Through the courtesy of the Oil & Carbon Products, Ltd., an opportunity was secured of examining the Del Monte plant, which is in operation near London, England. As is well known, there is a great demand at the present time for "oil" and motor spirit (gasoline), and the future will see this demand increased. Anyone interested may well pay a visit to this particular plant.

Crude oil is here distilled from bituminous coals, cannel coal, shale and peat. The hydrocarbons are driven off at the different temperatures at which they vaporize, and are then condensed by being brought into contact with cooler material. The liquid obtained is not a heavy tar, but a true petroleum of the paraffin series, which yields by treatment 30 to 40 per cent. of motor spirit.

The retorts are built in pairs at an angle to the horizontal. The coal or other material is charged automatically into the lower end of the retort from the hopper *H*, which receives it from a conveyor. The fuel or material passes from *H* into an air-tight rotary valve *G*, the function of which is to prevent the inlet of air or the outlet of gas.



Coke Retort Employed in Del Monte Process

The valve *G* delivers into the tube or retort *A*. *B* is an interior tube which runs through *A*, an Archimedean screw conveyor being threaded thereon. The hydraulic ram *S* actuates the hollow tube and Archimedean screw through the levers *N*.

The fuel material after being divested of the required byproducts, such as oil, gas, etc., is discharged from the tube *A* through the valves *G* to coke conveyors by means of the pipe *Q*. The valves *G* are operated from the hollow tube *B* by the chain and sprockets *L* and *K*.

The retort is heated externally by gas burners placed in brickwork beneath it, and internally by similar burners placed in the hollow tube *B*. No condenser is required, the incoming fuel condensing the greater portion of the volatiles which run from the pipe *XX* in the form of liquid distillates. The incondensible gases pass off through pipe *XXX*, to be scrubbed for the recovery of ammoniacal liquor and light spirits. This gas is afterward used for heating the retorts and in otherwise carrying on the process.

The flame temperature of all the burners varies from 1000 to 1100 deg. F., and the material being treated never reaches even these comparatively low temperatures. Depending upon the nature of the material being treated, the time consumed during its passage through the retort varies from 45 to 75 min. The coke or other residue is discharged in a cool state and quenching is not necessary.

130 Gallons of Oil Is Sometimes Secured

The yield of crude oil varies from nothing to 130 gal. to the ton, according to the material being treated. A sample of Scotch cannel coal produced 85 gal. of oil to the ton, the specific gravity being 0.82 to 0.92. Such oil could be scrubbed and used for motor purposes, although, of course, not very satisfactorily.

The analysis of the cannel coal was as follows:

	Per Cent.
Moisture	3
Volatile matter	42
Fixed carbon	41
Ash	14
Total	100

The residue from bituminous coking coal is semi-coke or smokeless fuel, which is excellent for domestic purposes. Ten to 12 per cent. of the volatile is left in this residue and is sufficient to give free combustion. If metallurgical coke is required, the residue can be further treated at high temperatures.

Bituminous coal with 30 per cent. of volatile matter yields approximately $\frac{8}{10}$ of a gallon of oil per ton for each 1 per cent. of volatile; 30 per cent. of this will be motor spirit, 30 per cent. fuel oil, 40 per cent. paraffin wax and liquid bitumens. By sacrificing the last two, the yield of motor spirit can be increased.

Taking a ton of bituminous coal with an analysis as follows: Volatile matter, 35 per cent.; ash, 5 per cent.; moisture, 4 per cent.; fixed carbon, 56 per cent., the yield would be about 30 gal. of crude oil, which would convert into 12 gal. of motor spirit and 5 gal. of fuel oil. The byproducts would also include 56 lb. of pitch, 15 lb. of sulphate of ammonia and 1200 lb. of residue fuel.

The expense of the process would be about as follows:

The cost of retorting would be	24c. a ton
The cost of converting oil	2c. a gal.
Standing charges	24c. a ton
Contingencies	10c. a ton

A plant capable of treating 1000 tons a day can be attended to by 4 to 6 men per shift, with an almost entire absence of noise, smoke or external heat. The whole proc-

*Croppers Lathom, Ormskirk, Eng.

ess is mechanical and continuous, the charging and emptying of the retort being done automatically and without interruption. At the present time the plant is stopped every night and started again in the morning. Nearly always a different sample of material is tested each day, as within two hours sufficient heat can be gotten up to start running.

The capital outlay for a complete plant is, roughly, $500 per ton per day, or, in other words, $500,000 to handle 1000 tons daily.

Fifty to 60 gal. of crude oil were obtained from one ton of bituminous shale or "oil shale." This substance contained from 40 to 50 per cent. of volatile matter. Tests are being made of shales and other material from Utah, Wyoming, North Dakota, Australia, Africa and other parts of the world. The cost of mining shale, which lies in thick beds near the surface, with a steam shovel, should not be more than 10c. per ton.

It is interesting to note that the inventor of the Del Monte process, Smith Everett, is an American. His home is now in England, but he was born in Palmyra, N. Y., and learned engineering in the United States. He was formerly engaged in railroad work (electric and steam) in Cuba. Mr. Del Monte is a Cuban. The concessionaire is W. H. Heath, 154 Cromwell Road, Kensington, London.

The writer desires to express his thanks to the above gentlemen for courtesies shown him during his visit.

The Byproduct Coke Industry in Russia

A few years ago the byproducts from coke works here were allowed to go to waste, but now there are in South Russia 10 factories, owned by nine firms, for the production and utilization of these products. During the first nine months of 1913, these firms were operating 887 recuperative coke ovens, in addition to a larger number not of the recuperative type, the former producing byproducts. The monthly average number of working recuperative ovens was 825, as compared with 389 in the corresponding period of 1912. The increase in the last four years in the proportion of recuperating ovens to the total number of coke ovens is shown by the following table:

Year	All Ovens Number	Recuperating Ovens Number	Recuperating Ovens Per Cent.
1910	4524	344	7.6
1911	5024	344	6.8
1912	5318	799	15.0
1913	5747	907	15.8

The aggregate of European Russia's coal deposits was stated in a recent report of the Russian Geological Committee to be about 75,000,000,000 tons. As regards the quality, it is said that the Donetz basin is the only locality that can supply metallurgical coke. The following table, covering a period of 10 years, shows in tons of 2000 lb., the quantities of coal used for coking in Russia and the amounts of coke produced therefrom:

Years	Coal	Coke	Years	Coal	Coke
1903	2,774,733	2,020,831	1908	3,963,600	2,932,560
1904	3,656,362	2,639,920	1909	3,958,866	2,890,393
1905	3,559,610	2,597,676	1910	4,079,930	3,018,213
1906	3,415,098	2,479,249	1911	4,930,655	3,642,647
1907	3,823,380	2,794,860	1912	5,689,411	4,252,697

Prices for coke given out on March 31, 1914, were as follows: First quality, $6.87 to $7.72 per ton; second quality, $5.72 to $6.29; small coke, $2.15 to $7.44; metallugrical coke, first quality, $6.58 to $7.44; briquettes, $5.44 to $6.02.

Coke and Byproducts in South Russia

The nine firms previously mentioned produced in all of their ovens 1,788,660 tons of coke during the first nine months of 1913, of which 1,022,400 tons went through the ovens designed for recuperating byproducts. The following table shows, in tons of 2000 lb., the production of byproducts during 1911 and 1912, and the first nine months of 1913:

Byproducts	1911	1912	Jan.-Sept., 1913	Byproducts	1911	1912	Jan.-Sept., 1913
Coal tar	9049	13,916	30,771	Sulphate of ammonia	357	2445	10,434
Ammonia water (25% strength)	3295	5,548	13,228	Spirits of ammonia	141	92	120
				Pitch	2745	2889	9,969
				Heavy oils	2229	2369	8,909

The increase in production was due to increases in the size and the number of ovens. Sulphate of ammonia is beginning to be used in Russia as a fertilizer; but most of it is still exported, principally to the southern states of Europe. The pitch found ready employment within the country, where it is mainly, if not exclusively, used in the production of briquettes. The heavy oils are used to great advantage for the impregnation of railway sleepers. Many more recuperating ovens are planned for 1914 and it is believed that all the pitch produced will be absorbed by the rapidly increasing output of briquettes, of which it is expected that over 500,000 tons will be manufactured in 1914. Some years ago briquettes were manufactured in Odessa from cheap coal dust, but they fell into disfavor when they began to contain too much clay, sand, and ashes.

The development in Russia of the manufacture of sulphate of ammonia, spirits of ammonia, and pitch has resulted in the almost total cessation of imports of these articles. Benzol, phenol, naphthalin and anthracene continue to be imported because they are not produced locally.

The Coppe system of ovens predominates in south Russia, but many ovens of the Carway and Otto types are also to be found. The control of the sale of coke byproducts from south Russian works is almost wholly in the hands of a firm in Kharkof, which publishes no price lists and is very conservative about furnishing information as to the average prices of the byproducts that it handles. A list of the firms in south Russia engaged in the production of byproducts from coke may be obtained from the Bureau of Foreign and Domestic Commerce or its branch offices.—*Daily Consular and Trade Report.*

Value of Service

[Quoted by David Ross in address before mine inspectors' convention at Pittsburgh, June 11, 1914.]

Is your salary all you receive for your working?
Is it prospect of hunger that keeps you from shirking?
Do you toil for the coin and for that by itself?
Is your industry wholly a question of pelf?
If so, heaven pity you, poorest of men,
You ought to be back with the mollusks again
In time protoplasmic—'mid pliocene murk,
If your salary is all you receive for your work.

If there isn't a smile from someone well served,
If there isn't a soul whom your kindness has nerved,
If there isn't a service you've rendered—beyond
The price of a coupon or government bond—
If there isn't a thrill of achievement in
The work of your day—something worthy to win
Past cash—you're a negligible part of the mob,
If your salary is all you get out of your job.

—Strickland Galligan in Indianapolis "Star."

Coke Manufacture and Blast Furnaces in Inner China*

SYNOPSIS—Coke was first made without ovens; later hand-washed coal and rectangular ovens of clay or brick were built. The coke is principally used in the smelting of iron in small clay furnaces, blast for which is furnished by hand.

An experience of several years in the oldest mine of China, known as the Pinghsiang mine, the only one in that country producing coke in accordance with European practice in commercial quantities, afforded an opportunity to become acquainted with the original methods of coke manufacture pursued in the provinces of Kiangsi and Hunan.



Interior of a Chinese Foundry, Showing Primitive Blast Furnace and Means of Supplying Draft

These methods, although relics of former times, are still largely followed, and a few ancient blast furnaces are yet in working condition. These furnaces, both in design and construction, give evidence of extremely early origin and are of especial interest to those historically inclined.

Following the fate of the ancient coke ovens, these blast furnaces are gradually becoming extinct, their disapearance being in direct ratio to the increase in the imported products—an increase which has been consistent in spite of the disadvantage of the great distance that separates China from foreign sources of supply.

The simplest method employed in the manufacture of coke consists in piling the coal taken from a suitable seam in a columnar form 16 to 19 ft. in diameter and 6 to 7 ft. high. Ignition is made at the bottom, and after the entire mass has reached incandescence it is covered from the bottom upward with a mixture of coke ashes and common clay. When the heat has cooled off after several days this jacket is removed, the coke then being available for distribution.

Hand Washing Is Employed.

Since the combustion losses were over 50 per cent. and the supply of a suitable grade of coal was not readily available, the next step in the evolution of coke-making methods represented a great advance. The coal coming from the mines with an average ash content of 25 per cent. is first crushed by wooden mallets or beetles, and then washed by hand in wooden tubs. In these tubs a flat, open-sided trough or basket made of bamboo matting is swung back and forth in such a manner that the lighter or purer coal is washed off and deposited in the bottom. The remainder or heavier material left in the trough contains about 50 per cent. of ash content. This is used as a material for firing the coke.

When the tubs have filled up a sufficient amount with

*Note—Abstracted from a translation from "Stahl und Eisen."

the washed coal they are emptied into carrying baskets, which are transported to the ovens slung on poles between the shoulders of two carriers.

The washing of four tons of crude coal represents a day's work for a laborer, the compensation being 4 cents, in addition to which he receives his meals, which represent an equivalent of 2 cents. An analysis of the coke made from coal washed in this manner shows an ash content of from 10 to 14 per cent.

The coke ovens are made of air-dried brick or clay, the walls being about 16 inches thick. They are rectangular in form and open at the top. They cover a space of about 8 ft. 3 in. by 65 ft. 6 in. at the base, and are 2 ft. 5 in. high on the inside.

The ground forming the floor of these ovens is first well tamped and then paved with brick. Spaced about 3 ft. apart in the long sidewall are openings approximately one by two feet in cross-section, provided for ignition purposes. These are faced on the opposite wall by brick chimneys 3x4 ft. in cross-sectional area, and about 3 ft. high.

The openings above mentioned are filled with wet coal transported in baskets, while the charge for coke making is covered with unburned brick and dabbed with clay and ash in as air-tight a manner as possible.

The material previously placed in front of the ignition openings is then fired. When combustion has progressed through the charge of coal as far as the chimney on the opposite wall, all of the air openings are closed.

These ovens are calculated to contain a charge of about 24 tons, delivering aproximately 16 tons of coke, although the average may not be so high. The life of the fire depends largely upon the amount of rain which falls during the coking process. This often soaks through the coal in the ovens to such an extent that coking is prolonged three days or more, during which time the ignition fires are frequently restarted five or six times. Ordinarily, however, the ovens are not tampered with, so that a good quality of hard coke is obtained, possessing a compressive strength of 2130 lb. to 2580 lb. per sq.in.

The construction of these ovens is simple and inexpensive, and their operation requires but little attendance. The losses due to wasteful combustion and the nonutilization of gases, however, are correspondingly high, and the production of one ton of coke requires an equal amount of ignition material.

Notwithstanding the fact that the coke produced under these conditions is uneconomical in the light of modern practice, the method is doubtless practical for small mines having limited capital.

This coke is used by the Chinese for smelting in small continuous blast furnaces. Limonite or brown iron ore and hematite, red iron ore, are usually employed for this purpose.

Small Clay Blast Furnaces Are Employed.

The type of blast furnace used consists of a conical vessel 6 ft. 6 in. high and divided into upper and lower halves. The walls are made of clay 12 in. thick, and the inside diameter at the top is 4 ft. and at the bottom 22 in. The walls are held together by circumferential iron bands.

Two openings lead into the bottom. The upper one serves as a passage for the air blast, and the other, which is closed by a clay plug, acts as a discharge for the pig iron.

To produce a draft a section of a hollow tree trunk is employed. In this a leather-packed piston is moved back and forth by hand. A suitable set of flap valves is employed, and the resulting air blast is conducted to the smelting furnace through a pipe.

The furnace is so arranged that for purposes of discharging its contents it can be tilted about 30 deg. toward the outlet opening. Charging is done hourly, brown iron ore and black sand, together with coke of the above manufacture, being mostly used. The output of such furnaces ranges according to the quality of ore from 1000 to 1500 lb. per day.

For smelting any given quantity of iron an equal weight of coke is necessary. Small pigs about 5 in. long and 1¼ in. square are cast from these furnaces, also small plates about 10x5x12 in. are produced. Although an analysis shows a comparatively high percentage of sulphur and silicon, this iron is not as brittle as might be expected. It is used chiefly in the manufacture of household dishes and utensils and in agricultural implements.

Ohio Breaks Coal Record

All previous records in the coal production of Ohio were exceeded in 1913, both in quantity and value, according to E. W. Parker, of the U. S. Geological Survey, notwithstanding the fact that coal-mining operations were seriously interfered with by an unprecedented flood in March and April of that year. It is estimated that the possible production was cut down probably 5,000,000 tons on account of high water.

In spite of this interruption the production increased from the previous maximum output of 34,528,797 short tons in 1912, to 36,200,627 in 1913, or a gain of 1,671,830 tons. The value increased from $37,083,363 to $39,948,058, while the average value per ton showed an advance of 3 cents, or from $1.07 in 1912, to $1.10 in 1913.

The average number of working days made by the employees was 206 as against 201 in 1912, and the average production by each man employed was 790 tons for the year, compared with 758 in 1912. In 1913, 32,642,848 tons or 90.2 per cent. of Ohio's total production was mined by machine. At the present time Ohio has less than 4 per cent. of the total output reported as shot off the solid. Out of a total of 1681 machines in use in 1913, 1421 or nearly 85 per cent. were of the chain breast type. Short-wall machines are growing in popularity as is indicated by an increase in their numbers from 106 in 1912, to 187 in 1913. The number of long wall machines increased from 2 to 17, and the number of pick machines decreased from 77 to 56.

Reports of the Bureau of Mines show that the coal-mining fatalities in 1913 numbered 165 as against 133 for the previous year.

Washington State First-Aid Meet

A first-aid and mine-rescue contest will be held at Seattle, Wash., on July 22 and 23, under the auspices of the Bureau of Mines, the Washington Coal Operators' Association and the State Mine Inspection Department.

Who's Who in Coal Mining

James Pearson

Out in Montana there is one man who graduated from the school of "hard knocks" and has succeeded with only that brand of college education. The fellow we refer to is James Pearson, who was born in Massillon, Ohio, 49 years ago.

He started as a trapper boy when 11 years old, and by the hardest kind of work advanced himself to the po-



JAMES PEARSON

sition of mine foreman with the What Cheer Coal Co. in Iowa. Later he became superintendent of the same company, afterward leaving the mines to accept a position as traveling salesman with the Harrison Machine Company The call of his early vocation, however, was too strong for him to resist, and he again took up coal mining, serving as foreman for the Sand Coulee Coal Co. in Montana. In a short time he was appointed superintendent of the Sand Coulee Co., later becoming superintendent of the Cottonwood Coal Co., another Montana concern, subsidiary to the Great Northern R.R.

Mr. Pearson's next position was that of manager for all the mines of the Cottonwood Coal Co. He continued in this capacity until he was appointed mining engineer for the Great Northern Ry. Co.

He is president of the Neal Creek Cattle Co., director of the Brown Coal Co., and president of the Sage Creek Coal Co., which corporation is opening a large coal mine at Lehigh, Fergus Co., Mont. He is also a member of the Electric City Club and the Elks Club, both of Great Falls, Mont. In addition, he is an executive board member of the Montana Coal Operators' Association. Mr. Pearson has been with his present company 22 years, and during that long period of administration has not had one day's shut-down on account of strikes. Nothing could bear more forcible witness to his ability as a leader and manager of men.

Henry S. Geismer

It used to be the vogue to always go West when seeking an avenue to dissipate business energy, and incidentally accumulate a bank account, but the direction of travel has changed somewhat, and many men look upon the South as the land of promise. One young man who has cast his lot in the southland is Henry Geismer. He first saw the light of day in Union City, Mich., early in the spring of 1875.

Mr. Geismer had excellent advantages in the way of an education ,graduating from the University of Mich-



HENRY S. GEISMER

igan as a civil engineer in 1897. Without wasting any time amid the pines of Michigan, he hit a hot trail for Alabama, secured a job right away as mining engineer with the Sloss-Sheffield Steel & Iron Co., later serving as engineer for the Tennessee Coal, Iron & R.R. Co.

This work occupied about eight years of Mr. Geismer's time and effort and prepared him well for his next job as chief engineer of the Republic Iron & Steel Co. (southern district). From 1907 to 1909 he filled the

position of general superintendent of coal mines for the last-mentioned company in the same southern district.

From 1909 to 1911 he was district manager of Georgia and Tennessee for the Southern Steel Co. While serving in this position he had charge of coal mines, ore mines, limestone quarries and two blast furnace plants.

In 1911 Mr. Geismer decided to start in business for himself, and formed the Keiser-Geismer Engineering Co. This new firm started business in September and met with much success from its earliest inception. In December, 1911, he was appointed receiver of the Chattanooga Iron and Coal Co., a $700,000 corporation. In December, 1912, he was appointed one of three appraisers for the properties of the Georgia Iron & Coal Co., a concern capitalized at $1,000,000.

He is a member of the American Institute of Mining Engineers and is a technical writer of ability and prominence.

Coke Crushers

By F. V. Hetzel*

SYNOPSIS—For best results coke must be split, not crushed. The most successful machines for this purpose are made with corrugated mating rolls built up of chilled segments. These should be provided with some means for uniform feeding.

In crushing run-of-oven size coke to smaller sizes, there are two important considerations: first, that the coke be reduced in size with a minimum amount of breeze or dust; second, that the crusher be such as to produce a fairly uniform range in the size of the product.

The brittle nature of coke calls for handling of somewhat different kind than that to which coal is ordinarily subjected. The coke should be split rather than hit or mashed, and the crusher should be such as to give the material this treatment with the minimum amount of contact between the lumps of coke and the crushing surface. On this account it has not been found practicable to size coke in crushers of the jaw or of the centrifugal hammer type. Two-roll crushers are in general use for reducing the size of coke, and these are of several varieties.

Over in England some gas works use a crusher which has spiral steel cutters, like lawnmower blades, mounted close together in the circumference of one roll, the other being made of a number of steel blades or disks with saw teeth, mounted on the roll shaft. The idea in this design is that the saw teeth act as a feed while the cutter blades shear the coke. This machine has not been used to any extent in this country, the disadvantage being that bits of coke wedge in between the saw blades, and in doing so and in being pushed out again some of the pieces are reduced to dust.

Some coke crushers in successful use have pyramid-shaped teeth, like those used on coal crushers, but the trend of modern practice is toward machines with grooved or corrugated rolls, the length of the grooves being parallel to the roll shaft. These grooves vary in width from 2½ in. to 3½ in. and in depth from 1½ in. to 2½ in. The grooves are rounded on the bottom so that pieces cannot stick in them, and the action of the machine is such that lumps which bridge over between the tops of adjacent grooves are split or cracked by the shearing action of the ridges on the mating roll.

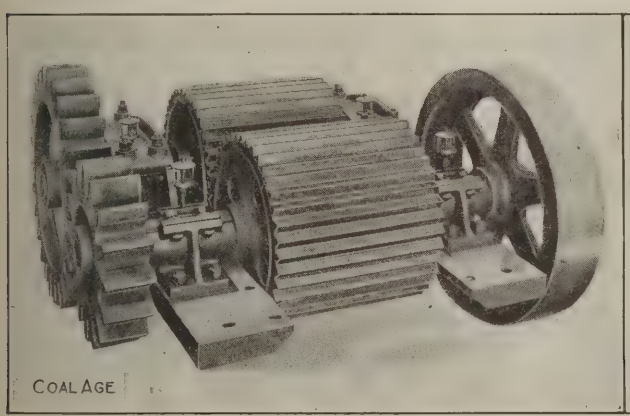


Fig. 1. Crusher with Chilled Cast-Iron Rolls

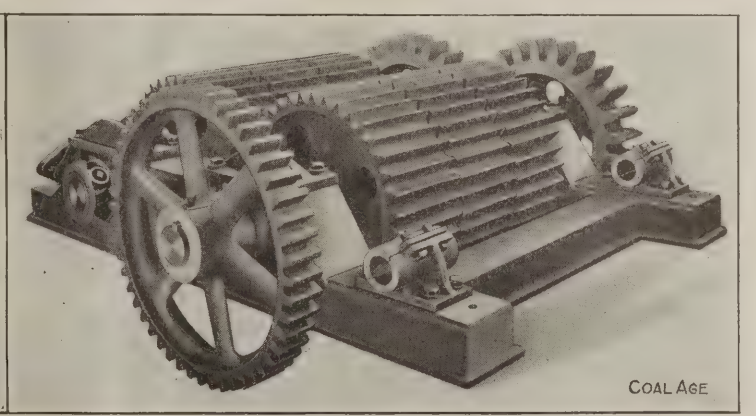


Fig. 2. Crusher with Rolls in Sections

Rolls of this kind are, in the smaller sizes (see Fig. 1), made in one piece of chilled cast iron; in some of the larger sizes, the rolls are made in sections which can be turned end for end or changed in position on the shaft if the diameter should become unevenly worn (see Fig. 2), but in the best crushers the rolls are built up of chilled iron segments bolted to heavy steel or cast-iron centers which are keyed to the roll shaft (see Fig. 3).

Feeders Are Necessary

In order to size coke properly the feed to the crusher should be steady and uniform and evenly distributed across the face of the rolls. If coke is drawn direct from a bin into the crusher, or if a skip load or carload

*Chief engineer, Link-Belt Co., Philadelphia, Penn.

is dumped into it, the crowding and tumbling of the material on top of the rolls causes useless breakage and the production of too much breeze.

At the same time, the middle portions of the rolls drag in more coke than the ends, and as a consequence the middle part has more work to do, becomes smaller in diameter than the ends, and it becomes difficult to maintain a proper sizing of the product. The same bad effects are produced if the crusher is fed by a chute which is narrower than the face of the rolls.

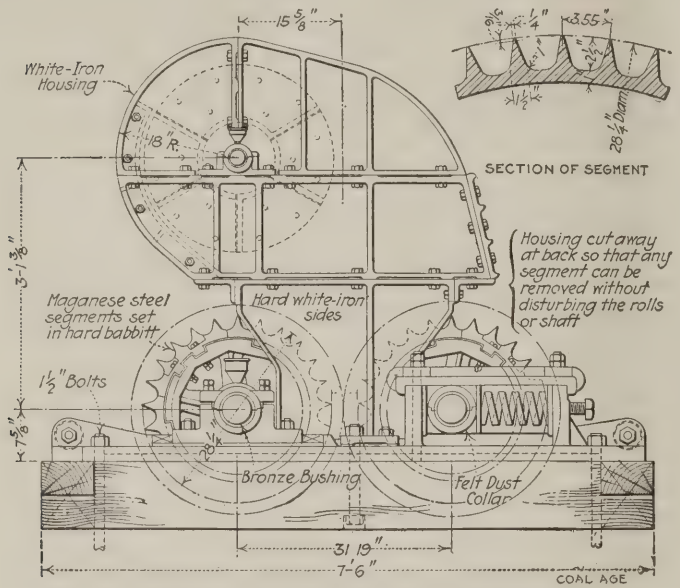


FIG. 3. CRUSHER WITH CHILLED SEGMENTAL ROLLS

The remedy for both of these evils is to use a feeder of some kind. Sometimes this is a belt conveyor or a conveyor of the steel-apron type (see Fig. 4). The advantage of the latter is that it works at a slow speed and will draw coke out of a dump hopper without that danger

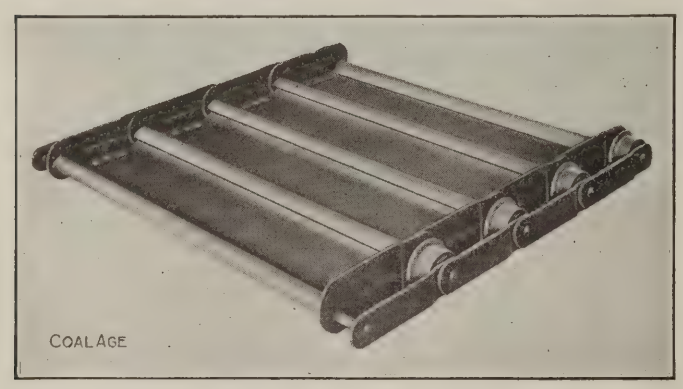


FIG. 4. SECTION OF STEEL APRON USED FOR FEEDING

to the carrying medium which is always present when a belt conveyor is used for feeding.

THE REVOLVING VANE FEEDER HAS DECIDED ADVANTAGES

Another feeder which has decided advantages is the ordinary vane or roll feeder, and when this is mounted directly on the crusher frame the installation becomes quite simple and compact (see Fig. 5). The crusher shown in the picture has rolls 31 in. in diam. by 30 in. long, mounted on heavy shafts geared together by long tooth spur gears, the teeth being made long so that the space between the rolls can be varied to produce crushed coke of several ranges of size.

The rolls are built up of chilled-iron segments bolted to cast-iron centers, and the frame or housing is so made that either shaft can be backed out of position and lifted clear without disturbing any part of the frame, feeder or the chutes. In a similar way any segment on either roll

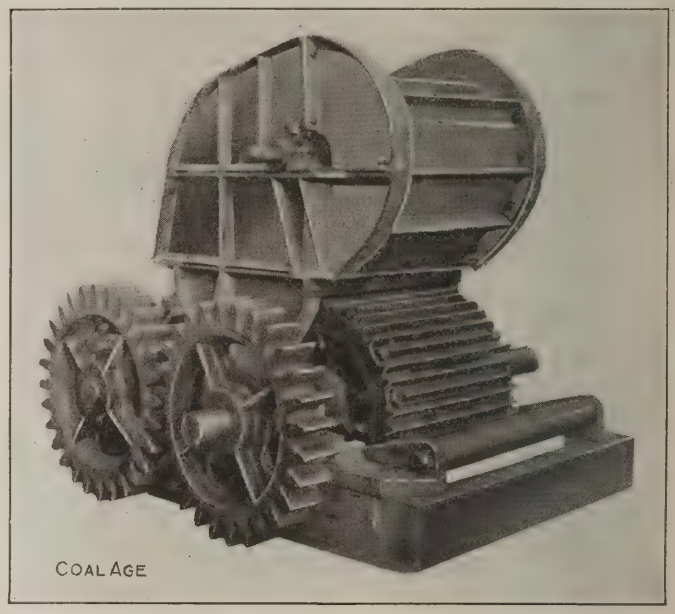


FIG. 5. CRUSHER WITH VANE FEEDER MOUNTED ON THE HOUSING

can be unbolted and a new one inserted without disturbing the roll shafts or the setting of the gears.

The feeder roll is made of hard cast-iron plates or vanes fastened to centers keyed to the shaft; a slow-speed drive is employed, and the plates or vanes pick up coke from the chute and deliver it to the crusher at a uniform rate. At the same time they distribute it over the full face of the rolls and prevent the uneven wear previously referred to.

Crushing coke is not easy work. It demands hard rolls, hard cast-iron housing plates, dust-tight protection for bearings and convenient means for copious lubrication. No crusher can be depended upon to give a perfectly sized product, nor one which is entirely free from breeze. Hence it is necessary to use screens for separating the sizes and removing the fine material.

American Mine Safety Association

The business meeting of this association will be held in New York City, Sept. 7 to 10, inclusive. The first-aid and mine-rescue contest will be held at Terre Haute, Ind., on Saturday, Sept. 12. The details are not yet fully arranged. H. M. Wilson, the secretary-treasurer of the association, may be addressed at the Bureau of Mines, Pittsburgh, Penn.

Apart from the high economy and reliability of large steam turbo units there are other reasons in favor of turbines especially for electrical work. The turbo-generator is capable of holding momentary overloads even up to 100 per cent. without detriment to the plant itself.

Editorials

True Fuel Economy

There are at some coke works as many as four possible sources of power, and at all two. These last are the waste gases in coke making and the coke breeze, which latter, though available for the raising of steam, has no commercial value.

In plants where there are washeries, there is also the washer refuse, which may be separated into two parts, a fair boiler fuel running about 16 or 20 per cent. ash and a worthless refuse which is only fitted for the culm pile. Perhaps if the boiler feed mentioned were properly dried, coal having even more than 20 per cent. of ash might be used with economy. However, at present, such use is not practicable as the boiler fuel contains 6 or 7 per cent. of "free" water and is usually fed by shovel, such wet and adhering coal not being mechanically stoked. Under these conditions, it does not pay to burn refuse having a lower thermal efficiency than that indicated.

Another source of power is often found in the roof of the mine; the "rooster bed" of the Pittsburgh seam, for instance, being nearly always too sulphury to convert into coke, but well suited for steam uses on the plant. In many cases, large quantities of this coal are brought out with that portion of the draw slate which is not stowed in the mine. This fuel piled with the slate in great hill-like dumps soon catches fire, burns and fills the valleys with sulphurous fumes and clouds of smoke.

These are the great losses in the coke region. We should perhaps lash ourselves into a fury about them, and imitate the conservationists in condemning the operators for them. Perhaps, however, the charge will rest more appropriately on other shoulders, for the losses will hardly be eliminated till there is a demand for power in those sections of the country where they occur. The mines, it is true, do themselves need power for their operation and this need is continually on the increase, but the many sources of fuel which the wastes provide cause the operators to utilize part of some one of these sources and neglect all the rest. Almost any one alone will give the average operator all the power he wants.

And in this condition there will be no change until the sections of the country now producing coal are supplied with factories and peopled with artizans making finished products. As long as the New England states and the state of New York produce the bulk of the articles in common use, largely out of raw materials manufactured in the coal-mining states, and as long as the fuel for the factories making these products is brought hundreds of miles over the railroads and along the American coast at a useless expense of more fuel, so long will other fuel values, too low grade to transport long distances, be wasted at their source.

One of the crying needs of industry today is for a relocation which will make operation cheaper. Manufacture and fuel should come closer together. We believe that in England the correct allocation of industry has been more nearly reached than in this country. Unfortunately, from an early date excellent railroad connections have made the separation of mine and factory less objectionable and wasteful than it well might be, but it is hardly necessary to declare that because the fault might be a greater source of loss than it is, is no conceivable reason why it should not be rectified.

A drift from the present coal-consuming to the coal-producing sections should have taken place long ago and even today such a tide of industry is not too late. We discuss freight rates and coal prices with unreasoning fierceness and talk economy with a convincing knowledge of thermal units, but might we not show equal discretion in discerning that freight rates will never be lower than when eliminated and fuel will never be cheaper than when we obtain it from the combustion of waste products? These eliminations and economies we can only secure by locating our factories where the logic of the situation would place them.

If you would take a short convincing course in "motion study," stand by a coal-carrying railroad and watch the cars passing by, transporting fuel that should never be transported and returning with manufactured products to the places where those products should have been advanced to their completed state. One-half our present-day travel is the result of a habit rather than the outcome of an economic study of the needs of industry.

And then the thoughtful observer seeing the riot of transport on our trunk lines, shuffling freight that never needed shuffling, will wonder whether a tariff between districts which would prevent fuel from moving to factories instead of factories moving to fuel would, on the whole, be a curse or a blessing to humanity in general and this country in particular. Would not such a measure, perhaps, unthinkable in some ways, tend to bring the coal consumer and producer into closer touch to the benefit of both?

The Good Faith of the Union

Settlements are still being made between miners and operators, though over three months have passed since the first day of April, the day on which the old scale expired. Yet outside of Ohio there has been no real suspension or strike in the central competitive district, though in some places the operators, and in some the miners, have been disposed to lay the mines idle, despite the vote at Indianapolis requiring a continuance of work during settlement. But on the whole, it must be conceded that J. P. White and his coadjutors have endeavored to keep faith with their declaration that they would not suspend or strike till it was clear that an agreement could not be secured by any other method.

We never suspected that Mr. White did not mean all that he said, though, of course, we knew, and the president of the United Mine Workers would not have denied, that he came to the conference with the strike as a potential weapon, even if he did not intend to use it. In fact, some think that he had already decided, when he came

into conference, that, if coaxing failed to accomplish his purpose, he would concede everything and indeed he ultimately did, after the nation's business had rapidly gone from bad to worse, and hopes for an increase in wages became nil. Some of the operators at the time, however, did suspect chicanery and frankly told him so. We are pleased to note that they were wrong.

Perhaps two years from now the leaders of the United Mine Workers will come to the conference having power, in case of a deadlock, to submit the matters at issue to arbitration. Meanwhile why not now discuss the basis on which arbitration should proceed? Otherwise, we shall establish a court without precedents and without known principles and may not find its decisions to our liking. Perhaps a constitution as a basis for decision would be a considerable help in making both sides willing to submit their case or ready to agree, before submission to arbitration becomes necessary.

When is a rise in rate justifiable? We fear some operators are a little disposed to say, "never, so long as it can be avoided"; whereas surely there are often good reasons for increases in wages, and a little investigation would furnish them as a basis for arbitration.

Looking backward, the doubts of Mr. White's faith seem ungenerous. He offered the operators exactly what they asked. They realized that he was making the public favorable to his ends by the concession and feared that he might be proposing nevertheless to play false. So they increased their demands to include arbitration. White might have been willing to concede it, but could not, in view of his instructions from Indianapolis.

The refusal to accede to arbitration did not prove bad faith and now we think it will be conceded that White never intended to do less than he promised. The logic of the situation and the pressure of bad times eventually proved that it was not for him to demand concessions, but to accept the operators' propositions unaltered. But in all the protracted discussions, he never shifed his position that there must be no strike, if an adjustment were obtainable without it.

Machine-Mining Fatalities

It is interesting to compare the fatalities in machine rooms with those in the breasts and pillars which are worked by hand, and to note how much fewer are the deaths resulting from machine methods than those resulting from pick mining in the bituminous mines of Pennsylvania.

SOME FATALITIES IN BITUMINOUS MINES OF PENNSYLVANIA IN 1912

Pick miners killed at face of workings by falls of roof.	92	
Pick miners killed on pillars by falls of roof.....	75	
Company men killed on pillars by falls of roof.....	1	
Total men killed in breasts and pillars by falls of roof		168
Miners killed by mining machines	1	
Machine runners and scrapers killed at face of workings	11	
Machine runners and scrapers killed removing pillars.	1	
Machine runners and scrapers killed by machinery....	4	
Machine runners and scrapers killed by electricity at face or in entry	3	
Loaders killed at face of workings.....	28	
Loaders killed on pillar work.....	1	
Loaders killed on entries by electricity.....	3	
Total men killed in breasts and pillars where machines are employed		52

This shows that though more than half the coal (50.8 per cent.) was mined by machinery, not one-fourth part of the accidents occurred in machine rooms and pillars reckoning all accidents likely to be affected by methods of operation except possibly explosions of gas, dust and powder. To include these figures would hardly change the calculation.

These results are much more convincing than those in Illinois, which have excited so much interest and concern. They apply also to a state with almost three times as large an output and where we believe machinery is more evenly distributed. It may be said that they prove nothing absolutely, for machines are excluded from the most dangerous places, but we nevertheless believe that mining machines do help the safety movement.

They speed up recovery and so enable the coal to be mined before the roof is weakened, for there seems to be something in the theory that it takes time for a mine roof to break. They increase the output per man and so reduce the fatality rate per ton. They prevent blasting out of the solid and so render heavy shattering shots unnecessary. They make it needless for men to crawl under the cut in the dangerous manner of the pick miner and perhaps the reduction in the labor involved may render the machine cutter better able to attend to his roof testing. The greater frequency of inspection where a large tonnage comes from a small number of rooms may also be a cause of this better result.

Anthracite Region--A Modern Tower of Babel

The seven counties of Pennsylvania where anthracite mining is the principal industry, have a total population of 1,122,361 people, of which number 529,262 or 47.15 per cent. are foreigners, or the children of foreign-born parents. According to race, the Russians come first with 119,382; next in order come the Austrians, Irish, Germans, Italians, Welsh, English, Hungarians and Scotch.

Is it any wonder that the officers of anthracite companies, as well as the state inspectors, have difficulty in securing obedience to mine rules and mining laws? A large number of these foreigners are too old to master the English language, and it is because of this fact that the companies post notices in half a dozen languages.

When we consider this polyglot population, it is easier to understand the difficulties that invariably arise when employers and employees about the mines attempt to reach an amicable understanding in regard to wages and conditions of employment. Out of such a heterogeneous mass of men there is little likelihood of any large percentage of them gaining a correct idea of what it is they are contending for in their labor disputes. There is no doubt but that the labor leaders clearly understand the facts, but we doubt if even they can convey a lucid idea of their demands to the men they represent.

There is surely a wide field for effective work on the part of the state, the Y. M. C. A., and local mining institutes, in the hard-coal regions. Mining companies have of necessity come to a full recognition of the true situation and realize that their problems of ventilation, pumping and engineering are not of any greater importance than the vital question of educating and satisfying their employees. Industrial peace and industrial efficiency are essential to the success of any mining or commercial enterprise, and peace and efficiency cannot exist if the men entirely lack in understanding.

The successful corporations of the future will devote much time and effort to the study of social and educational work.

Motor Trucks for Handling Coal

That a large-capacity motor truck with power-dumping body may be just as efficient and economical on short-haul work as on long, has been abundantly proved again and again by the record sheets of the Youghiogheny Coal Co., of Pittsburgh. This company has shown it to be practicable to deliver from 250 to 400 tons of coal with a Peerless five-ton truck in a single night.

These tonnages have not been carried under special conditions, when the stage has been set for record-breaking, but were accomplished in the usual course of the company's business without any previous preparation whatever.

The Youghiogheny Coal Co. has a contract for coaling numerous large buildings in the downtown district of Pittsburgh. It operates a dock at the foot of Eighth St., where coal is unloaded from barges into overhead bins. The average haul from the dock to the various buildings which the company supplies is four-fifths of a mile.

On the night of Apr. 14, last, truck "C" of the company's fleet—a five-ton truck—left the dock on its first trip at 6:30 o'clock. By 11:30 o'clock it had hauled 30 loads to the Oliver power plant. Two loads went to the Fort Pitt Hotel, between 11:25 and 11:36 o'clock. Seven loads to the Union bank building took from 11:45 to 1:22 a.m. From 1:37 to 4:22 a.m., 11 loads were carried to the Farmers' Bank building. These 11 loads, owing to conditions at the building which make it necessary to unload with a slide instead of a rear dump, required as much time as 18 loads to the other buildings.

These trips consumed 10 hours. A total of 51 loads had been hauled, amounting to 316 tons 928 pounds.

The truck continued to be operated by the night shift for an hour and thirty-five minutes longer, carrying nine additional loads to the Oliver power plant, and one more to the Fort Pitt Hotel. This brought the total volume for the night to 60 loads, or 370 tons, 1760 lb. The mileage for the night trips was 46 miles, or four-fifths of a mile per trip.

Ohio Wage Scale

The latest information from Ohio is to the effect that on July 1, the operators and miners in the Hocking Valley, Pomeroy, Jackson and Crooksville districts were still negotiating. The miners cut their offer of 49.64c. for machine coal on the mine-run basis to 47c. The operators held firmly to 44.61c. Adjournment was taken till the following morning, both sides being optimistic of an early settlement.

Interesting Articles Next Week

We have found it impossible to crowd all the coke articles prepared for this special number in our issue this week. As a consequence, succeeding numbers of COAL AGE will contain various articles covering many other interesting problems pertaining to the manufacture of coke. In addition we will continue the series of articles on "The Use of Electricity in Coal Mining." Still another article we will publish next week, describes in great detail, "Indiana's First Electrically Operated Coal Mine."

Extracts from a Superintendent's Diary

When we abolished the saloon from our camp, we hoped that one kind of family discord would be abolished with it, but we were mistaken. Apparently we'll have to abolish a certain few of our families before we can achieve so desirable a condition.

Take old John Ross for example: Every pay-day since the saloon was outlawed, John has sneaked off to the city, urged on by terrible thirst, and returned with the thirst quenched, but with fists and tongue active.

Sometimes the grand finale came at ten and sometimes at twelve o'clock the same night, but, aside from the time element, there is little variation. His wife calls in the neighbors just in time to prevent a knock-out blow, and the day following Tom awakes somewhere near noon, quite unconscious of all the commotion he has originated and proceeds to bathe the swollen eyes of his wife, the while he vows that he has forever sworn off.

Yesterday being pay-day, I decided to assist Tom's wife, and so, when I saw Tom sneaking off, I hailed him and reminded him that his little five-year-old (Harry) had been promised new shoes with blue kid tops, and that, according to promise, Harry should be taken to town and thus be assured a perfect fit.

I make no claim to the scheme; it was furnished me by Tom's wife. Here is how it worked out:

At six o'clock Tom returned as usual on the local, accompanied by his usual jag, but Harry was nowhere to be found. The more we questioned Tom, the less we knew, and so in disgust we hurried him off to bed and began to search out all of the others who had been to town and had noticed Tom during the day.

By plotting all the facts (during all this time, while we were gathering the news, the entire camp was in an uproar; some wanted to lynch Tom, others wanted to hire a special and go to the city in search of Harry, while still others routed the telegraph operator out of bed and got busy with the wires), we learned that by ten o'clock Tom had purchased the shoes and he and Harry had been seen marching up and down, quite after the approved manner of father and son. By twelve o'clock Harry had been left in the waiting-room of the station while Tom went out to purchase a lunch; by two o'clock Harry had considered himself deserted and had been seen by several at the station, in very great distress; that was the last dope on Harry.

Tom had been found sleeping in an alley by a policeman, at about ten minutes before leaving time for the local, and had been hustled aboard by the policeman and several of our miners who happened along. None of these particular miners had recalled that Harry had accompanied his father in the morning, and so made no inquiry.

About twelve o'clock Mrs. Tom came down and plainly told me what she thought of me for allowing a man like Tom to take off her child without having someone made responsible for his return. That settled the matter! It was up to me to return Harry. I promptly got in touch with the city police department by long-distance 'phone. Yes; there was a little boy who had said that his name was Harry, now sound asleep in the chief's office, and in one hand he still held on to two little blue top shoes.

Perhaps, because of the fact that Mrs. Tom does our family sewing, Mr. Tom and his family won't be abolished forthwith.

Legal Department

Recent Decisions

BY A. L. H. STREET*

Corporation's Lien on Shares of Stock—The provisions of the Arkansas statutes which give a lien in favor of a corporation on stock, to secure payment of debts due the company from the holder of the stock, extends only to debts which are actually due, and not to unmatured obligations. (Arkansas Supreme Court, Young Coal Co. vs. Hill, 165 Southwestern Reporter 292.)

When Employer is Not Responsible for Defective Condition—A coal company is not liable for injury to an employee resulting from a defective condition in ways or machinery, unless negligence is attributable to the company in the matter of permitting the defective condition to arise or continue. (Alabama Supreme Court, Epsey vs. Canaba Coal Co., 64 Southern Reporter 753.)

Injury Caused by Falling Slate—A coal-mining company is liable for injury to a member of a timbering crew caused by falling slate, if his foreman, after making an investigation, directed him to continue work, and if there was no such obvious danger as would have justified the injured employee in refusing to proceed. (Kentucky Court of Appeals, Bracken vs. Lam Coal Co., 165 Southwestern Reporter 686.)

When Seller Need Not Tender Delivery—If a contract for a sale of coal for monthly deliveries obligates the buyer to order approximately a certain tonnage each month, the seller is not bound to tender that amount before he can recover damages for the buyer's failure to order the specified amounts. (United States Circuit Court of Appeals, Seventh Circuit; Alwart Bros. Coal Co. vs. Royal Colliery Co.; 211 Federal Reporter, 313.)

Damages for Delay in Constructing Coal Handling Apparatus—When a contractor for the construction of a coal-hoisting tower inexcusably fails to complete the work by the time agreed upon, damages are recoverable against him for loss of economic operation during the period of such delay, together with interest on that amount. (Massachusetts Supreme Judicial Court, C. W. Hunt Co. vs. Boston Elevated Ry. Co., 104 Northeastern Reporter, 728.)

Duty to Warn Employee of Danger—A coal company is liable for injury to an employee, caused by sudden starting of a wheel upon which he was assisting in adjusting a belt, if the company's represenatives failed to warn him of dangers which he could not readily appreciate, or if they failed to use reasonable care to safeguard him against the accident. (United States Circuit Court of Appeals, Third Circuit; Valley Camp Coal Co. vs. Kucewicz; 211 Federal Reporter 953.)

Recovery of Freight Overcharges—In a suit to recover from a railway company the excess of freight charges collected on coal shipments above reasonable charges, a shipper is entitled to show rates charged on shipments originating at the same points and hauled through the destination to other points, and, also, what rates are usually charged for hauling coal like distances under similar conditions. (Colorado Supreme Court, Kindel vs. Colorado & Southern Ry. Co., 139 Pacific Reporter 1105.)

Validity of Agreement for Payment to Shipper—An agreement by a railway company to pay a shipper 20c. per ton for "spotting" cars on the shipper's tracks in its own yards, is invalid under the Interstate Commerce Act, as amounting to a contract for an unlawful rebate. This charge cannot be sustained as a terminal charge, if it has never been published as such, as required by the Act. (New York Supreme Court, N. Y. Central & H. R. R.R. Co. vs. General Electric Co., 146 New York Supplement 322.)

Duty of Railway Company to Continue Switching Service—The fact that a shipper has denied liability for demurrage charges sought to be collected by a railway company is no excuse for discontinuance of switching service previously afforded him on a private track. He is entitled to sue to enjoin the company from wrongfully discontinuing the service, if discontinuance would seriously impair his business. If a railway company knows in advance that a consignee will not accept delivery of freight on a certain track and he is entitled to delivery elsewhere, demurrage charges cannot be based upon a delivery there. (Tennessee Supreme Court, Dunlap Lumber Co. vs. Nashville, Chattanooga & St. Louis Ry. Co., 165 Southwestern Reporter 224.)

Reasonableness of Freight Rates—The finding of the Interstate Commerce Commission as to the reasonableness, or otherwise, of a rate charged by a carrier in interstate commerce, is an administrative function properly delegated to the Commission, and is, if lawfully made, conclusive. If such finding of the Commission is, that a given rate is unreasonable, it is as if the unreasonableness of such rate were fixed by statute, so far as future charges are concerned. But such finding, although possessing evidential value, is not conclusive nor even prima facie evidence of the reasonableness of a rate in a suit brought by a shipper for damages sustained by him on account of excessive charges. (United States Circuit Court of Appeals, Third Circuit; Lehigh Valley R.R. Co. vs. Meeker, 211 Federal Reporter 785.)

Liability for Mine-Foreman's Negligence—Injury by Explosion—A mine foreman employed under the Pennsylvania laws may be engaged by the operator to perform service beyond his statutory duties, and the operator is liable for negligence in the manner in which he performs such outside duties. Plaintiff, a miner, inserted charges of explosive in coal in the wall of a chamber on assurance from a superior that, though the explosive was damp, it was safe for use. The charges, however, did not explode when set off nor when new charges were inserted near them. In striking a large mass of coal broken down by the second charges, one of the first charges was exploded by plaintiff's pick with the result that he was injured. Held, that the operator was liable for the injury sustained. (United States District Court, Southern District of New York; Calausky vs. Lehigh Valley Coal Co.; 212 Federal Reporter 304.)

Safety of Miner's Place of Work—An employer's failure to use a proper degree of care to furnish a safe place of work for his employees may be established by circumstantial evidence. "A miner who had just been employed by a coal company was directed to begin work in a room of a coal mine in which mining had been done a few days before. He drained out some of the water and cleared away débris, and then began to pick coal, and after he had been at work for about five minutes his pick struck an unexploded charge of an explosive that had been left in the coal, which caused an explosion that seriously injured him. It was held, that the explosion and the attendant circumstances are prima facie proof that the company failed to perform its absolute duty of furnishing the miner a safe place to work, and also that the miner was free from contributory negligence." (Kansas Supreme Court, Broseghini vs. Sheridan Coal Co., 139 Pacific Reporter 1025.)

Penalty for Mining Coal Near Boundary Line—Suit brought under the West Virginia statutes to recover a $500 penalty from a coal company for mining coal within 5 ft. of a line dividing adjoining coal lands must be instituted within one year after the penalty accrues. Such a company is liable for the acts of its employees in violating the statute without regard to whether the company authorized the violation. "The mere fact that the corporation had a general uninforced policy against violating the statute does not absolve it. * * * Those in charge of a mine for a corporation must see that the statute against mining within 5 ft. of a division line is observed, otherwise the corporation itself is liable for the penalty. The neglect, mistake, or disobedience of its servants in this particular will not excuse it. In this day of accurate civil engineering and efficiency organization there can be no neglect, mistake, or disobedience of the company's servants in violating the statute, but that for which the company itself is reasonably chargeable. A failure on the part of the corporation to see that its servants obey the statute, is its own nonobservance of the statute. A coal company cannot say that it notified its mine management to observe the property line and therefore is not responsible for the violation of the statute If this were so, there could be no enforcement of the statute under its terms. The act of the management and servants at the mine in such a particular is the act of the corporation without other proof of authority or approval." (West Virginia Supreme Court of Appeals, Gawthrop vs Fairmont Coal Co., 81 Southeastern Reporter 560.)

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The Human Element in Coal Mining

By George N. Griffin*

During recent years much thought and attention have been given to the conditions of coal-mining camps as matters of consideration apart from the actual working conditions of the mine itself, and its immediate surroundings. Mining companies are realizing that many conditions are in existence in the various coal camps, which, to a great extent, make or mar the plant as a whole.

It is realized, of course, that a coal mine is opened as any other industrial enterprise is started, primarily for the purpose of getting a fair return for the money invested; hence the further fact must be acknowledged that unless such enterprises can be made to earn a fair return they cannot be kept in operation, as none of us relish the idea of investing money at a loss.

While this is true, yet I believe that several improvements can be made in many coal-mining camps and villages, which, though they call for the investment of much capital, will, indirectly, bring adequate returns to the plant as a whole.

Better Mining Towns Needed

First, I would mention suitable and comfortable dwellings for the employees; such as can be rented at a reasonable figure. Most of us have heard of houses which have been equipped with all the modern conveniences, such as electric lights, bath, toilets, etc., only to find that some of the tenants have used the bathtub as a receptacle for wood or coal or some of the other paraphernalia of housekeeping. This may be true in a few isolated cases, but usually good, comfortable dwellings are appreciated by the average mine worker.

It is true, though, that in some cases tenants will leave good houses owned by a company, to live in mere shacks for the sake of economy. Many of such shacks, if owned by a company, would be declared unfit for human habitation. Such people as these need educating up to a higher standard of living, and I think this is gradually being done. This is especially true of the rising generation, the members of which are rapidly assimilating American ideas of the correct standard of living. It would be well, also, if all coal companies (as some do) would take more interest in religious, educational and all other matters pertaining to better living conditions. It is a common practice on the part of many writers on life in mining camps to denounce conditions as altogether bad. That there is some truth in the statement that they are not what they should be, we all must admit, but it will not be so, if the same attention is paid to the educational, religious and amusement features, as is given in the average town.

The Employment of Idle Time

The great trouble, as I see it, is that frequently the only place to which the men can go except to their homes after the day's work is done, is the saloon with its attendant evils. Coal companies, I think, are beginning to realize that the intemperate habits of their employees are costing them much money.

To offset this, encouragement ought to be given to all kinds of healthy amusements and entertainments, such as baseball, football, picture shows, lectures on first-aid work, etc. A good game of football or baseball is much better for our men and boys than hanging around questionable places; hence a playground ought to be furnished, if possible. Much good can be accomplished if the fathers and mothers can be induced to keep in close touch with the school. This can be done by visiting the classes frequently, encouraging the teachers in their work and incidentally stimulating the children in their studies. By these visits the officials of the mining company will, also, be able to judge, to a certain extent at least, as to the ability of the teachers.

In all this work, great care must be taken to avoid the appearance of patronage, for the average workman detests being treated with condescension. In attempting to do these things, one of the most important matters is to secure the coöperation of the residents of all places where such work is undertaken. This includes the wives and children of the employees. If such coöperation can be secured, the sociological work will be made much easier, for the reason that all will feel that it is their job.

The bravery displayed at numerous tragedies with which mining centers have been afflicted, goes to prove that many unselfish, heroic souls are hidden behind grimy faces. Acts of heroism are being performed day by day that cannot be surpassed in any other department of human activity, war even included. Such material as this ought not to be neglected for we are quite sure that any uplift work expended will get its reward in a higher plane of living on the part of the residents of such camps. And as a byproduct, companies will get more intelligent and better service as a financial return for their additional investment.

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Convention of American Peat Society

The eighth annual convention will meet at Duluth, Minn., Aug. 20 to 22, 1914. Experts of international renown on the commercial uses of peat lands and the reclamation of swamp lands will address the convention. The itinerary of the delegates, of whom more than 100 are expected, includes a trip over the Mesaba Range by special train as guests of the Duluth, Missabe & Northern Ry. and the Duluth & Iron Range Ry., auto rides about the city of Duluth, and a trip of inspection through the Minnesota Steel Co.'s new plant on the St. Louis River above Duluth. This will be the first convention at which the European countries will be represented. Among those scheduled to address the gathering are: C. L. Wood, of Stockton-on-Tees, England; Thomas Tomlinson, a well known engineer of Dublin, Ireland, who will discuss Ireland's peat bogs; K. Lubkowski, of Warsaw, Poland, who will talk on Russian peat deposits; Dr. Joseph Hyde Pratt, state geologist of North Carolina; Charles A. Davis, peat expert of the U. S. Bureau of Mines, who has made a special study of Mesaba Range formations; Dr. F. V. Coville, of the U. S. Bureau of Plant Industry; Robt. Blei, of Sacramento Calif.; John Wiedmer, of St. Louis, Mo.; Dean A. F. Woods, of the University of Minnesota; W. H. Emmons, State Geologist, and other state and national officials. On account of its international character, the convention is receiving much attention from Duluth and Mesaba Range engineers and professional men.

It is contended that producer gas provides a more satisfactory means of transmitting heat through an extensive plant than steam. The mains are probably less costly, and there are no losses corresponding with steam condensation, while for furnace work, high temperature and evaporating, it offers great convenience and an all-round economy which might be set down as equal to 30 per cent., over the direct burning of coal under such apparatus. In plants spread over a large area, gas can advantageously be carried to isolated gas engines, which, unlike steam engines, do not fall off in efficiency in the small sizes.

Discussion By Readers

A Longwall Proposition

Letter No. 4—The discussion of the proposition, submitted by H. R. Hartsuff, COAL AGE, June 6, p. 944, relating to the adoption of the longwall system of mining, should prove of interest, not only by way of determining whether the longwall method of mining is applicable under the conditions cited, but also by the comparison it suggests of the two general systems of mining, with respect to the safe and economic extraction of the coal.

Personally, I do not consider the conditions submitted by Mr. Hartsuff as favoring the adoption of longwall mining for the following reasons:

1. Longwall mining depends on three essential conditions; namely, (a) a hard bottom; (b) a pliable or yielding rather than a brittle roof; (c) a thin seam not exceeding 4 ft. in thickness, lying flat or but slightly inclined, at some considerable depth below the surface and free from faults or other troubles. The conditions last mentioned are the only ones that appear to be fulfilled in the present case.

2. In the application of the longwall method, in the present instance, disintegration of the fireclay bottom can reasonably be expected to take place over a large area of extraction. This disintegration would be more rapid in the roadways where the bottom is already broken, with the result that the roadside packs would be weakened and demolished very rapidly over the entire mine.

3. Under the conditions cited, the roof slate, varying from 4 to 10 ft. in thickness, would be the first affected by the extraction of the coal. This slate would settle away from the hard rock above and its weight would rest heavily on the packs and cause them to subside more rapidly. But the greatest danger would be experienced when a sufficient area has been mined to cause a break in the sulphur binder above. This break would be sudden, and the force of the impact when this overburden dropped through the few inches of space intervening between the roof slate resting on the packs and the rock above would undoubtedly be disastrous.

4. If the seam is gaseous, another danger would be presented by the accumulation of gas in the void space formed by the settling away of the roof slate from the overlying rock. This space would form a very convenient reservoir for the accumulation of dangerous gases. By the breaking of the rock strata above, the gas would be driven out forcibly into the mine workings, increasing the danger of the situation tenfold.

5. The cantilever action of the unbroken roof would cause an excessive pressure to be thrown on the coal face, which, owing to the large leverage, would be productive of grave danger unless successfully controlled.

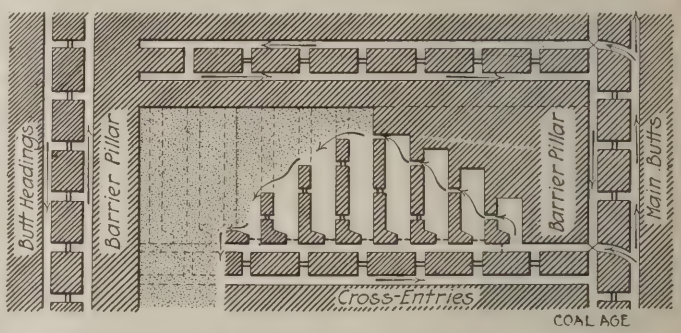
The method of mining this seam, as described by Mr. Hartsuff, is an antiquated one. My experience as a miner in the northern bituminous coal field, where this method has been in operation for a period of about 80 years, leads me to conclude that it is not applicable to the mining of coal under any conditions. When compared with the room-and-pillar system of mining, the defects of the method become very prominent, the most important being: (a) Ineffectual ventilation; (b) the loss of a large percentage of coal.

I have come to regard the two general systems of mining—the room-and-pillar and the longwall system—as being sequential. In my opinion, the room-and-pillar system stands first and is adapted, either advancing or retreating, to any conditions where the coal seam does not lie at such a depth below the surface that the required width of room pillars is such as to restrict the rooms to the dimensions of entries. Before this condition is reached, the longwall system may be adopted, chiefly for monetary or economic reasons.

I would not adopt or advise the adoption of the longwall advancing method. While, for a time, it may possess advantages over the retreating method, these are soon superseded by the disadvantages that develop as the work progresses.

Referring, again, to the case in hand, I would make the following suggestions:

1. Make no change in the entry development.
2. Drive single rooms and proportion the width of



SHOWING PANEL WORKED ON RETREATING PLAN

room to width of pillar, having due regard to the depth of cover, thickness of seam, character of roof, floor and coal, which elements practically determine this ratio.

3. As indicated in the accompanying diagram, drive the cross-entries only to the barrier pillar flanking the next pair of main entries, or butt headings; and make this barrier pillar of such width as to protect those headings from any danger of squeeze.

4. As each pair of cross-entries reaches the barrier pillar, start to turn rooms on the rise side of the entries, at the inby end; and work out the coal in this panel on the retreating plan. (This is a modified panel system of mining.)

In closing, let me say that I have seen this method in operation in a seam almost identical with that described by Mr. Hartsuff, except that there was an overburden of from 400 to 600 ft. The mine was operated with entire safety, and little trouble or expense was incurred from squeeze in the mine.

I. C. PARFITT.

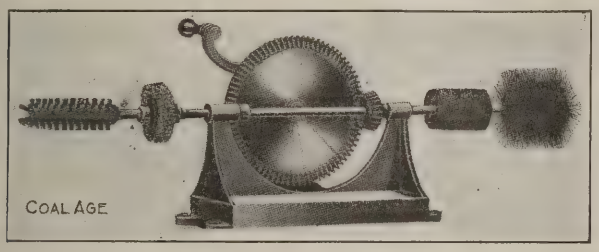
Jerome, Penn.

Cleaning Safety-Lamp Gauzes

Referring to the inquiry from Johnstown, COAL AGE, June 20, p. 1024, I note a contributor asks for a "cheap and convenient method" for cleaning safety-lamp gauzes, so as to do the work effectively and avoid the installation of "a special machine for that purpose."

I have found, by long acquaintance with the work, that the statements made by this inquirer are correct. He states: "The usual method of cleaning the gauzes of a large number of safety lamps, especially where two gauzes are used in each lamp, consumes much time and is often imperfectly done. Without a close inspection of each gauze, it is difficult to detect when this work has been slighted."

While a number of machines have been designed and constructed for cleaning safety-lamp gauzes, I have found



A CHEAP AND EFFECTIVE MACHINE FOR CLEANING SAFETY-LAMP GAUZES

that the cheapest machine doing effective work of this kind is that illustrated in the accompanying figure. This machine is shown as being operated by hand; but, if desired, it can be readily mounted to be operated by power. I believe it has been found to do effective work wherever it has been employed. The same machine has been used to clean the glass chimneys of the lamps, as well as the wire gauzes. It is a great improvement over the common hand brush used for that purpose; and for this reason, I have suggested its use, for the benefit of the readers of COAL AGE.

G. A. C.

New York City.

Working Coal Seam with Heavy Parting

Letter No. 1—The question as to whether it would be profitable to work a 5-ft. coal seam with a heavy parting, depends to a very large extent on the market conditions and the competition with coal that can be more economically mined. If this competition is keen, it is possible that the seam in question cannot be worked with a profit. But if there is a fair margin between the market prices and the operating costs of the competing coals, it should be quite feasible to operate in this seam profitably; especially as the coal is said to be of a better quality than other coals in the district. It should be possible, also, to get a larger percentage of lump coal, than would usually be obtained from working a 5-ft. seam.

I have had a long experience in the longwall method of working, and, unless there are reasons, not stated, that would prevent, I would strongly recommend its adoption, for the following reasons: Yardage is eliminated; a maximum recovery of coal is obtained, which is an important factor in the working of a thin seam; the longwall method of working is more favorable to machine mining; ample space is available for stowing the waste from the thick parting; a larger percentage of lump coal will be obtained; ventilation is simplified; and supervision is easier.

The mining should be done in the parting, which should all be removed and stowed away before the coal is mined, in order to insure loading only clean coal. There are several methods by which the mining may be done and the best can probably only be determined by experiment. Machines that will undercut in the vein above the floor level can be used; or, by keeping the face of the upper bench of coal always in advance, an ordinary longwall machine can be used to mine either in the top or bottom of the parting, using the lower bench of coal for the floor. The remainder of the parting not cut out by the machine must be removed by shooting or by a hand pick. A few light shots should do the work. Another method that might be employed would be to cut out the parting with punching machines. It is necessary to mine in the parting, however, as it would be found to be impossible to separate the dirt and load clean coal if both were shot down together.

By the longwall method of working, the weight of the roof can be utilized to assist in bringing down the top coal, and but little powder will be required either for this work or in blasting out the bottom bench. A large proportion of lump should be obtained, especially as the mining is done in the parting, and no slack coal should be produced by this plan.

The parting will be used to make the packs, which must be built solidly; and, in order to do this, some large pieces will be needed to face up the packwalls. If these are not available from the parting, they must be obtained from the roof, which should break down in the waste spaces between the packs and thus relieve the face of some of the roof pressure. Some timber will be needed at the longwall face; but these props can be drawn and used over again as the face advances and the packwalls are built.

Not knowing the exact working conditions and the scale of wages, it is impossible to estimate with any certainty, the cost of mining this coal; but it should not exceed by 10c. per ton, the cost of mining a 5-ft. seam of coal under similar conditions but without the dirt parting. This additional cost would be partially, if not altogether, offset by the superior quality of the coal and the larger percentage of lump that will be produced.

C. V. GOULD,
Mining Engineer.

Salt Lake City, Utah.

Letter No. 2—Referring to the inquiry in regard to working a seam of coal 5 ft. thick with from 6 to 18 in. of parting in the middle of the seam, much will depend on the conditions. However, it may be stated, in a general way, that in order to insure good drainage in the mine, it is important to reach the lowest point of the seam and work toward the rise. By so doing the face of the workings will be generally dry.

If the mine is not already opened, the plan should be drawn on the triple-entry system. Cross-entries should be turned off the main road 600 ft. apart. Double rooms, 40 ft. wide, should be turned off on each side of the cross-entries and driven 300 ft. These rooms should be driven

on 70-ft. centers so as to provide a 30-ft. pillar between adjoining rooms. Tracks should be laid on each side of the rooms next to the rib or pillar. The cross-entries should be driven on 60-ft. centers so as to provide a good width of entry pillar, to avoid the danger of a squeeze, cutting off the roadways. As each room reaches the limit the pillars should be drawn back, in regular order. There will be plenty of space in these wide rooms for stowing the waste of the parting in the seam.

I am satisfied that this coal can be worked profitably, providing the parting can be cut with mining machines and provided there is a good market for the coal. Allowing 25c. per ton for loading the coal into the mine cars, 7c. per ton for machine cutting and 7c. per ton of coal for stowing away the slate and waste of the parting, would make the cost of coal loaded in the cars and ready to be hauled out of the mine, 39c. per ton. To this it will be necessary to add 10c. per ton for hauling and loading the coal into the railroad cars and, say 5c. per ton for royalty and 16c. per ton for other expenditures, such as rails, ties, posts and cap-pieces. This will make the total cost of the coal loaded on the railroad cars 70c. per ton, which I believe is possible under ordinary conditions of mining such a seam.

There being a large percentage of sulphur in this coal (3.73 per cent.), it will be necessary to take extra precautions, in the development of the mine, to avoid spontaneous combustion and gob fires. It is important to load out all the fine coal and slack produced and not permit this to be thrown into the gob. The time to take these precautions is when the mine is first opened out. It is less trouble to start right than to overcome the difficulties resulting later, in the development of a mine subject to frequent gob fires.

Should the plan I have suggested not prove successful, a change can be made to the longwall system of mining, with little or no extra cost. The longwall method, it is true, affords plenty of space for stowing away the waste material and yields a large recovery of the coal. In this system, the stalls or roads should be turned from 200 to 300 ft. apart. It will be necessary to shoot down the top over the roadways to provide sufficient headroom. This material can be used for building the roadpacks, which should be from 10 to 12 ft. in width on each side of the road. These packs must be well built in order to maintain a sufficient height in the roadways when the weight comes on the packs. The roads should be wide enough to allow a little room to stow any slate that may fall in the roads later; but this will not be much if the roof is good, as stated.

SAMSON SMITH.

Mineral, Va.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Operation in Proportion—In any proportion expressing the equality of two or more ratios, there is usually one unknown term whose value is to be determined from the combined values of all the other terms. To ascertain the value of the unknown term **x**, write the couplet containing it as the second member of the proportion and the remaining couplet or couplets as the first member.

Observe carefully to write each couplet as a direct ratio when it increases or decreases in the same order as does the unknown ratio. If, however, an increase of the former causes a decrease of the latter or vice versa, the couplet must be written as an inverse ratio. The following example will serve to make this clear.

Example—If six miners load 200 tons of coal in 10 days, working 8 hr. a day; in how many days will five miners load 300 tons, working 9 hr. a day?

Solution—There are clearly four ratios in this question, including eight terms of which one is unknown and must be designated by **x**. The ratio of the miners is 6: 5; the tonnage, 200: 300; the days of work 10: **x**, and the hours per day 8: 9. These are all direct ratios, as they compare the first case mentioned, with the second, in the same order as that of the unknown ratio containing **x**.

The first step after finding these ratios, is to write the one containing the unknown term **x**, as the second member of the proportion; thus,

$$\frac{\quad}{\quad} : \frac{\quad}{\quad} :: 10 : x$$

Now, consider the miners as compared with the number of days they work. It is evident the more men employed, the less time will be required to do the work. Hence, this first couplet must be written as an inverse ratio: 5:6.

Next, considering the tonnage, it is clear that the more coal to be loaded, the more time will be required; and the tonnage is expressed, therefore, as a direct ratio, which is 200: 300.

Again, in regard to the last ratio, it is certain that the longer the working day, the less will be the number of days required to finish the work. This is, therefore, an inverse ratio, namely, 9: 8.

Writing these ratios, then, as a compound proportion,

$$\begin{matrix} 5 & : & 6 \\ 200 & : & 300 \\ 9 & : & 8 \end{matrix} :: 10 : x$$

The **rule of proportion** makes the product of the means equal to the product of the extremes. The value of the unknown term **x** is, therefore, found by dividing the product of the means, by the product of the known extremes, which are the antecedents of the couplets in the first member of the proportion. The method of cancellation simplifies the work; thus:

$$x = \frac{\overset{2}{\cancel{6}} \times \cancel{300} \times 8 \times \overset{2}{\cancel{10}}}{\underset{3}{\cancel{5}} \times \cancel{200} \times \cancel{9}} = 16 \text{ days}$$

The Coal Age Pocket Book

INVOLUTION

The word "involution" means a rolling up or involving. As applied to numbers, it means the process of multiplying a number by itself any given number of times. In other words, the number is taken so many times as a factor; and the resulting product is called the first, second, third, etc., **power** of the number according to the number of factors taken.

Powers of Numbers—The required power of a number is indicated by writing a small figure expressing such power, at the right and slightly above the number. The small figure is called an **"exponent"** or the **"index"** of the power.

The first power of a number is always the number itself. The second power is commonly called the **"square"** and the third power the **"cube"** of the number..

The following examples will serve to illustrate the process of finding the indicated power of any number; as 3, for example:

First power	$3^1 = 3$	$= 3$
Second power,	$3^2 = 3 \times 3$	$= 9$
Third power,	$3^3 = 3 \times 3 \times 3$	$= 27$
Fourth power,	$3^4 = 3 \times 3 \times 3 \times 3$	$= 81$
Fifth power,	$3^5 = 3 \times 3 \times 3 \times 3 \times 3$	$= 243$

The process of involution is thus seen to be that of a continuous multiplication of a number into itself, the resulting product being the power sought, such power being indicated by the number of factors employed. For the sake of ready reference, the squares and cubes of numbers from 1 to 1000, together with their square roots and reciprocals are given in the "Useful Tables for Engineers and Students."

Important—To shorten and simplify numerical calculations in involution it is well to note the following:

1. To find any power of a number having one or more ciphers at the end; discard the ciphers and find the required power of the number so diminished. To that result annex as many ciphers as the number discarded multiplied by the index of the power.

Thus, to cube 600, proceed as follows:

$$6^3 = 6 \times 6 \times 6 = 216.$$

To this annex, $2 \times 3 = 6$ ciphers; hence $600^3 = 216{,}000{,}000$

2. To find any power of a decimal, find the required power of the number, discarding the decimal point; and, in the result, point off as many decimal places as those in the original number multiplied by the index of the power.

Thus, to cube 0.4, proceed as follows:

$$4^3 = 4 \times 4 \times 4 = 64.$$

Then, point off $3 \times 1 = 3$ decimal places; hence, $0.4^3 = 0.064$.

3. The power of a number is equal to the product of two powers of that number, such that the sum of their indices is equal to the index of the original required power. For example, the fifth power of a number is equal to the product of the square and the cube of the number.

$$3^5 = 3 \times 3 \times 3 \times 3 \times 3 = 243$$

or

$$3^5 = 3^2 \times 3^3 = 9 \times 27 = 243.$$

Inquiries of General Interest

How to Buy Coal

Last year we purchased coal for the plants, at a contract price of $2.05 per net ton delivered. The contract for the purchase of this coal was based on the following proximate analysis:

	Percentage
Moisture	0.64
Volatile matter	39.07
Fixed carbon	55.14
Ash	5.15
Total	100.00
Sulphur	1.05 per cent.
Heat units	14,510 B.t.u.

During the year, we had two samples of this coal analyzed for our own satisfaction. Each of these analyses showed considerably less combustible matter and a far greater percentage of ash and sulphur than the original analysis on which the contract was made for the purchase of the coal. These two analyses also showed a much less heat value (B.t.u.) than the previous analysis. The samples for analysis were taken from two separate cars, at different times during the year. They are as follows:

	Percentage
Moisture	1.21
Volatile matter	34.39
Fixed carbon	52.51
Ash	11.89
Total	100.00
Sulphur	2.04 per cent.
Heat units	13,347 B.t.u.

The above sample was taken from Car 62,462. Another sample taken from Car 72,494 gave the following analysis:

	Percentage
Moisture	0.90
Volatile matter	28.00
Fixed carbon	52.58
Ash	18.52
Total	100.00
Sulphur	7.73 per cent.
Heat units	11,760 B.t.u.

Prior to last year, we had used only Pittsburgh district coal, which was purchased at a contract price of $2.40 per net ton, delivered. This coal gave a proximate analysis as follows:

	Percentage
Moisture	1.70
Volatile matter	31.80
Fixed carbon	60.10
Ash	6.40
Total	100.00
Sulphur	0.84 per cent.
Heat units	13,480 B.t.u.

A brief calculation of the cost of heat units, under last year's contract, as compared with the same item under the contract of previous years, shows that each cent expended for fuel, purchased 141,560 B.t.u., this calculation being based on the contract analysis of the coal first above given; while each cent of outlay in previous years purchased only 112,333 B.t.u. The increase in B.t.u., in favor of last year's contract, is thus 29,227 B.t.u. for each cent of outlay; or 26 per cent. of gain over the contract price of previous years. To offset this reduction in the price of coal, however, an examination of the records for the year shows that a considerably larger amount of coal was used during last year than in any year previous.

The question I desire to ask is whether the reduction in the price of the coal, on a heat-unit basis, justified last year's contract of purchase, judging from the first analysis submitted above as compared with the last analysis given, under which coal had been purchased in previous years. Kindly advise what factors of the analysis enter into such a comparison and determine the superior qualities of the coal for fuel purposes.

J. A. Flood,
Sec'y., Venango Mfg. Co.
Franklin, Penn.

The purchase of coal, in respect to economy of operation, can only be determined by a careful consideration of the requirements. It is not wholly a question of the cost of heat units, as the cheaper coal, on this basis, may contain impurities that cannot be permitted or that would forbid its use for the purpose intended.

There are certain limitations to the allowable percentages of the sulphur and ash shown in the proximate analysis of a coal intended for many purposes; while, for most fuel purposes, there are limits to the allowable percentage of bone or slate. Again, the hardness, weathering qualities, disposition to heat in bunkers, and similar characteristics, must be considered. In practice, the flaming quality of coals is often an important factor and determines or limits the adaptation of a particular coal for use under certain types of boilers.

The fact that a much larger amount of coal was used last year, in the operation of this plant, of itself proves nothing, since a larger amount of work may have been done, for which greater horsepower would be required. However, it is plainly evident that the two analyses made during the year compare very unfavorably with the contract analysis first given, both in the decrease of combustible matter they show and the increase of impurities in the coal. It is possible, however, that the two analyses made during the year were not representative of the coal used.

The sampling of coal for purpose of analysis is a most important item in the determination of the value of the coal. The analysis of samples of coal taken from the same car will often vary very widely, in the percentage of volatile matter shown and more especially in the percentage of impurities present. For this reason, it is never safe to rely on one or two analyses; but numerous samples and analyses should be taken, the average of which will generally represent more closely the quality of the coal delivered.

In this connection, we would draw attention to two interesting letters on the subject, "How to Buy Coal," Coal Age, Vol. 4, p. 866; and Vol. 5, p. 296. We hope that this important question will be taken up and further discussed by those whose experience in the purchase of coal for fuel makes their remarks of value to the producer and consumer alike.

Examination Questions

Mine Managers' Examination Held at Springfield, Ill. June 15, 1914

Ques.—If 50,000 cu.ft. of air is produced by a given power, in a circular airway 12 ft. in diameter, what quantity will the same power pass in an airway of the same length, 8 ft. in diameter?

Ans.—In this case, the airways being circular are similar. Then, the length of the airways being equal and the power constant, the quantity of air in circulation varies as the cube root of the fifth power of the diameter of the airways. In other words, the quantity ratio is equal to the cube root of the fifth power of the diameter ratio. Therefore, calling the required quantity of air circulated in the 8-ft. airway x, the power being the same in both airways, we have:

$$\frac{x}{50{,}000} = \sqrt[3]{\left(\frac{8}{12}\right)^5} = \sqrt[3]{\left(\frac{2}{3}\right)^5} = \sqrt[3]{0.1317} = 0.508$$

$x = 50{,}000 \times 0.508 = 25{,}400$ *cu.ft. per min.*

Ques.—An airway 60 yd. long, 5 ft. high and 8 ft. wide is full of firedamp. What quantity of air must be added (a) to render this quantity of gas explosive; (b) to make it reach the maximum explosive point; (c) to so dilute the gas as to render it nonexplosive?

Ans.—The cubic capacity of this airway is 3x60x (6x8) = 8640 cu.ft. The term "firedamp" refers to an *inflammable* or *explosive* mixture of air and gas; marsh gas (CH_4) undiluted with air is not firedamp, as it is an extinctive gas and not explosive. Assuming, however, that the meaning of the question is that this entry is full of marsh gas, and taking the volume of this gas as 8640 cu.ft.; (a) if air be added, the mixture will first become explosive when the proportion of gas to air is 1 : 5, assuming no other gas or dust is present. The required volume of air to produce this result is, therefore, $5 \times 8640 = 43{,}200$ cu.ft.

(b) The maximum explosive point, under the same conditions, is reached when the proportion of gas to air is 1 : 9.57. The required volume of air, in this case, is therefore $9.57 \times 8640 = 82{,}680$ cu.ft.

(c) Under the same conditions, the firedamp mixture becomes nonexplosive when the proportion of gas to air is 1 : 13. The required volume of air, in this case, is therefore $13 \times 8640 = 112{,}320$ cu.ft.

Ques.—If the total air pressure upon a ventilation door is 400 lb. when the water gage is 2½ in., what is the area of the door on which this pressure is exerted; and what is the height of the door when its breadth is 5.5 ft.?

Ans.—Assuming the given water-gage reading is taken on the door, the indicated difference of pressure between the two sides of the door is $2.5 \times 5.2 = 13$ lb. per sq.ft. If the total pressure exerted on the door is 400 lb., the area pressed is $400 \div 13 = 30.77$ sq.ft. The height of the door is, therefore, $30.77 \div 5.5 = 5.59$, say 5 ft. 7 in.

Ques.—Of two airways of equal length, which will pass the greater quantity of air under the same pressure; one of these airways is 8x8 ft. in section, and the other 4x16 ft. in section? Give the reasons for your answer.

Ans.—These airways have the same sectional area (64 sq.ft.), and their lengths being equal, the quantity of air in circulation under the same pressure varies inversely as the square root of the perimeter of the airways. In other words, the quantity ratio is equal to the square root of the inverse perimeter ratio. The perimeter of the first airway, which is square, is $4 \times 8 = 32$ ft.; and that of the second airway, $2(4 + 16) = 40$ ft.; and the ratio of the quantities of air passing in these airways is therefore:

$$\frac{q_2}{q_1} = \sqrt{\frac{o_1}{o_2}} = \sqrt{\frac{32}{40}} = \sqrt{\frac{4}{5}} = \sqrt{0.8} = 0.894$$

The ratio of air passing in the first airway to that in the second airway is, therefore, 1 : 0.894; or, for every 1000 cu.ft. of air passing in the first airway there is 894 cu.ft. passing in the second airway, under the same pressure.

The reason that the same pressure will pass less air in the second airway than in the first is that the second airway has a larger perimeter, and therefore a larger extent of rubbing surface, for the same sectional area of the airway.

Ques.—(a) What angle is included between N 60° E and N 25° W? (b) What angle is included between S 20° W and N 70° W?

Ans.—(a) The given bearings, in this case, being each measured from the north end of the meridian and lying in different quadrants on opposite sides of the meridian, the angle included between them is $60 + 25 = 85$ deg.

(b) In this case, the first bearing given is measured from the south end of the meridian, while the second is measured from the north end; and, both of these bearings lying on the same side of the meridian, the angle included between them is found by subtracting the sum of their angles from 180 deg.; thus, $180 - (20 + 70) = 90$ deg.

Ques.—Give the names, chemical symbols and composition of the different gases met with in coal mines.

Ans.—The most common mine gases are the following:

Methane or marsh gas; symbol, CH_4; comp., 1 atom carbon, 4 atoms hydrogen.

Carbon monoxide; symbol, CO; comp., 1 atom carbon, 1 atom oxygen.

Carbon dioxide; symbol, CO_2; comp., 1 atom carbon, 2 atoms oxygen.

Hydrogen sulphide; symbol, H_2S; comp., 2 atoms hydrogen, 1 atom sulphur.

Olefiant gas; symbol, C_2H_4; comp., 2 atoms carbon, 4 atoms hydrogen.

There are, besides, the gases forming the atmosphere; namely, oxygen and nitrogen, in more or less definite proportions.

CORRECTION—Attention has been called by readers to an oversight in failing to complete the answer to Question 12 of the Pennsylvania Bituminous Examination, May, 1914, COAL AGE, June 20, p. 1025. The value of one-half the water gage is given as 5.1 in. To this answer should have been added

$$w.g. = 2 \times 5.1 = 10.2 \text{ in.}$$

Coal and Coke News

Washington, D. C.

It is now practically established that the decision of the Interstate Commerce Commission in the 5 per cent. freight rate advance case will be handed down by the time this issues from the press. Of course, there is always a possibility that unexpected circumstances may intervene to prevent the carrying out of the program in regard to this case, as has so often happened in the past, but the present prospect of such a failure seems small—less than on any previous date.

While many rumors are in circulation, there is no reason to doubt the essential accuracy of the forecasts already made with regard to the case. These indicate that there will be some moderate advances on the more expensive articles of freight which move in large quantities. On the bulky commodities which furnish the basis of freight tonnage there will be no advances.

Conspicuous in the latter class of items, it is now understood, will be coal and ores. From the start there has appeared to be little warrant for any belief that an advance in these articles will occur. The commission and its counsel have shown a consistent indisposition to advance rates on coal and this has been borne out in a good many of the minor decisions that have come forward from time to time, in which the coal rates are involved:

A refusal by the commission to advance rates on coal will not, according to expectations, be the last of this matter, as coal operators have indicated a definite determination to secure a reduction of the charge made by the railroads in the anthracite regions and the Department of Justice is apparently committed to that course of action. Bituminous rates are already considered by many to be higher than they should be. Both in the matter of coal and of other articles in the same class it is to be expected that the rate controversy will go on, without reference to the actual findings in this particular case.

Larger Appropriation Is Asked

Working for the increased appropriation for which the Bureau of Mines has made request, Director Holmes has just given elaborate testimony before the House Committee on Appropriations, with a view to convincing that body that the extra $100,000 suggested should be granted. Mr. Holmes stated that he particularly wants this money for the study of waste in smelting and for the ascertainment of the best use to be made of gases from the smelters. He said that the gases contained primarily sulphur and arsenic, one smelter in Montana thus throwing out into the atmosphere many tons a day.

"The damage is extending for miles around," added Dr. Holmes. 'In the case of another smelter in California the damage can be traced 25 miles where the drift of the wind is constant for a considerable period of time, and the area is extending. We have demonstrated how to take care of arsenic and the metalliferous materials given off in small quantities, such as lead fumes and that part of the sulphur given off in the form of sulphuric acid, which is decidedly injurious.

We have found cases of damage from the arsenic, from the lead and from other metallic fumes. About the smelter itself, where the employees of the company operate, most of the damage done has been from the lead and arsenic gases. The policy we have pursued is the proper one to follow, that wherever it was feasible to do so investigations of this kind which were totally local in their character, should be paid for by the companies themselves rather than by the Government.

In connection with the smelter investigations there were certain problems which the smelter companies have practically declared to be unsolvable, and they did not think they ought to be called upon to spend money to solve problems which they did not think could be solved and which apply to other smelters as well as to themselves. Of the appropriation last year for this general work we have expended in all for smelter work $15,000. Wherever the problem was at all a local one we have required the smelter company to do the investigating. We have selected the men and we have mapped out the line of examination which we thought should be followed, but every dollar of expenditure and the employment of the men and the handling of the moneys has been entirely within the hands of the smelters.

What we do is entirely laboratory investigation on our part to determine, primarily with reference to sulphur gases, what can be done.

Dr. Holmes also made mention of the use of an invention by a Government employee which by virtue of the use of metal plates charged with electricity produced a deposit eliminating smoke.

It is now being used in smelter operations in various ways, he said. It is being used to take the arsenic out of the smelter gases as refined arsenic. It is being used in connection with petroleum in California, where the petroleum becomes so thoroughly mixed with water that it forms an emulsion so that the water will not separate from the oil by gravity.

It has been tested by several smelter companies to such an extent that they are now actually installing large scale plants for such purposes. Another interesting application was in southern California, where two large cement plants in the center of orange groves were destroying them. They prevented the dust from leaving the stacks.

With the expenditure of $15,000 we have this year conducted the more abstract of these investigations, which could not be considered local in this character. Three of the smelters, under our general advice, are conducting investigations, each one of which costs practically as much as the amount we are spending. It seems our duty to get other people to bear these burdens just as far as feasible. We handle none of the money of these smelter companies; we plan the investigations and select the men to do the work and watch the results.

Dr. Holmes was asked by members of the committee about the waste of sulphuric acid.

The only possible use for this acid, he said, will come when it can be collected, and its collection involves the storage of an enormous quantity. Unless there is a market for sulphuric acid, there should be the question of storage, and it would be leaking into the streams, which would be just as vigorously opposed as turning the gas loose in the atmosphere. What we are trying to do is to find some means of collecting it as sulphur in the form of a solid, so that it can be compressed into cakes; then it can be stored without any difficulty or loss in storage.

Sulphuric acid is used in a good many manufacturing operations in the East, but the supply comes in the main from Sicily, because the cost of transportation from the West makes its price greater. Nevertheless, we are trying to get some of the larger smelter companies to go into not only the manufacture of sulphuric acid but also of the phosphates.

Dr. Holmes mentioned other lines of investigation—such as safety and waste investigations in certain metallurgical plants, like those for the extraction of silver and gold.

He asked for an additional appropriation of $20,000 for the next year. It is especially desired to use this money, he explained, with reference to investigating the explosives used in metal mining and quarrying. In metal mining, he said, they want quick action, because they want to shatter the ore or rock, but they do not care anything about low temperature. What they want is an explosive that will produce the minimum of poisonous gases, because, as he said, in metal mining there is no such extensive ventilation system as in coal mines.

Poisonous gases, he explained, came from the powder used, decidedly injuring the men until they finally became unfit to work. To instruct them pictures were being used, he told the committee, because most of the men did not understand English. With each picture is a line or two in four different lauguages. "By that means we get them to understand the meaning of these lectures," said Dr. Holmes, "and we have been quite successful in bringing out the entire attendance of the miners. They will come to see the pictures and then try to learn all about safety projects. We would be still more effective if we could afford to use moving pictures."

HARRISBURG, PENN.

An action in equity which will raise the question whether men who have not had five years' experience as practical miners are eligible to receive certificates as mine foremen or assistant mine foremen, was brought in the Dauphin County Court, this city, on June 24 by James J. Moran and James B. Reilly, Pottsville solicitors for James Mathews president of district No. 9 of the United Mine Workers.

The action is to restrain James E. Roderick chief of the Department of Mines from issuing certificates to any of the 139 miners who may be returned as having passed the examination for certificates held at Pottsville May 25 and 26. It is contended that some of the applicants were not eligible to take the examination and will lay before the court the dispute whether men can be given certificates without having worked for five years.

PENNSYLVANIA

Anthracite

Plymouth—Operation at Dodson No. 1 colliery, Plymouth Coal Co., has been entirely suspended and the mules hoisted. The custom was to take the mules out daily from all workings except the Red Ash or lower vein. All hands have been suspended except those necessary for the safety of the property. The closing by injunction of certain sections of the mine made it too expensive to operate the Red Ash vein alone, hence the suspension.

Dunmore—When a car of coal being hoisted to the breaker of Grove Colliery of the Pennsylvania Coal Co. got beyond the control of the nippers and ran into the heavy gearing apparatus on June 24, work at the colliery was suspended, which threw 500 men and boys out of employment for the day. It was expected that the damage done by the car would be repaired at once so that work could be started at an early date.

Centralia—Centralia is gradually settling down into the mines or at least the entire west end of the town is so doing. Some few years ago there was a large cave-in on the main street, now the streets east of Troutwine are gradually settling and the people are getting worried. For the past two years a slight settling has been noticed and on June 26 the residents of Troutwine and other streets west were busily engaged in raising their homes, they having sunk almost 3 ft. in that time.

Bituminous

Ellsworth—This town will be the scene of a big Fourth of July celebration the plans for which have been worked up by E. E. Bach, sociological superintendent of the Ellsworth Collieries Company.

Honesdale—Indications of coal have been discovered on the farm of David McGraw, and a prospector has been employed to ascertain the extent of the deposit, if any exists.

Hastings—Current from the Penn Central Light & Power Co. was recently turned into the workings of the Pennsylvania Co., known as mines Nos. 11, 12 and 13. In addition to supplying the mines, however, the town of Hastings will be lighted by the central station company.

Fayette City—Fire on June 25 destroyed the stables of the Pittsburgh Coal Co. and two dwellings at Nauvoo Hollow, near Fayette City. The loss, which was partly covered by insurance, is estimated at $7000.

WEST VIRGINIA

Wheeling—By a majority of 6, the miners of the Mound Coal Co., who have been on strike for some time, on June 26 voted to return to work. The vote was on the question of whether or not the men would return to work without the bonus which the operators had been paying. A committee was apointed to ask that the miners be permitted to have a check weighman, and also that the company repair its screens, which are claimed to be in a bad condition. It is likely that both propositions will be granted.

Charleston—Part of the vote of the miners of the Kanawha district as to whether they will accept the second proposition offered by the federal mediators in the strike settlement was rejected June 26 by officials of district 17, and went back to the local unions for correction. The officials claim they found illegalities in the vote of 19 of the locals in the district. This action postponed settlement of the strike.

About 150 miners of the Milburn Coal Co., on Paint Creek, who had been working pending an adjustment of the disputes between operators and men in the Kanawha field, struck on June 24, on account of the continued failure of the factions to reach an agreement.

Fairmount—On the afternoon of June 23 a fire was discovered in the main dip heading at the Barnesville shaft of the Consolidation Coal Co. All men and animals were immediately removed from the mine, and fire apparatus and helmet men from adjoining developments hurried to the scene. The latter spent the night in fighting the flames, the origin of which could not be determined.

KENTUCKY

Pineville—A jury in the Bell County, Ky., Circuit Court returned a verdict recently for $20,000 as damages against the Coleman Coal Mining Co. in the case of James Aslinger's administrator against that firm. Aslinger was killed while at work in the mines of the defendant company. The case will go to the Appellate Court of the state.

Whitesburg—The Consolidated Coal Co. has put 200 additional negro miners at work in the mines around Jenkins and McRoberts. All the mines are now running full time.

Henderson—Sugg & Sights, L. S. Jackman and others, announce the sale of several thousand acres of virginia coal lands in the Hebbardsville, Zion and Niagara districts to outside capitalists. Names are withheld, but it is stated that the new owners will develop the properties at once.

Louisville—Coal operators in this vicinity are making extensive preparations for the meeting on Aug. 18 to 20 of the National Commissary Managers' Association. The programs of the various sessions will be educational with addresses by noted merchandising experts, stereopticon lectures showing ideal store arrangements, attractive disposition of stock, etc.; symposiums dealing with methods of building up commissaries, the evolution of commissary managers from clerical positions to executive posts and specific ways in which the ambitious commissary manager can increase his efficiency.

OHIO

Cincinnati—Charles W. Poysell and Edward Marmet, receivers of the Marmet Coal Co., were recently granted permission to give an option upon the entire assets of the coal company to New York parties for one million dollars. The business is to be continued as a going concern by the receivers.

Columbus—Word comes from certain parts of the Hocking Valley mining district to the effect that many of the rank and file of the miners' organization are opposed to the methods employed by the union in distributing strike benefits. Since the start of the suspension, April 1, only $6 per man has been paid as strike benefits. These men will insist that their assessments be distributed in their local district.

Lowellville—It is announced that the Lowell Coal Co., whose mines have been idle for the past two months, will resume operations shortly, as soon as the installation of a quantity of new electrical equipment is completed. The plant will be one of the best equipped in the state when this installation is ready for operation.

INDIANA

Brazil—The engine house and tipple of the Progressive mine, south of Brazil, were recently destroyed by fire, the loss being about $3000, with no insurance. This mine has been abandoned for some time.

The Crawford Coal Co. is sinking a new mine north of this city. It will give employment to 200 men.

Shelburn—The Reliance mine, one o fthe largest in Indiana, will be reopened shortly, after a shut-down since April.

Jeffersonville—The assessment against the Monongahela Consolidated Coal & Coke Co. shows a large falling off, due to the removal of several floats and much cable and machinery to Cairo, Ill. The stock of coal in the local harbor is also less than a year ago.

Washington—George Trowbridge, of Bicknell, Ind., has bought the Elnora mine and will extend its development.

Evansville—The Deepwater Coal & Coke Co., which recently took options on a large number of mines in southern Indiana and western Kentucky, is now surveying the Sebree mines at Sebree, Ky.

ILLINOIS

Pana—Following a hearing of the suit in the Circuit Court, Judge James McBride ordered Master in Chancery James Brennan to sell at foreclosure all properties ,mines and machinery of the Pana Coal Co. This company was placed in the hands of receivers last fall as the result of suits filed by Farson & Co., Chicago bankers, for interest due on bonds. The bonded indebtedness of this concern is placed at $219,000; unpaid interest, $20,718.50; receivers' certificates and expenses, $25,000; receivers' and attorneys' fee, $15,000.

Princeton—Arrangements have been made for the opening of the mine at Marquette in the near future. A new company has been formed under the name of the LaSalle-Hennepin Coal Co. to operate this mine, which was closed down some time ago by order of the state mining board. The new company expects to put the mine in shape to conform to the state laws, and begin operation.

Glen Carbon—No. 2 mine of the Madison Coal Corporation will shortly be operated to its full capacity. This mine has been opened and a force put to work cleaning it up. It is expected that 200 men will be employed, and that probably 2000 tons a day will be taken out for a while, but it is anticipated that this will be increased shortly to 3000 tons.

KANSAS

Pittsburg—The Chapman Coal Co. will shortly install self-rescuers in its mine No. 5. The apparatus will be worn by shot-firers in the performance of their work.

ARKANSAS

Russellville—The improved situation in Arkansas has resulted in resumption of operations by a number of mines. The Russellville anthracite mines have resumed work, while several smaller ones are tuning up for full-time operations.

COLORADO

Louisville—Charles C. Welch, F. W. Loveland and Henry B. Teller, directors of the Louisville Mining Co., have been sued in the District Court at Boulder by Charles A. Campbell for $1650 damages for alleged undermining of his property, causing his store building, located near the main part of the city, to sink.

WYOMING

Cheyenne—Alleging that the Wyoming Coal Co., operating in Sheridan county, has defaulted interest and failed to keep its mortgage contract, and is about to default in its pay-roll, the Continental Trust & Savings Bank, of Chicago, has applied to the United States District Court for the appointment of a receiver.

WASHINGTON

Douglas County—A supposed coal deposit recently found 35 miles east of Roseburg has been reported upon by Ira A. Williams, of the Oregon Bureau of Mines, and was found to be obsidian or worthless volcanic glass. Over 20 claims had been filed and considerable work done.

FOREIGN NEWS

Piedras Negras, Mexico—A demand for the payment of $100,000 in gold has been made of the Aguila Coal Co. by constitutionalist officials. If this money is paid, it is announced that threatened confiscation of the property will be temporarily deferred. All efforts of American and French stockholders, owners of coal mines confiscated a month ago, to recover their property have failed.

TRADE CATALOGS

The J. C. Stine Co., Tyrone, Penn. Bulletin No. 18. Twenty eight pages 8x9½ in. illustrating and describing Stine fans, engines and pumps.

Western Electric Co., 463 West St., New York. Catalog. Western Electric inter-phones and accessories. Illustrated, 48 pages, 7½x11 in.

Pawling & Harnischfeger Co., Milwaukee, Wis. Bulletin No. 301A. "The Application of the Electric Hoist." Illustrated, 8 pages, 6x9 in.

Ottumwa Iron Works, Ottumwa, Iowa. Catalog No. 30. Electric and steam hoisting engines and mine equipment. Illustrated, 116 pages, 7½x10 in.

The Mesta Machine Co., Pittsburgh, Penn. Bulletin "O." "Mesta Rope Drives." Eigh pages, 6x9 in., illustrating and describing rope transmission machinery.

The Martin-Hardsogg Co., Pittsburgh, Penn. "Distinctive Mining Tool Makers." Catalog "H." Seventy-eight pages, 7x10 in., describing mining tools and supplies.

The Mesta Machinery Co., Pittsburgh, Penn. Bulletin "N." "Air Compressors and Vacuum Pumps." Eight pages, 6x9 in., illustrated with drawings, diagrams and halftones.

The National Stoker Co., Covington, Va. "Crowe Stokers." Thirty-two pages, 6x9 in., with numerous drawings and illustrations, showing installations of Crowe chain grate stokers.

Edward Darby & Sons Co., Philadelphia, Penn. "Expanded Metal and Ventilated Sheet Lockers." Leaflet of 8 pages, illustrating and giving general specifications of Pen-Dar metal lockers.

The Sullivan Machinery Co., Chicago, Ill. Bulletin No. 63M, replacing Bulletin 63H. "Sullivan Iron-Clad Coal Cutters." Thirty-six pages, 6x9 in., illustrating iron-clad coal-cutters and their usage in coal mines.

The Electric Storage Battery Co., Philadelphia, Penn. Bulletin No. 146, May, 1914. "The Iron-Clad Exide Battery for Storage Battery Locomotives." Eighteen pages, 9x11 in., illustrating and describing storage batteries for locomotives.

Weston Electrical Instrument Co., Newark, N. J. "Experimental Electrical Testing by Students." Seventy eight pages 6x9 in., illustrating various electrical tests and apparatus. The book is compiled for and is of especial value to science teachers.

The Atlas Power & Manufacturing Co., of Cleveland, Ohio. Bulletin No. 1155. "Storage Battery Locomotives." Nine pages, 6x9 in., illustrating and describing various sizes and types of storage battery locomotives, particularly adapted to mine usage.

The Atlas Car & Manufacturing Co., Cleveland, Ohio. Bulletin No. 1165. "Electric Side, Rotary, and Rocker Dump Cars." Pamphlet of 8 pages, 6x9 in., illustrating and describing self-propelled dump cars, particularly applicable to slate disposal at mines.

PERSONALS

C. M. Means, electrical engineer, of Pittsburgh, Penn., has been apointed consulting electrical engineer with the U. S. Bureau of Mines.

J. R. Crowe, head of the Crowe Coal Co., operating mines at Pittsburg, Kan., will leave shortly for a tour of Europe. Mr. Crowe intends to inspect a number of mines while abroad, though the trip will be primarily for pleasure purposes.

George D. Key, candidate for attorney-general of Oklahoma, is making promises of putting the alleged "coal trust" out of business. Mr. Key, in recent speeches, has attacked the McAlester Coal Co. and others, alleging that operators have conspired to mulct the consumer.

Joseph Elwood, for several years with the Pittsburg & Midway Coal Co., at Pittsburg, Kan., has resigned to become general manager of the P. R. Sinclair Coal Co., of Aurora, Mo. He will have charge of the marketing of the company's output, with offices at Pittsburg, Kan.

Governor Cox, in a statement issued recently, denies that he will bring to the attention of the special session of the Ohio General Assembly the question of amendments to the Green mine-run law. He says the special session is called for taxation legislation, and nothing else will be taken up.

H. D. Mason, Jr., who has been in charge of the government mine rescue car at Pittsburg, Kan., for the past year, has been transferred temporarily to Pittsburgh, Penn., succeeding J. W. Paul, engineer-in-charge, who will leave shortly for an inspection tour of European mines. K. H. Chisholm probably will be transferred to Pittsburg, Kan., from McAlester, Okla., pending Mr. Mason's return. A. I. Young will be in charge of the car at Pittsburg.

Russell G. Belden and A. Eugene Wayland, of Spokane, Wash., who were recently convicted of using the United States mails to defraud, in the promotion of coal-mining companies, have been sentenced by Federal Judge Frank H. Rudkin to imprisonment, Belden's sentence being confinement in the federal prison on McNeil's Island for one year and one day, and Wayland's six months in the Spokane county jail. A stay of judgment, however, was granted, and the men were allowed to have their liberty on bail, pending an appeal to the United States Appellate Court at San Francisco.

James Taylor, formerly Illinois state mine inspector, now of the Draeger Oxygen Breathing Apparatus Co., of Pittsburgh, Penn., who was on a visit to Kincorth, Saskatchewan, Canada, on hearing of the coal-mine disaster in southwest Alberta, hurried to Hillcrest. After having made a careful study of the work done in connection with efforts at mine rescue on that occasion, he states that the men from the rescue stations of both Alberta and British Columbia did splendid work in recovering the bodies of those killed by the explosion, although there was no opportunity to get men out of the mine alive, death having overtaken them almost immediately.

OBITUARY

August Diehl, a former coal operator, died at Fulton, Mo., on June 22, after a short illness. Mr. Diehl retired from active business several years ago. He was 72 years old and a native of Germany.

William Guest, aged 78 years, one of the pioneer colliery engineers of the Lackawanna Valley, who died on June 23, in Scranton, could boast of never having experienced an accident in over 50 years of service at the Pyne shaft. He was employed by the Lackawanna Coal Co. for 51 years.

CONSTRUCTION NEWS

Waynesburg, Penn.—John Bender and John Zubal are preparing to open a mine in the Mapletown vein of coal under the McNatt farm in Cumberlad Township.

Nashville, Tenn.—At a cost of $5000, the St. Bernard Mining Co., George C. Atkinson president, is erecting a corrugated iron paint shop here, using its own employees.

Fairchance, Penn.—Arrangements have been made for the opening of two coal mines near Fairchance. The 9-ft. vein of coal will be worked, a contract having already been made for the coal mined.

Columbus, Ohio—Negotiations have been completed by the National Coal, Fuel & Supply Co., which has offices in the New Hayden Building, Columbus, for the purchase of a tract of 3200 acres of coal lands in Buchannon County, Va. The consideration is approximately $288,000. The load was purchased from the Roanoke Land Co. and the local corporation proposes to develop it in the near future.

Whitesburg, Ky.—Real estate, coal and timber land values have gone up in the lower end of Letcher County since the announcement was made that the Wasioto & Black Mountain R.R. would be extended from Benham, Harlan County, through Pine Mountain and down Pine Fork Creek. A crew of engineers is on hand preparatory to making the survey, and it is declared that construction work will be begun at once. The extension, which will run about 16 miles, will mean expensive tunnelling and grading and will open up an exceedingly rich country.

Toledo, Ohio—The $2,000,000 dock and harbor improvement of the Hocking Valley Ry. Co. at this point is nearing completion. It will be one of the most important pieces of dock and pier improvement in this section and will put the Hocking Valley foremost among railroads handling coal on the Great Lakes. The two loading machines, one of which has been completed and the other to be finished by Aug. 1, will be the largest in service on the lakes. They will be capable of handling 40 cars each of 50-ton capacity per hour, and can load the largest coal boat on the lakes in 6½ hours. During a season of navigation they can handle 10,000,000 tons of coal.

NEW INCORPORATIONS

St. Clairsville—The Big Five Coal Co. has reduced its capital stock from $300,000 to $6000.

Vincennes, Ind.—The Wasson Coal Co. has increased its capital stock from $150,000 to $175,000.

Carbon Hill, Ohio—The Russell Run Coal Co. has increased its capital stock from $10,000 to $20,000.

Bridgeport, Ohio—The Pursglove Coal Mining Co. has made a reduction of capital stock from $100,000 to $5000.

Matoka, W. Va.—The Delparen Briquet Co. has been incorporated with a capital stock of $100,000 to manufacture briquets for fuel

Liberal, Mo.—The Liberal Coal & Mining Co. has been formed to operate a steam shovel at Liberal, Mo. J. H. Vincent, a mining engineer, of Pittsburg, Kan., is the head of the new concern.

Gary, Ind.—The Mid-West Diamond Drilling Co. has been organized with a capital stock of $20,000. The business of this firm will be mining. The directors are William L. Brennan, James B. Brennan and John A. Brennan.

Skelton, W. Va.—The West Virginia Coal Mining Co. has been organized for coal development with a capital stock of $50,000. The incorporators are T. R. Ragland, of Skelton, W. Va.; K. L. Moon, E. F. Simpson, M. L. Norvell and W. M. Beckers, Jr., all of Richmond, Va.

Peel Tree, W. Va.—The Little Mountain Coal Co. has been granted a charter. The chief works of the new concern will be at Peel Tree. The organization is capitalized for $500,000, $5000 of which has been subscribed and paid in. The firm will do a general coal mining business

Henderson, Ky.—The Kentucky-Henderson Coal Co., with a capital stock of $425,000, has been incorporated by the following, all of 1137 Schofield Bldg., Cleveland, Ohio: J. A. Curtis, L. C. Mizer and W. H. Hill. Mr. Curtis is soon to announce the details of the developments the company will make.

INDUSTRIAL NEWS

Pottsville, Penn.—A peculiar situation recently developed in Pottsville. The town ran entirely out of nickels. The Philadelphia & Reading Coal & Iron Co. was handicapped in making up its payrools and the government was asked to ship $10,000 in nickels to the region.

Athens, Ohio—Howard Manington, representing the Ohio Electric Co., which has started the construction of a $1,000,000 power plant at Flodwod, Ohio, for the purpose of supplying electric current to mines in that neighborhood, is trying to make contracts with cities and towns for furnishing light.

Washington, D. C.—Investigation of charges that a "coal trust" is influencing coal-carrying railroads to discriminate against Atlantic ports south of Norfolk will be begun by the Interstate Commerce Commission early in July. Subpœnas have been issued for several prominent men connected with the interests concerned.

Charleston, W. Va.—In the hope that the state will be able to properly distribute labor, sending idle men to points where they are needed, J. H. Nightengale, commissioner of labor, recently announced that a free employment bureau will be opened. This action is taken under an act of the legislature passed in 1901, but never enforced.

Parkersburg, W. Va.—The Sylvester Co. has announced the removal of its business headquarters from Connellsville, Penn., to Parkersburg, W. Va., the object being to secure a more central location in the coal-mining district. The name of the firm is also changed from the Sylvester Co. to W. Sylvester. This, however, involves no change in ownership, management or policy.

Columbus, Ohio—The W. J. Hamilton Coal Co. has filed an answer to the petition, filed several days ago, asking the United States court to declare it bankrupt. The company denies that it is insolvent or that it is a bankrupt, and asks that the case be dismissed. The petition asking that the company be declared bankrupt was filed by the Buffalo Collieries Co. and others.

Philadelphia, Penn.—A protest has been made by the grievance committee of the Delaware, Lackawanna & Western R.R. mining employees against the patrol system recently inaugurated at the company's mines. This system was established in the interest of the workmen's safety and not, as charged, for the purpose of driving the men to work. The protest carried with it a strike threat, but this, it is believed, will be averted.

Birmingham, Ala.—The officials of the Tennessee Coal, Iron & R.R. Co. recently announced the receipt of an order for steel rails amounting to 32,000 tons from the Frisco line. This steel will be used in relay work, the construction of passing tracks and some new construction along its line. Steel plant operations, although not at the maximum, have been more or less satisfactory, and the belief is entertained that there will be but little idle time this summer.

St. Louis, Mo.—The Interstate Commerce Commission has ordered the Rock Island and Denver & Salt Lake railroads to establish on or before Sept. 1, and maintain for at least two years from that date, rates on bituminous coal from the Oak Hills district, Colorado, to destinations in Kansas, Nebraska and Missouri, not in excess of those contemporaneously in effect from the Walsenburg district to the same destinations. The railroads proposed to increase rates.

Pittsburgh, Penn.—The H. K. Porter Co. intends shortly to bring out a new type of locomotive, combining as practical features compact construction, vertical boiler, gasoline, kerosene or fuel-oil burner equipment, piston valves, outside valve gear and a condenser attachment to eliminate steam exhaust in mines and tunnels. Equipped with a gasoline burner, this locomotive gives absolutely no smoke or obnoxious gas in the exhaust, making it ideal for tunnel or mine service.

Seattle, Wash.—Four hundred tons of coal mined by the government in the Matanuska coal fields of Alaska for the use of the navy in making steam tests was recently brought by the steamship "Admiral Sampson." The coal was discharged at the Puget Sound Navy Yard, where it will be stored until the armored cruiser "Maryland," which has been selected to make the test, can be spared from service in Mexican waters. Four hundred and fifty tons of coal are still at Knik, Alaska, and probably will be brought down on the next steamer.

Coal Trade Reviews

General Review

Heavy curtailment in the anthracite regions marks the inception of the usual midsummer lethargy. Individuals working full and forcing the market. Eastern soft-coal buyers fail to respond to unusually low prices and trade devoid of further absorbing paver. Western situation developing a better tone.

The regular monthly increase in the anthracite circular on Wednesday of this week, has forced a heavy general restriction in operations throughout the mining regions for the first time this season. Many of the large companies shut down on Tuesday night and will remain closed until Tuesday morning of next week; the curtailment was of larger proportion than anticipated and marks the beginning of the usual summer dullness in the anthracite trade. The individual operators are attempting to work full time but are obliged to make heavy concessions on the circular, sales down to the April discount and even less being frequently made. The consumers are getting well stocked and the market has little further absorbing power. Stocks at the upper Lake ports are still excessive and will continue so until the crops begin to arrive but the Lake movement is about normal.

There is no life to the Eastern bituminous market in any direction. Buyers are indifferent to low prices, some exceptionally good offers failing to move tonnage and the trade appears to be completely devoid of further absorbing power. With many of the manufacturing plants closing down on July 1, the midyear period, to take inventory and undergo a general overhauling, the indications are for a further curtailment, temporarily at least. The increased demand in the West for certain of the West Virginia grades has diverted some coal from the Eastern market but not sufficient to relieve the tension. The bunkering business at tidewater continues light but the foreign trade is proving excellent.

The Lake market still fails to develop the expected activity. A slight increase from the Pittsburgh district is noticed, but this is offset by a reduced consumption among manufacturing interests as a result of the customary mid-year shut down. The labor deadlock in Ohio is still in effect and seems to be more complete than ever before; indications now are that settlement will be effected by subdistricts. In the meantime current requirements are being obtained from outside sources and some improvement in the steam grades is noted with prices slightly stronger. The resumption of operations in the Kanawha field has had a depressing effect and surpluss tonnages are again accumulating. Steam fuels in the Southern market are notably firmer, industrial activity apparently being on the increase there; the higher grade domestic coals are also bringing a slightly better price.

The steam coals are reported generally stronger throughout the Middle West also. In spite of the many adverse conditions in different parts of the country the large Western crops are undoubtedly having a stimulating effect upon the situation there. There are quite a number of contracts still being held back but prices are well maintained and there will be a rush to close contracts at the first indication of any improvement. Mines as a rule are on about half time schedule.

ATLANTIC SEABOARD

BOSTON

Continued summer dullness. Fewer "market cargoes" the only hopeful sign. Prices show no improvement. A slightly better movement of Pennsylvania grades looked for in July. Anthracite consumers taking on very little.

Bituminous—There is no improvement in the tidewater situation. Pocahontas and New River prices continue as weak as at any time in June and there appears to be no life to the market in any direction. There are perhaps fewer cargoes of consignment coal to be forced on reluctant purchasers, but otherwise there are no hopeful signs to report. There are now practically no contracts left open and it is hard to see where any buying power can develop during July and August. What coal comes forward aside from "market" lots is almost exclusively for application to contract business and the volume of such business is much smaller than usual at this season. The amount of sail, barge, and team colliers laid up for lack of business has increased rather than diminished and beyond a few half-hearted appeals for "offers," the transportation people are reconciled to the general dullness and do not shade rates below what would yield some sort of return.

The amount of coal standing at the Hampton Roads piers continues to be very large. Spasmodic efforts are made here to move blocks of it beyond what can be shipped to regular contractors, but an ordinary "cut" proves as ineffectual as none at all. Buyers are now so callous to low prices that they have ceased to be responsive.

The Pennsylvania varieties will be helped a little by the slackening demand for anthracite. There was a reduction of 5c. in the water rate from Philadelphia on railway barges carrying bituminous temporarily, both for part and for whole cargoes. The movement should therefore be somewhat improved during July, particularly because many Eastern buyers wait for just such a situation. Prices are unchanged; operators are still obliged to name bottom figures on what tonnage they move.

There is no new feature in Georges Creek. What is mined is confined pretty well to contract and prices therefore show no weakening.

Anthracite—July opens with a small amount of tide orders held over from June and a fair prospect of business the latter part of the month. Meanwhile, the holidays in the region, are likely to cause curtailment of output, and a dull spell is looked for. Retail dealers are not favored with more than scattering orders from consumers and stocks in most parts of New England are well up to the limits of storage.

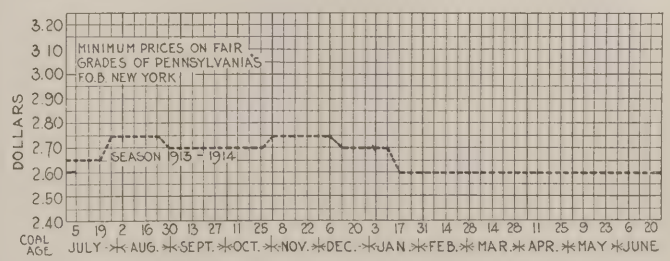
	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.90@1.40	$1.10@1.55	$1.67@1.77	
Philadelphia*.....	2.15@2.65	2.3 @2.80	2.92@3.02	
New York*.....	2.45@2.95	2.6 @3.15	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.55@2.85
Boston†.....	.....	.....	.....	3.25@3.63
Providence†.....	.....	.....	.....	3.25@3.63

* F.o.b. †On cars.

NEW YORK

Bituminous production still restricted and further curtailment anticipated. Stocks depleted and a moderately firm undertone prevails. First general suspension of the season becomes operative in the hard-coal regions.

Bituminous—A steadily increasing dullness charatcertizes the local soft-coal market. Negotiations on the new contracts have ceased entirely for the moment and practically no spot business whatever is being done. Production for the current week was about on the same reduced schedule as last week, but further curtailment is anticipated next week when many industrial concerns will close down for two weeks, taking inventories and giving their plants a general overhauling.



As has been the case for some time past, the movement is restricted entirely to contracts, and requisitions on these are much reduced. A moderately strong demand for gas coal in the West is relieving the tension on these grades in the Eastern markets to a certain extent. The West Virginia gas-coal operators are probably working close to full

rated capacity, while it is doubtful if the steam-coal mines are producing 50% of their possible output.

There is still a great deal of coal being held in boats to avoid demurrage which can possibly be obtained at concessions. Aside from this, there is no evidence of any consignment coal at Tidewater and no forced sales at sacrifice prices are being reported. The unusual condition of restricted operations with the Berwind Company still prevails, due no doubt to the adverse conditions in the bunkering trade, but as a rule the supplies at Tidewater are only normal. Probably no new contracts are being closed but some of the agencies have figures out on the same basis as last year. No business whatever is being done in the spot market but the prices remain quotable on the same basis as for the past several weeks as follows: West Virginia steam,, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The salient feature of the hard-coal market during the current week has been the general restriction in operation on the part of most of the big companies; many of them suspended operations Tuesday night and will remain closed until Tuesday of next week while all the others are curtailing to a certain extent. This is the first general suspension throughout the mining regions and marks the beginning of the customary summer dullness in the anthracite trade. That a restriction in operations has been imminent for some time was generally agreed to by all, but it was hardly expected to be of such large proportions. A combination of several conditions has made this necessary. There is scarcely any demand at the moment except for stove coal, and with the increase of 10c. in the circular on domestic grades on Wednesday, July 1, what little demand there was, practically all disappeared.

There is practically no demand on any of the sizes. Stove coal which has been in short supply throughout the season can now be had for reasonably prompt shipment in any desired tonnage. Pea and buckwheat are being stocked heavily. It is expected that the customary lethargy following the 10c. increase on the first of the month will prevail until well toward the close of the month when another spurt is expected. We now quote the New York market on the following basis with the circular on the prepared grades, increased 10c. per ton:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.90	$4.60@4.90	$4.85	$4.55@4.85
Egg	5.15	5.00@5.15	5.10	4.90@5.10
Stove	5.15	5.15	5.10	5.10
Chestnut	5.40	5.10@5.40	5.35	5.00@5.35
Pea	3.55	3.40@3.55	3.50	3.25@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.10@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

PHILADELPHIA

Market for anthracite growing more stagnant. No immediate improvements indicated. Bituminous situation slightly more encouraging, but it is still difficult to negotiate a sale even at the low prices prevailing.

Anthracite—The anthracite situation still continues to slow up as the summer progresses. Continued inactivity in the industrial field has reduced the demand for the small sizes to such an extent that most of the output is being placed in stock. The domestic market is absorbing all the stove coal, but on the other sizes, short-time work at the mines is sufficient to meet all requisitions. Tidewater business is gradually disappearing. Individual operators still continue to work their mines on full time, and buyers are quoting their own figures. Quotations of $2.10 and $2.15 for pea coal, without the tax, are freely made, and April prices or in some cases less, are the rule rather than the exception. The price of stove is about the only figure that is being maintained, and a comfortable order for chestnut will have a tendency to reduce this also.

Tidewater prices rule about as follows:

	Circular	Individual
Broken	$4.55	$4.55
Egg	4.80	4.60 @ 4.70
Stove	4.80	4.80
Chestnut	5.05	4.70 @ 4.80
Pea	3.25	3.00

Bituminous—The bituminous market still continues, as a whole, dull and listless. With the exception of possibly an increased demand, due to the fact that some of the manufacturing establishments have had to replenish their stocks to a certain extent, there is little change over the previous week. Prices for the medium coals are still quoted at from 90c. to $1.10 and the better grades $1.25 to $1.35, with considerable effort attached to making sales at even these figures.

BALTIMORE

Industrial troubles in the West are stimulating West Virginia prices. Eastern business continues slow and quiet. Export trade holds steady and firm.

The West Virginia situation on soft coal is being materially helped by strike troubles in some of the Middle West states. Not only are prices better for delivery West, but the mine interests are showing more of a disposition to withdraw from the poor trade Eastward. Hurry calls for coal to the West to take the place of Ohio fuels have resulted in sales of three-quarter gas at from $1 to $1.05 for prompt delivery, while the same fuels East have been quoted at a maximum of 85c. Slack, too, is doing better Westward, sales being quoted at anywhere from 65 to 75 cents.

Pennsylvania fuels have felt the effect of the Western demand to a less marked degree, the increase being largely confined to districts which have always participated in this business. Pennsylvania coals of medium grade are quoted at from $1 to $1.10. Best fuels are still firm around $1.35, on spot business. The Eastern business as a whole is rather slow and uneventful.

HAMPTON ROADS

Demand for all grades still light. Practically no coal moving except on contract. Circular prices still being quoted.

Dumpings for the week have not been heavy. There have been times when berths at all piers were vacant, although vessels have been compelled to remain in the stream awaiting turn at the dock. Taking the week as a whole, the total dumpings will just show a fair average.

Practically all coal shipped has been New River and Pocahontas run-of-mine, with some small lots of high volatile. Some coal has moved to the Southern ports, but the heaviest coastwise shipments have been to Boston, Providence, Portland and Fall River.

Quotations remain the same as they have been for some time, and, although there may be some little cutting by smaller concerns who have coal on demurrage, it is not believed any great reductions will be made in circular prices. There is still more coal in the railroad yards than normal, with a fair amount of vessel tonnage about due.

Foreign shipments for the week have been to Naples, Genoa, Leghorn, Coronel, Punta Arenas, St. Lucia, Port of Spain, Santiago, Barbadoes, Para, Pernambuco and Cerea. From present indications, dumpings for June will fall considerably behind those for May, but the prospects are there will be an increase over the figures for June of last year.

SEABOARD SHIPPING

The "Journal of Commerce and Commercial Bulletin" reports coal shipping, under date of July 1 as follows:

An active business was done in steamer chartering for grain cargoes, the bulk of which was for Montreal loading. Additional freights of the kind offer steadily for July, August and September loading, and rates are strong and buoyant, with tonnage offerings limited. The demand for tonnage in all other trades was limited and but little was done in chartering. There was no change in the sail tonnage market and nothing of consequence was done in chartering. Tonnage is abundant and offers freely, but business of all kinds is difficult to obtain. Rates are nominal and not quotably altered.

Coal charters have been reported as follows:

Vessel	Class	Nationality	From	To	Tonnage
Camilla	Steamer	Norwegian	Baltimore	Bocas del Foro	1530
Ocland	Steamer	Norwegian	Baltimore	Daiquiri	1874
Estelle Krieger	Schooner		Philadelphia	Porto Rico	1047
Augustus D. Babcock	Schooner		Norfolk	Texas City	1299
Kineo	Schooner		Hampton Roads	Texas City	1867
Chas. Whitemore	Schooner		Baltimore	Georgetown, S. C.	582
Henry W. Cramp	Schooner		Philadelphia	Bangor	1448
	Steamer		Atlantic Range	Yokahama	6000
Auchemblae	Steamer	British	Baltimore	Vera Cruz	2500
Putney Bridge	Steamer	British	Baltimore	Vera Cruz	2147
Henry Lippitt			Philadelphia	Cay Francis	

COKE

CONNELLSVILLE

A notable firming up in coke. Large contract placed at $2. Foundry grades dull at expiration of contracts.

The coke situation has firmed up decidedly, as three consumers have just placed contracts for second-half furnace coke at $2 flat, involving a total of 27,000 tons a month. One of these consumers is in the East, another in local territory and the other in the West. As prompt coke can be had at well under $2 it is inferred that the buyers expected a considerable firming up in the market in the near future. There is also indicated a stronger preference on the part of buyers for the best grades, as there are some brands of coke rather freely offered at about $1.85 for third-quarter and $1.90 for the half-year.

Prompt furnace coke is as dull as ever. Several contracts for second-half are under negotiation with sellers who are committed to a price of $2. Foundry coke is rather dull, considering that most contracts expire this week. The market is quotable as follows: Prompt furnace, $1.75@1.80; contract furnace, $1.90@2; prompt and contract foundry, $2.30@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ending June 20 at 262,575 tons, an increase of 2960 tons, and shipments at 260,265 tons, an increase of 6913 tons. This is about 60% of the normal capacity of the region.

BUFFALO

Still dull and heavy, with some low prices being quoted.

The ovens are still reducing their active number, and though there is occasionally report of a firmer and more active steel market it does not affect coke. There is at present a report of coke selling at low prices, but the producers of standard grades are holding firm on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.25 for stock coke.

COLUMBUS

The coke market is ruling steady in every particular. The demand is not strong and offerings are also small. Prices are firm at the figures which have prevailed for some time.

CHICAGO

The market is firm. Prices are: Connellsville and Wise County, $5@5.25; byproduct, egg, stove and nut, $4.65; gas house, $4.25.

ST. LOUIS

In June 1913 an unusually large tonnage of coke moved into St. Louis, but this season practically none has arrived from outside points. Some local coke was distributed, but not in the tonnage anticipated. A good demand is looked for in July.

LAKE MARKETS

PITTSBURGH

Mining operations unchanged at about 75% of nominal capacity. Lake movement fairly heavy, but market sales of Lake coal very light. Prospective closing of mill consumers in July. Price shading for prompt slightly diminished.

Mining operations in the Pittsburgh district continue at about 75% of nominal capacity, though at perhaps not over 60% of the possible capacity under pressure. There has been a slight further increase in shipments in the Lake trade, but this is more or less offset by small line trade since many of the mills and factories contemplate closing for a short time in July for repairs.

While the Lake movement on the whole is fairly large in tonnage, though well behind the movement of last year to this date, the proportion of coal passing through the local market for Lake shipment is small. Nearly all the coal being shipped in the Lake trade is by Lake shippers which have their own mines, or long-term arrangements with mines. There is somewhat less cutting of circular prices in the case of prompt coal, but there remains considerable, and particularly on slack. which sells down to 55c.. and possibly 50c. in some instances. Circular prices remain: Slack, 80@90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in.. $1.50. per ton at mine. Pittsburgh district.

BUFFALO

Some report of improvement here and there, but it is not general. Anthracite at full mid-summer quiet. Mines all running on part time.

Bituminous—A few of the local shippers claim to see better things in the trade, but as a rule there is no improvement. Slack has been hard to dispose of, but some shippers now report that they have sold all their surplus. It is also stated that some of the larger producers of slack are stocking considerable rather than sell it at present prices.

In spite of the uniformly slow movement of bituminous there are some who are preparing for a stir. There are a few mine owners and representatives who are able to keep their mines running practically all the time and sell their coal at good prices, but the rule is about three or four days' operation a week, and more or less difficulty in disposing of even this reduced output. The buyers are in the market only on solicitation. Bituminous prices are quite as steady as the amount of coal moving will warrant, being based on $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley 15c. to 25c. lower.

Anthracite—The trade is quiet, with no stir expected till after the midsummer lull is over. There is no real complaint, as in bituminous, for what is not sold now will have to be taken later. The actual consumption has not fallen off and is not likely to diminish so long as the supply lasts. Mining is slowing down, on account of the general lack of demand.

The Lake trade keeps up remarkably well, in view of the general notion that the Upper-Lake docks are largely overloaded. The coal does not move out very fast, but it is expected to as soon as the fall crops begin to come in. The Buffalo shipment by Lake for the week was 168,000 tons, which is a decidedly large amount.

TORONTO

Plentiful supplies available and prices showing a softening tendency.

Trade shows little change for the better, manufacturing requirements being much below normal, with a downward tendency in wholesale prices for steam coal. The yards are well suplied, there being a larger quantity of bituminous than usual on the market, owing to the fact that but little is going up the Lakes, vessels being unable to get return cargoes of ore. Buyers as a rule are only purchasing for immediate requirements. Prices are as follows: Retail, anthracite egg, stove and nut, $7.50; grate, $7.25; pea, $6.25. Bituminous steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50; wholesale f.o.b. cars three-quarter lump, $3.68; screenings, $2.64.

TOLEDO

Market dull and prices unchanged. Indications of improved industrial conditions creates hopes of a better market shortly.

The Toledo market is still quiet and prices remain the same. It is believed that Lake shipping will show improvement as soon as business picks up a little, which seems probable according to present indications. Many of the smaller factories have been closed for summer repairs and inventories, and will be reopened within a short time.

The new Hocking Valley docks here have been formally opened and a number of boats loaded and sent up the Lakes with coal. The Hocking Valley has transferred one crew from its old west side docks to its new plant. On July 1 the old dock machinery and trackage rights of the Hocking Valley on the west side will be turned over to the Pennsylvania, after which the Hocking Valley will maintain night and day crews at its new docks.

COLUMBUS

Steam coals in fairly good demand and at slightly better prices. Domestic dull though showing indications of improvement.

Demand for steam grades is holding up well despite the general business depression which cuts into the tonnage required for factories. West Virginia and Kentucky coal is finding its way into Ohio to fill this demand. Prices which were extremely low several weeks ago are more steady and higher. Railroads are also in the market for fuel and have confiscated coal cargoes found on their lines.

There is also a little better demand for domestic grades but so far dealers have been able to take care of this business without inconvenience. Pocahontas and West Virginia splints are in good demand and the same is true of anthracite. Prices on domestic coals are rather firm and ruling unchanged at the levels which have prevailed for several weeks.

The Lake Trade is as active as could be expected with Ohio mines closed. The Hocking Valley docks at Toledo have handled 680,000 tons since the opening of navigation.

What quotations are being made in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.50@$1.40		$1.50@$1.40	$1.50@$1.40
¾-inch	1.35@ 1.30	$1.20@$1.15	1.35@ 1.30	1.30@ 1.25
Nut	1.30@ 1.25		1.25@ 1.20	1.25@ 1.20
Mine-run	1.15@ 1.10	1.10@ 1.05	1.15@ 1.10	1.10@ 1.05
Nut, pea and slack	0.85@ 0.80		0.85@ 0.80	0.80@ 0.75
Coarse slack	0.75@ 0.70	0.85@ 0.80	0.75@ 0.70	0.70@ 0.65

CLEVELAND

Sharp competition between West Virginia and Pennsylvania operators for the Ohio trade. Labor situation still indeterminate. Lake trade continues slightly below normal.

Prices for slack show some signs of advancing and a better demand is being had from all quarters. The improvement is so slight that it is not a real feature, but it is indicative of the future. Fairmount coal has practically been driven out of the market by Youghiogheny and other Pennsylvania fuels that are being sold at remarkably low prices, which the West Virginia operators are refusing to meet. Very little coal is coming in on consignment, as the market is too weak for that.

Pocahontas operators are quoting lump and egg at $2.25 a ton at the mines. A few odd cars were on the market at $2.10, but were not being generally offered, as the broker is not in any hurry to sell. The market for Pocahontas slack is so slow that they are not making the prepared sizes. An odd car of splint was on the market and a few other domestic coals are to be found, but not enough to make them features of the situation.

Hard coal is moving in the usual summer quantities and dealers are having no difficulty getting what they need.

Interest in the coal strike has been centered on southern Ohio and Hocking negotiations, which so far have not been successful. Eastern Ohio operators are prepared to reopen negotiations with the miners through a single representative, who will meet a single representative of the miners. They are anxious to reopen the mines, as the demand for their product is such they fear to lose part of their trade. No effort will be made to meet the miners until Hocking operators have concluded negotiations one way or the other.

The Lake situation is very easy so far as the coal shipper is concerned. Vessels are plentiful, as grain cargoes and ore are so short of the demand the ship-owners want to delay their vessels as much as possible. There are a number of boats operating exclusively in the coal trade, and the result is the coal shippers have more vessels offered them than they have cargoes to load.

For shipment the following prices are being asked:

	Pocahontas	Youghiogheny	Fairmount
Lump	$3.60		
Lump, 1½-in		$2.35	
Lump, ¾-in		2.25	$2.00
Mine run	2.60	2.10	1.90
Egg	3.60		
Nut		2.20	
Slack	2.20@2.35	1.60@1.65	1.65@1.70

CINCINNATI

Resumption of operations in the Kanawha fields and slowing down in Lake shipping are depressing the trade. Surplus tonnages again accumulating. Market completely devoid of interest.

Probably the slowest market of the season has prevailed during the past week, which, considering the previous slump, might well be expected to produce a bad effect. The cessation of operations in the Kanawha field had a slightly favorable effect upon the market for a time, and this, coupled with a reported improvement in the Lake trade, made things temporarily better. But with the resumption of work at the Kanawha mines, fresh supplies of surplus fuel have been thrown upon the market. Both dealers and operators declare that the domestic movement is slower than ever before at this season.

Reports indicate renewed difficulty in keeping the Lake movement up to anything like a normal volume, boats refusing to carry coal up when they must come back light. As the result of this accumulation of adverse conditions the trade in this vicinity is facing an almost unprecedented slump just now; and while the general opinion, based on the necessary consumption of an ordinary year, is that a serious shortage later is inevitable, this does not seem to have any effect at the present time.

DETROIT

Trade holding its own and a more hopeful feeling prevails.

Operators are taking a more hopeful view of the situation; the trade is at least holding its own, and is generally considered as good as could be expected in view of the adverse conditions prevailing. The freight-rate increase asked for by the railroads continues to be the main controlling feature in the present situation. There are also other matters pending in railroad circles that are of vital interest to the coal industry, such as the spotting rules.

SOUTHERN

LOUISVILLE

New July circular has gone into effect and the market is notably firmer. Steam demand from the South is particularly good.

The first of July saw a general advance of about 10c. a ton on Kentucky domestic coals, for which the demand has been improving steadily in the last few weeks. This advance applied especially to the eastern Kentucky field, which has been booking orders in quantities for July, August and September delivery for some time. In parts of the Eastern and Western fields, however, the advance was not made generally effective.

Perhaps one of the most significant things about the market is that the industrial requirements to the South seem more insistent than from sections north of the Ohio River. The Southern demand has disposed of what was getting to be a large accumulation of steam coals; in fact, some of the mines, with effective selling organizations, have now had to instruct their Southern agents to go slow in accepting orders, as they seem to be booked ahead for heavy tonnages.

Such price changes as have been made in the last few days were discounted by the rate at which orders were booked for later delivery. It may be noted that the fancier grades of Southeastern Kentucky block coals are bringing from $1.75 to $1.90, f.o.b. mines, while the Harlan and Straight Creek grades are going at from $1.50 to $1.75. Otherwise the market is unchanged.

MIDDLE WESTERN

INDIANAPOLIS

A gradual improvement expected, due to the big wheat crop. Conditions generally unchanged yet, as to running schedule and prices. It is believed the railroads will be able to handle the heavy fall business satisfactorily.

The wheat is moving and the coal trade takes on a more cheerful tone. In spite of adverse conditions, the marketing of the large crop is bound to help toward a general improvement. There are contracts still hanging back, awaiting the turn of affairs and these will probably be closed at the first indication of improvement. An additional mine here and there in the state is starting up again but the general situation shows no marked improvement. There is more than the normal movement of Eastern coals going into the consumers cellars.

Sometimes there is an advance in Pocahontas at midsummer but not a rise all along the line. The dealers say it is caused by increases at the mines, but operators deny this and seem anxious for more business at old prices. The Indiana mines are said to be in good shape for a heavy run, if future trade conditions demand it. Their average operation now is not much better than half-time. No apprehension is apparent concerning the ability of railroads to handle the coal traffic during the movement of the wheat.

Indianapolis retail dealers have advanced their prices 25c. on both hard and soft coal, following similar advances at the mines. Their new quotations are:

Anthracite, chestnut	$7.75	Pittsburgh lump	$4.00
Anthracite, stove and egg	7.50	Raymond lump	4.00
Anthracite, grate	7.25	Winifred lump	4.00
Pocahontas, forked lump	5.50	Hocking Valley lump	4.00
Pocahontas, shoveled lump	5.00	Luhrig lump	4.00
Pocahontas, mine run	4.00	Luhrig washed egg	4.25
Pocahontas, nut and slack	3.50	Cannel	6.00
Blossburg	5.50	Linton No. 4 lump	3.00
Jackson (Ohio)	4.75	Linton No. 4 egg	3.00
Kanawha lump	4.00	Indiana washed egg	3.25
Kanawha, egg and nut	4.00	Brazil block	4.00
		Connellsville lump	6.00
		Citizens egg coke	5.50
		Citizens nut coke	5.50

CHICAGO

Stronger demand for same grades in the Chicago market and the general tone is improved. The call for Western coal is heavier, buying for near future delivery being more active.

A slight improvement in the steam trade has been reported and the consumption of fine coal is in excess of production. There is a better demand for mine-run and steam

lump which is construed as an indication that there probably will be a revival in business early in July. Anthracite dealers report slack business.

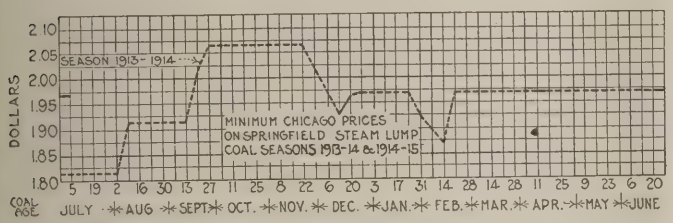
There has been but little change in the smokeless coal market. The larger producers are still adhering to the circular price of $1.25 for mine-run although many sales at $1 a ton have been reported. There is an unusual scarcity of lump and egg. Hocking coal, of course, remains off the market. On account of harvesting requirements Franklin County coal has been in demand among the farmers. All of the larger operators announced an advance from $1.35 to $1.50 for domestic sizes July 1. Springfield coal is being sold almost exclusively to the steam trade, no effort being made to force any domestic on the market. Screenings have been advanced five cents a ton as there has been a scarcity of this fuel.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W.Va.
Domestic lump	$2.07	$2.30@2.40	$2.12	
Steam lump	1.97		1.97	
Egg		2.30@2.40		$3.95
Mine-run	1.87	2.15@2.25	1.87	3.05@3.30
Screenings	1.62@1.67	1.95	1.62@1.67	

Harrisburg coal is quoted at: Domestic lump and egg, $2.30@2.40; steam lump, $2.25; mine-run, $2.15@2.25; screenings, $1.95; No. 1 nut, $2.40@2.55; No. 2 nut, $2.30@2.40.

Carterville prices are: Lump, $2.30@2.40; egg, $2.30@2.40 No. 1 washed, $2.40@2.55; No. 2 washed, $2.45.



ST. LOUIS

No demand with the possible exception of some of the steam sizes. Low prices have prevailed over the first have of the current year.

There is no demand for any kind of coal, with the possible exception of a small tonnage of screenings. Right now steam sizes are on the rise, and will possibly be at their high mark until July 8 or 10, when they will start to decline as they did a year ago. It will be remembered that screenings, between July 15 and 25, dropped about 30c. a ton. The circular of a year ago, is identical with the price list of this week, excepting, perhaps, that washed coal is not as strong now as it was then and that the higher grades of coal from Williamson and Franklin Counties are bringing as much as 10c. per ton more this year than last year. This is accounted for largely by the fact that the trade is becoming more discriminating.

The first six months of the calendar year have been anything but profitable ones to the coal trade. Unusually low prices have prevailed, and the greater portion of the period, coal has been selling at cost or less. In Illinois coals there will be nothing doing until about July 6 or 7, when the demand will begin. There is practically nothing moving from that field right now.

Independent and off grade anthracite is selling as much as 50c. below the circular. Smokeless is not coming in, in the volume that it has for the past two or three years, and indications are that its tonnage is diminishing.

The lowest priced coal recently shipped into this market was from West Frankfort, mine-run being quoted as low as 75c., Franklin County. Steam sizes from this point are being sold for less than the cheapest Carterville on the market, which indicates that there is something wrong with the Franklin County field, or at least a portion of it.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	.....	$1.15	$0.80@0.90	$1.15
3-in. lump	.....	.....	.....	.....	.....
6-in. lump	$1.20@1.35	.....	1.25	1.00@1.15	1.35
Lump and egg	1.85@2.15	$2.00	.....	.....	1.15
No. 1 nut	1.20@1.35	.....	.....	.....	.....
Screenings	0.85@0.90	.....	0.80@0.85	0.70@0.80	0.75@0.80
Mine-run	1.00@1.15	.....	.....	0.75@0.80	.....
No. 1 washed nut	1.30@1.40	2.25	1.50	.....	.....
No. 2 washed nut	1.20@1.25	.....	1.35	.....	.....
No. 3 washed nut	1.25@1.30	.....	.....	.....	.....
No. 4 washed nut	1.25@1.30	.....	.....	.....	.....
No. 5 washed nut	0.80@0.85	.....	.....	.....	.....

KANSAS CITY

Threshing demand absorbing considerable coal and the mines are moderately active. Labor scarce and some small strikes reported.

Much improvement has been noted in Kansas City recently, the demand from various sources being stronger. Coal is moving actively to the harvest fields, where threshing is on in full force. Industrial concerns are beginning to order for later delivery, and most of the mines are preparing for extended operations.

Difficulty has been caused by a scarcity of men in some districts. It is reported that some miners have gone to the harvest fields. A number of difficulties between operators and organized labor are reported. In most cases, however, these have been quickly settled and there is little room for concern. The market has been steady, with prospects for an advance in view of the improved conditions.

PORTLAND, ORE.

Nanaimo mines are working again after the settlement of the strike. They are getting out domestic coal but have not yet placed any steam fuel in the market, owing to the fact that considerable development work will have to be done; it is expected to have steam coal on the market within the next two months, however. These mines are operated by the Western Fuel Co. The South Wellington mines are working steadily, and at Comox the Canadian Colliers Co. is busy on its bunker-coal trade. The mines at Ladysmith are also working.

PRODUCTION AND TRANSPORTATION STATISTICS

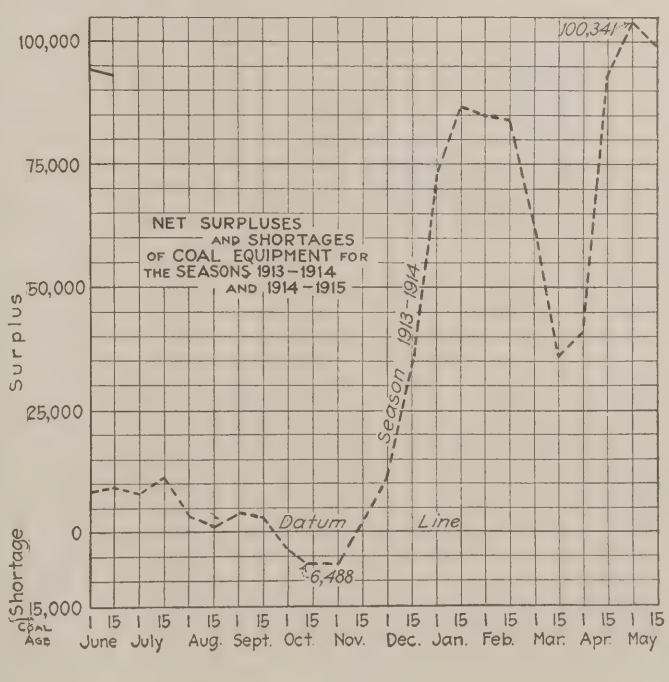
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended June 15, as follows:

	Surplus	Shortage	Net*
New England Lines	1,531	0	**1,531**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	20,854	0	**20,854**
Ohio; Indiana; Michigan; Western Pennsylvania	41,448	0	**41,448**
West Virginia, Virginia, North & South Carolina	5,962	19	**5,943**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	10,120	0	**10,120**
Iowa, Illinois, Wis., Minn.; North & South Dakota	8,347	9	**8,338**
Montana, Wyoming, Nebraska	954	0	**954**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,589	0	**1,589**
Texas, Louisiana, New Mexico	222	20	**202**
Oregon, Idaho, California, Arizona	2,493	1	**2,492**
Canadian Lines	0	0	**0**
Total	93,520	49	**93,471**

	Feb. 15	Mar. 1	Mar. 15	Apr. 1	Apr. 15	May 1	May 15	June 1
Surplus	84,775	64,822	39,133	41,055	92,139	100,370	99,664	94,770
Shortage	239	1,394	3,282	615	24	29	313	7
Net*	**84,536**	**63,428**	**35,851**	**40,440**	**92,115**	**100,341**	**99,351**	**94,763**

*Bold face type indicates a surplus.



SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for December and the years 1912 and 1913:

State	December		Year	
	1912	1913	1912	1913
Missouri	286,828	266,335	3,018,351	2,924,728
Kansas	511,651	540,872	5,153,543	5,782,194
Arkansas	169,490	138,678	1,852,290	1,943,861
Oklahoma	318,899	324,728	3,037,995	3,534,842
Totals	1,286,868	1,270,613	13,062,179	14,185,625

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for April, 1913-14, and for the ten months ending April, 1912-13-14, in long tons:

	10 Months			April	
Imports from:	1912	1913	1914	1913	1914
United Kingdom	6,091	8,550	10,133	1,099	442
Canada	850,351	1,181,216	882,772	119,805	136,486
Japan	12,935	66,497	83,441	23,840	233
Australia and Tasmania	162,867	129,985	226,945	12,827	29,020
Other countries	1,944	3,257	3,430	.....	.....
Total	1,034,188	1,389,505	1,206,721	157,571	166,181
Exports:					
Anthracite					
Canada	2,607,860	3,635,117	3,000,205	310,938	392,822
Uruguay	.....	.....	84	.....	.....
Other countries	51,254	66,324	50,077	7,377	3,438
Total	2,659,114	3,701,441	3,050,366	318,315	396,260
Bituminous,					
Canada	8,565,064	9,092,740	9,972,979	797,126	395,627
Panama	389,643	393,449	314,467	53,190	33,073
Mexico	266,536	350,201	259,575	85,664	24,453
Cuba	918,747	1,035,110	965,528	119,221	63,091
West Indies	577,545	502,891	481,284	46,878	56,213
Argentina	.....	.....	118,354	.....	18,966
Brazil	.....	.....	212,668	.....	15,831
Uruguay	.....	.....	44,671	.....	4,179
Other countries	1,145,609	911,299	1,066,061	169,702	160,604
Total	11,863,144	12,235,690	13,435,587	1,271,781	772,037
Bunker coal	5,832,031	5,976,266	6,449,722	599,195	695,192

NORFOLK & WESTERN RY.

Destination of shipments over this road for May and the first five months of this year and last year were as follows, in short tons:

	May		Five Months	
Coal	1913	1914	1913	1914
Tidewater, foreign	165,695	144,560	700,906	761,745
Tidewater, coastwise	340,073	336,958	1,640,744	1,652,101
Domestic	1,625,977	1,857,154	7,027,891	7,786,519
Coke				
Tidewater, foreign	5,857	.....	22,841	15
Domestic	132,391	88,145	693,860	491,732
Total	2,269,993	2,426,817	10,086,242	10,692,112

COAL FREIGHT DECISIONS

I. C. C. No. 5822—Hammerschmidt & Frazen Co. vs. Chicago & North Western Ry.

Proviso, Ill., a terminal of the Chicago & North Western Ry., within, but on the extreme outer edge of, the Chicago switching district, is an interchange point at which the North Western receives coal from the Indiana Harbor Belt Railroad moving in course of through transportation from points east of the Indiana-Illinois state line to Elmhurst, Ill., a point beyond the Chicago switching district, three miles west of Proviso on the North Western. Upon complaint alleging that the rates from Chicago to Elmhurst are unreasonable and unduly prejudicial, when applied as proportional rates from Proviso to Elmhurst, **Held:**

1. That the relative situation of Elmhurst and Proviso is not different in principle from that presented where competitive points are in close proximity to one another but in groups from or to which different group rates apply.

2. That while carriers may establish common rates to a defined zone or group of points and treat them all as a unit for rate-basing purposes, they do so subject to the inhibitions of the law against creating undue prejudice to points just without or beyond that zone.

3. The traffic here involved is through traffic, and the reasonableness of rates applicable thereto must be considered in respect to the reasonableness of the through rates in their entirety. So considered, the through rates to Elmhurst are not shown to be unreasonable in themselves, but they are found to be unduly prejudicial against Elmhurst and unduly preferential to Chicago and Proviso.

FOREIGN MARKETS

GREAT BRITAIN

June 19—Business is somewhat restricted owing to the strike of Marine engineers. Loading operations have so far been unchecked, but unless a quick settlement takes place the holding up of vessels will reduce shipments and cause pit stoppages.

Prices are quotable as follows:

Best Welsh steam	$5.04@5.28	Best Monmouthshires	$4.08@4.14
Best seconds	4.64@4.80	Seconds	3.84@3.90
Seconds	4.44@4.56	Best Cardiff smalls	2.58@2.64
Best dry coals	4.32@4.50	Seconds	2.46@2.52

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

Coke is quoted at: Special foundry, $6.24; good foundry, $4.80@5.52; furnace, $4.08@4.56.

British Exports—The following is a comparative statement of British exports for May and the five months of the last three years, in long tons:

	May		5 Months		
	1913	1914	1912	1913	1914
Anthracite	251,117	253,865	784,220	1,188,283	1,154,556
Steam	4,318,911	4,432,243	14,791,968	21,636,454	20,982,745
Gas	929,955	1,096,487	3,326,247	4,523,898	4,746,561
Household	128,856	142,968	485,599	710,583	603,010
Other sorts	301,108	282,773	1,028,645	1,460,607	1,365,846
Total	5,929,947	6,208,331	20,416,769	29,519,825	28,852,718
Coke	71,944	75,082	336,969	424,334	444,446
Manufactured fuel	145,723	186,050	526,634	837,070	852,326
Grand total	6,147,614	6,469,463	21,280,282	30,781,229	30,149,490
Bunker coal	1,618,844	1,840,950		8,366,021	8,500,680

GERMANY

Imports and exports in the German empire for April and the first four months were:

	April		4 Months	
Imports	1913	1914	1914	Change
Coal	940,715	809,690	2,934,902	—183,657
Lignite	650,074	603,636	2,131,097	—251,496
Coke	42,118	45,759	183,790	+1,676
Coal briquettes	1,089	3,270	10,216	+2,896
Lignite briquettes	8,556	7,637	45,035	+786
Exports				
Coal	2,938,850	2,930,875	11,962,216	+560,196
Lignite	3,250	2,982	23,502	+522
Coke	573,667	429,490	1,786,377	—490,042
Coal briquettes	207,788	224,782	789,310	—32,099
Lignite briquettes	51,654	52,178	295,741	—17,885

Production for the same period was:

	April		4 Months	
	1913	1914	1913	1914
Coal	15,821,006	15,162,413	63,379,455	63,144,078
Lignite	7,258,044	7,130,471	28,176,021	29,802,652
Coke	2,668,455	2,576,095	10,660,315	10,667,774
Coal briquettes	501,286	464,995	1,937,511	2,054,020
Lignite briquettes	1,818,192	1,846,679	6,866,452	4,474,060

COAL SECURITIES

Dividends have been announced as follows:

Delaware, Lackawanna & Western Coal—Regular quarterly dividend of 2½%, payable July 15, to holders of record, July 1.

Lehigh Valley Coal Sales—Regular quarterly dividend of 2½%, payable July 10 to holders of record, July 9.

Pittsburgh Coal—Regular quarterly dividend of 1¼% on the preferred, payable July 25 to holders of record, July 15.

Mahoning Coal R.R.—Dividend on the common of $5, payable Aug. 1 to holders of record July 15, and on the preferred of $1.25 payable July 1 to holders of record, June 19.

Reading Co.—Regular quarterly dividend of 2% on the common, payable Aug. 13 to holders of record July 28; regular quarterly on the first preferred of 1%, payable Sept. 10 to holders of record Aug. 25, and regular quarterly on second preferred of 1%, payable July 9, to holders of record, June 27.

St. Louis, Rocky Mountain & Pacific Co.—Regular quarterly of 1¼% on the preferred, payable June 30 to holders of record, June 21 to 29.

Island Creek Coal Co.—Regular quarterly dividend on the common of 50c., together with an extra dividend of $3, both payable Aug. 1 to holders of record, July 15, and the regular quarterly dividend of $1.50 on the preferred, payable July 1 to holders of record June 23.

COAL AGE

Vol. 6 NEW YORK, JULY 11, 1914 No. 2

Most states in which coal mining is an important industry have a law sanctioning the employment of check weighmen at mines. Sometimes, the law is more specific and states that there *shall be* a check weighman at all mines.

A little investigation in these states will reveal the following facts:

1.—All camps that are unionized and in which the "cut out" is in vogue, have a check weighman.

2.—Most camps that are not unionized do not have the check weighmen.

From these facts it is easy to assume that the operators are opposed to check weighmen and, at the non-union camps, intimidate the men into relinquishing their statutory rights. In fact, this charge has been repeatedly made by Eastern writers, in commenting on the present strike in Colorado.

Judging by our investigations in other states, we feel confident that these charges will be found untrue.

In Alabama, for example, during the 1908 strike, the union officials continually made capital of the fact that most mines were without check weighmen, and that this condition of affairs was contrary to the state law. After the strike was called off, the large companies issued orders to all of their superintendents to call meetings and insist on the miners electing check weighmen for each tipple.

Strange to say (from the viewpoint of the public) the men took no interest in the matter, and at many camps, not only refused to elect weighmen, but insisted on being allowed to continue without them.

Why?

1.—They didn't want to be assessed with their pro rata share of the weighman's wages.

2.—They had absolute confidence in the company weighman.

Just consider a moment, if you please, the position of a company weighman. If dishonest, he has all the opportunity in the world to steal from the company, by making false entries and crediting the surplus to "dummies."

It naturally follows that it is to the company's interest to pick an honest weighman, and that when such a man is selected, the miners will get honest weights.

Do you wonder, then, that the men are willing to trust the company's representative?

In Tennessee, we know of a case where a superintendent of a small operation, wishing to relieve his miners of the expense of a check weighman and yet unwilling to merit their distrust, offered to allow his men to elect a weighman from their ranks, to serve in the dual capacity. They refused because they preferred to bank on the boss' judgment, for so important a post.

Are we asking for the elimination of the check weighman?

Certainly not.

However, the next time you hear a union official or a college professor making rash statements about intimidation, etc., just give him a chance to produce some facts.

Indiana's First Electrically Operated Coal Mine

By Wiley F. Corl*

SYNOPSIS—A power contract which is fair to all concerned, and modern equipment carefully installed, render it possible for this mine to produce coal with an expense for current of but slightly over 3c. per ton of output.

Mine No. 1 of the J. K. Dering Coal Co., at Clinton, Ind., is, so far as we know, the first mine in that state to be operated entirely by electricity. It is believed, therefore, that a description of this installation will be of interest to mining men.

Many papers have been writen, setting forth the advantages of operating coal mines electrically over other methods; it is therefore considered unnecessary to give a review of this subject, as we believe that any new mine which is likely to be developed at this time will be electrically operated, provided cheap current is available.

Many mining men are, however, still sceptical as to the advantages of electric operation, and advancement in this direction is due to the foresight and energy of such men as J. K. Dering, who are willing to take the lead in these matters.

Mine No. 1, formerly known as Oak Hill mine, has been in operation for a number of years in upper seams of coal, but for only about one year in the No. 3 seam, which is now being worked. When this mine was opened in the No. 3 seam, an entirely new equipment was provided, including a steel tipple of the well known A. & G. type, a view of which is shown in Fig. 6.

The new electrified mine was placed in operation on Jan. 19, 1914, and a record of the power consumption since that date is given later in this article. It should be noted that although the mine is at present working at about one-third of its capacity, the cost of power per ton of coal is extremely low. A general plan, showing the location of buildings and the wiring scheme, is shown in Fig. 8. The photograph, Fig. 2, is a view of the plant, showing particularly the high-tension outdoor switch and

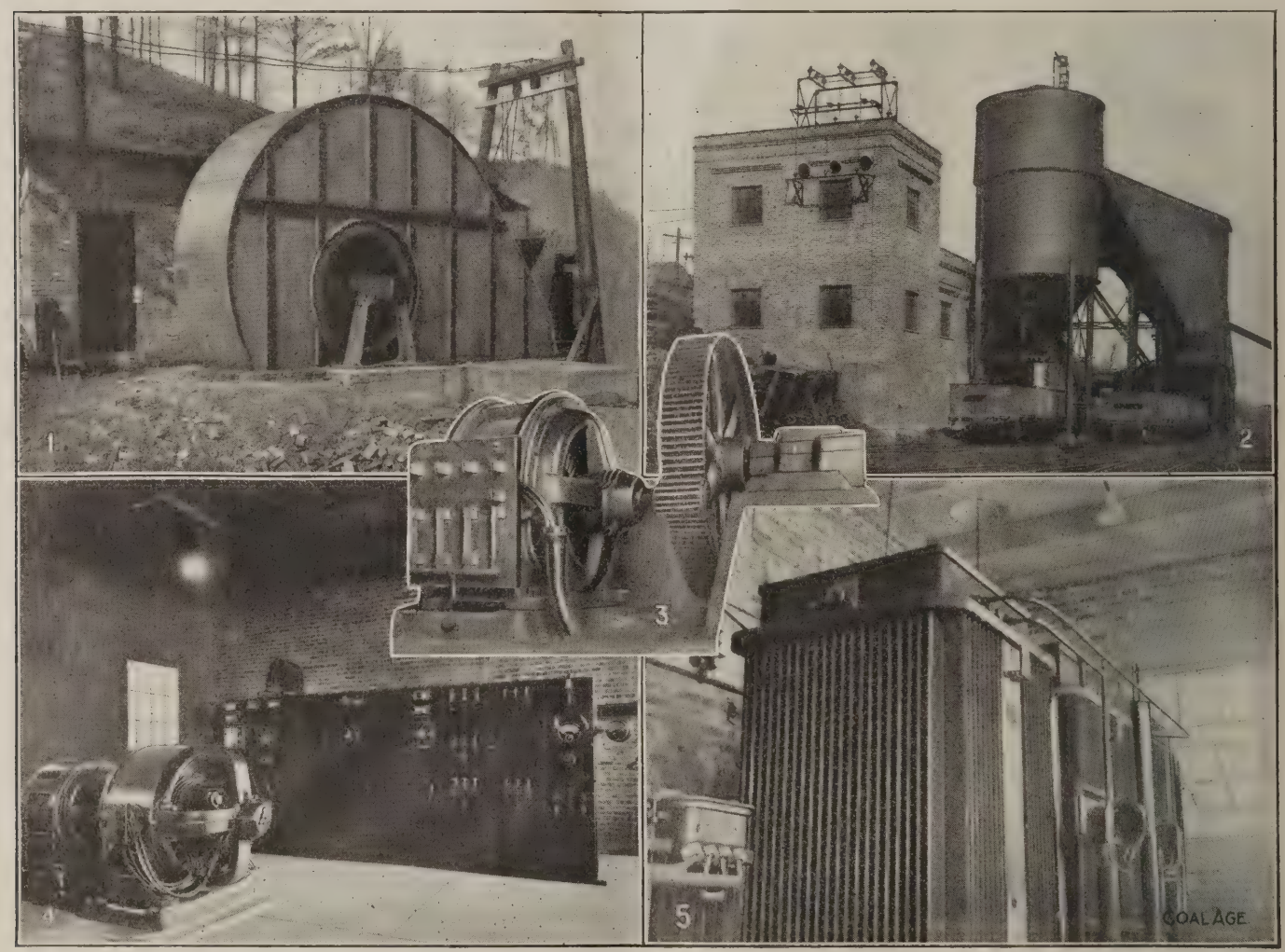


Fig. 1. Ventilating Fan
Fig. 2. Showing High-Tension Wiring
Fig. 3. Motor Driving Fan
Fig. 4. Motor-Generator Set
Fig. 5. Step-Down Transformers

*Electrical engineer, Allen and Garcia Co., Chicago.



FIG. 6. GENERAL VIEW OF TIPPLE AND SUBSTATION

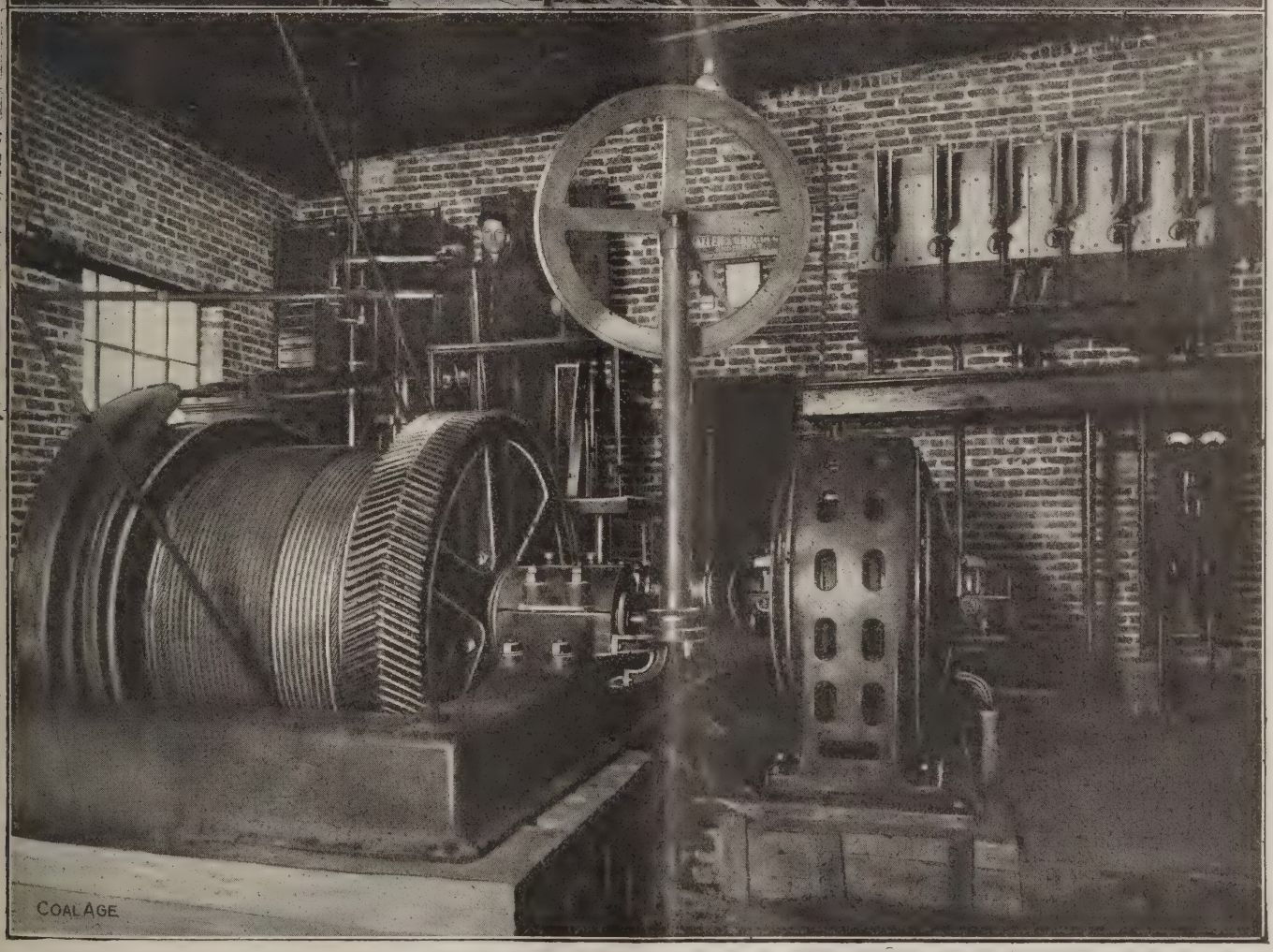


FIG. 7. THE ELECTRIC HOISTING ENGINE

the wires entering the building, the layout of the apparatus and the electric conduits are shown in Fig. 9.

Central Station Power Is Employed

Electric power is purchased from the Terre Haute, Indianapolis & Eastern Traction Co., and is brought to the mine at 22,000 volts, 3-phase, 60 cycles. It is then stepped down to 2200 volts by means of the transformers shown in Fig. 5.

The hoist motor and the motor-generator set are operated at 2200 volts, while all other motors take 220 volts, the power being taken from a small bank or secondary transformers.

Fig. 4 shows the motor-generator set and the switchboard controlling the different circuits. Extra panels are supplied to take care of additional motor-generator sets and additional 2200-volt and 220-volt circuits.

The electric hoist is shown in Fig. 7. This machine was furnished by the Ottumwa Iron Works. The drum is

The hoist motor is of the rotor-wound type and was designed to operate at a full speed of 514 r.p.m. This speed can be varied, however, in 7 steps and is controlled by a master drum, which operates solenoid switches and causes resistances to be cut into and out of each phase of the rotor circuit. This drum also reverses the direction of rotation of the motor at the will of the operator.

Double Precautions Against Overwinding

To guard against over-winding, a limit switch is geared to the hoist drum, so arranged as to shut off the current and apply the brakes after the latter has made a fixed number of revolutions. As an extra precaution switches are also placed on the tipple guides below the sheaves, so that the current will be cut off and the breaks applied in case the geared limit switch fails to act. In this connection it might be emphasized that the electric hoist can be made safer than a steam engine, and in fact can be better controlled in every way.

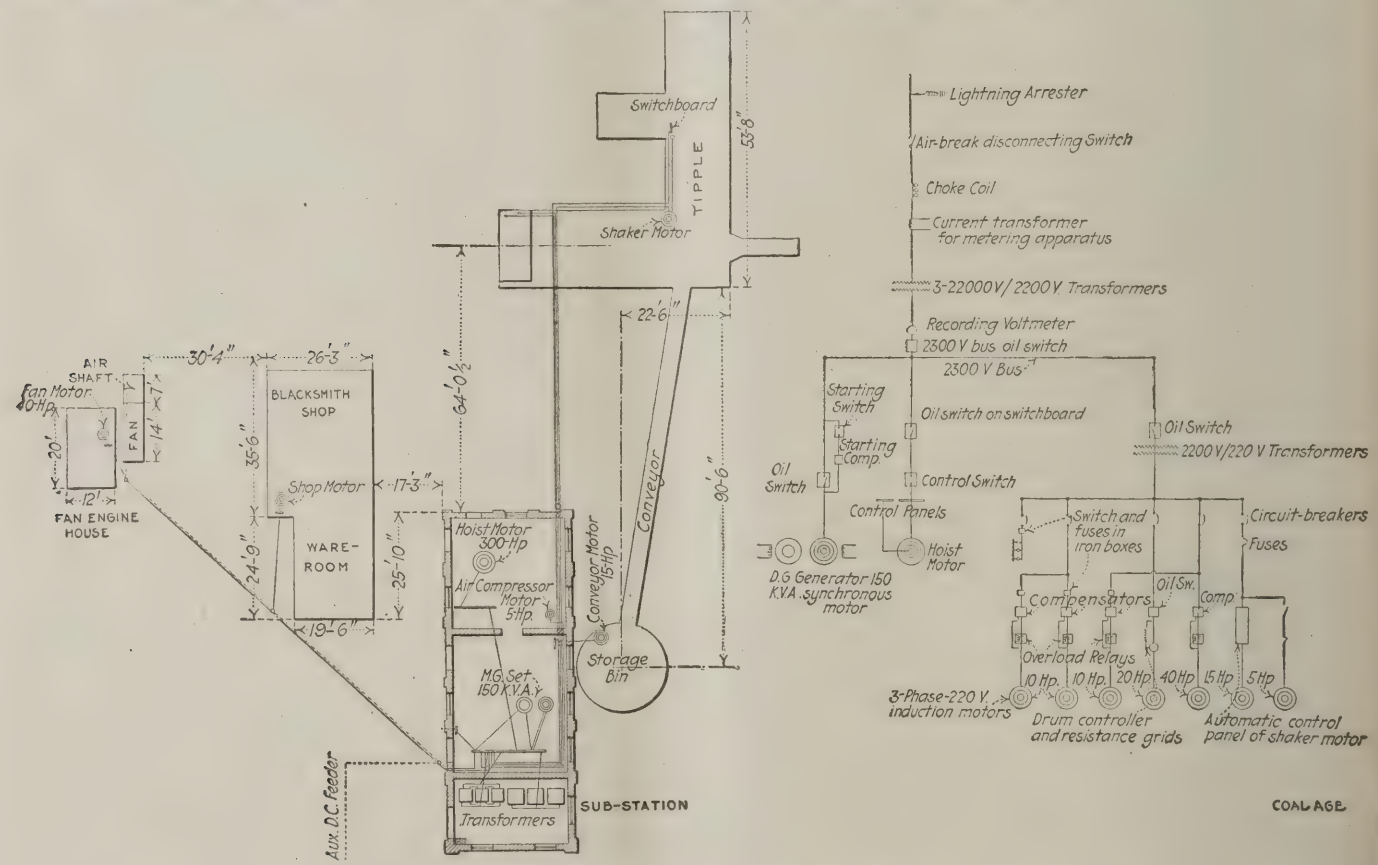


Fig. 8. Plan of Buildings and Wiring

5 ft. in diameter and is driven by means of herringbone gears from a 300-hp., 2200-volt motor. The brake is operated by a compressed-air engine of the air-oil type, which permits of close adjustment in braking. The air is supplied from an automatic, electrically-driven air compressor.

The capacity of the hoist is 306 tons per hour. The following table shows some of the information relative to its duty:

TABLE OF HOIST DUTY

Weight of cage	5000 lb.
Weight of car	1200 lb.
Weight of 1⅛-in. rope	550 lb.
Weight of coal	3400 lb.
Vertical lift of hoist	274 ft.
Time of acceleration	6 seconds
Time of constant running	7 seconds
Time of caging	3 seconds
Total time for one complete cycle	20 seconds

At present there is one 150-kw. synchronous motor-generator set which furnishes direct current at 250 volts for operating the pump and the cutting machines. The coal is undercut by Sullivan continuous cutters. An additional 300-kw. set will be installed immediately and electric locomotives will then be employed for hauling and gathering the coal. Electric power at 250 volts, direct current, will also be supplied from this installation to a neighboring mine for use in haulage and cutting.

An arrangement is also provided whereby power at 250 volts, direct current, can be returned from an engine-driven unit, at this neighboring mine and reverse the motor-generator set. In this way sufficient power is obtainable to operate the fan and to run the hoist at a low speed in case of failure of the transmission line from the central power station.

A new 8-ft. Jeffrey fan has been installed, as shown in Fig. 1. This machine is driven by a geared 40-20-hp. two-speed motor, as shown in Fig. 3. The fan requires at this time only about 10 hp. When the mine is further developed, however, it will consume about 40 hp., and it is then expected that the motor will be operated at full speed during the day time, and at half speed at night to save current. The shaking screen is operated by a 20-hp., variable-speed motor at 300 to 900 r.p.m. The control of this unit is in the weighman's house in the tipple.

The conveyor is operated by a 15-hp. constant-speed motor. This machine has an automatic-control arrangement, by which it can be started or stopped from the weighman's house also.

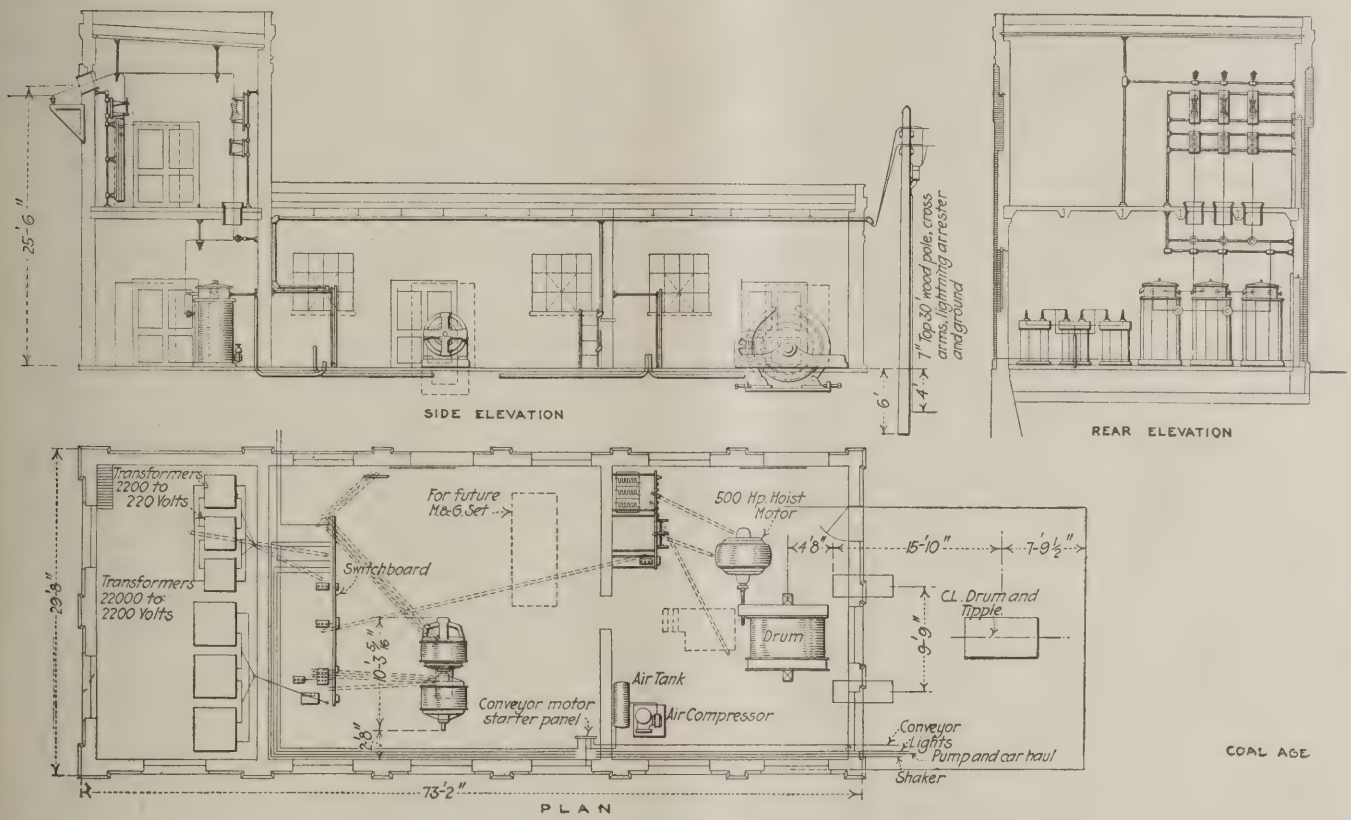


FIG. 9. LAYOUT OF APPARATUS AND CONDUITS

This mine does not make much water, and the pumping duty is light. A Deming triplex plunger pump is direct connected to a 5-hp. motor and is operated from the 250-volt, direct-current underground circuit.

A new brick building has been erected for shop work, in which the line shaft is driven by a 10-hp. constant-speed motor. The empty cars from the cage are taken up an incline by a car drag, actuated by a 10-hp. constant-speed motor. An electric switch, operated by the cager at the shaft, has been installed at the top of this car haul, so that the empty wagons can be sent to ether runaround. This witch saves a man who would otherwise be required.

COMMERCIAL ELECTRIFICATION DEPENDS ON COST

Almost everyone will agree that an electrified mine is more desirable than a steam operated plant, provided that the cost of installation and operation is no greater. Therefore, whether or not a development can be electrified depends upon the cost of current.

There are many forms of power contracts in use at the present time, several of which divide their charges into two parts; a primary charge, depending upon the maximum demand, and one based upon the current consumption. This latter item per kilowatt-hour varies with the amount of current used. This form of contract is based upon engineering facts and is best from a theoretical standpoint.

The main disadvantage of this type of agreement lies in the fact that it is hard to explain to the ordinary coal operator, who is not versed in electrical technique. It usually penalizes the small consumer since the average cost of energy is considerably higher to him than to one using a large quantity.

Of course, from an electrical standpoint the larger user is entitled to a somewhat lower rate. We do not intend to here discuss the merits of different rates, but only to say that from an operator's standpoint it appears best when possible to purchase electrical energy on a metered-current basis (with a sliding scale), although provision should rightly be made to cover a minimum bill.

THE CONTRACT IS FAIR BOTH WAYS

The Terre Haute, Indianapolis & Eastern Traction Co.'s rate is a very fair one for both the operator and the power company. The basis of this rate is a metered-current charge (with a sliding scale), while the power company is guaranteed a minimum bill, based upon a charge of $1 per month per kilowatt of maximum demand, this demand being assumed to be two-thirds of the connected load (manufacturers' rating).

Normally the energy consumed on the metered-current basis is greater than the maximum demand charges, in which case the minimum charge is absorbed.

The rates on the metered-current charge are as follows:

	Cents per Kw.-Hr.
For the first 5000 kw.-hr.	1.75
For the second 5000 kw.-hr.	1.6
For the next 40,000 kw-hr.	1.5
All current in excess of the above	1.35

The energy is metered on the 2200-volt side of the transformers and the bills are subject to a discount of 10 per cent., provided they are paid within 10 days after presentation. Several provisions are inserted in the contract to protect the power company, as well as the coal company, in case of difficulties in operation.

During the month of March, 1914, the mine worked 25 days at an average of nearly 600 tons per day, making a total production of 14,520 tons. The current consumption during this month, including the idle days, was 33,000 kw.-hr., or 2.27 kw.-hr. per ton of coal. This includes all operations except hauling.

This current consumption is divided into the following parts:

For hoisting 1.26 kw.-hr. per ton of coal.
For all miscellaneous motors, 0.295 kw.-hr. per ton of coal.
For cutting and pumping 0.715 kw.-hr. per ton of coal.

The consumption for cutting and pumping is taken on the alternating-current side of the motor-generator set.

All Power Used Is Included in Test

The above record of power consumption includes everything required, idle days as well as working days. On a test the hoist motor takes only 0.6 kw.-hr. per ton of coal per hoist, but this figure is increased even on working days to about 1 kw.-hr., this being partly because the coal is not dumped in one motion, but is "inched" or gradually discharged for better screening. Also many extra hoists are made to take the men, mules and material up and down. When hoists are made at the rate of 3 per minute, it is necessary to reverse or "plug" the motor for quick retarding. This internal electric braking requires about ¼ kw.-hr.

It is expected that when the mine reaches its normal output of 2400 tons per day, the current consumption per ton of coal for all operations, including standby losses and idle days, will be less than 2 kw.-hr.

The power bill for the month of March was $460, which is equal to a charge of approximately 1.4c. per kw.-hr., or slightly over 3c. per ton of coal.

All the engineering work in connection with the design, purchase and installation of this plant was performed by the Allen & Garcia Co., consulting and constructing engineers, of Chicago. The entire electrical equipment was furnished by the General Electric Co., except that the Westinghouse Electric & Mfg. Co. supplied the high-tension transformers, and the Delta Star Electric Co. provided the outdoor switching and protective apparatus.

Robert Nelson, the Electrical Inspector of Mines in Great Britain, says the practical requirements for safety in working an electrical plant underground are: (1) Strong metallic outer coverings for all apparatus (a) to protect insulating material from abrasion, (b) to prevent accidental contact by persons with live parts, and (c) to prevent open sparking. (2) An efficient connection to earth for the metallic outer coverings above mentioned. (3) Provision for making a faulty circuit dead automatically immediately leakage of current begins to develop. (1) and (2) can as readily be provided for in continuous-current working as in 3-phase working. (3) can be more conveniently provided for in 3-phase working.

Extracts from a Superintendent's Diary

Today we broke the company record for tons of coal hoisted from a single track slope in one shift. Am I proud? I am! Am I elated? I am not! The tension has been relieved and I am thinking of what is to follow. Tomorrow every superintendent in the company's employ will receive a slip of paper containing my record, and, along with that slip of paper, although invisible to the unintiated, goes a command to do just a bit better.

That's according to the "speeding-up" system. "Just a little better." So much depends upon that. How can you expect an increase in salary if someone is doing better? How can you ask for more assistants if someone is doing better? How can you ask for new expenditures if someone is doing better? How can you explain anything satisfactorily if someone is doing better?

But one can't be best always. In a short time—possibly in a very short time—someone will beat my record, and, presto, change! I will find myself again with the rear guard, submitting to the prodding of the big boss.

Let me hasten to explain that the big boss isn't half as terrible as I'm trying to picture him. He worked up through the ranks, so he knows how to handle us. He wants to stay where he is, so he's compelled to allow the biggest boss to handle him.

And how about the very biggest boss? Oh, there are unsatisfactory yearly statements and directors' meetings to hold his attention most of the time, and sometimes he probably gets a bit nervous himself.

Last week, at our regular monthly meeting of all the company superintendents, the boss kept his eyes pretty constantly on my corner of the room whenever records were discussed, and such partiality, properly interpreted, is always a reminder that the favored one hasn't been at the head of the record list for some time. It is therefore deemed advisable to indicate that a little extra ginger might be appreciated. This extra ginger has cost me some sleep during the week, but it resulted in today's record. At the next meeting it is likely I won't be noticed. Who will? Probably Tim Daily, and the old man can't stand much more of this close inspection.

These old men who are close to the 65 mark get flustered easily, and, if they once lose their nerve, the jig is up for all time.

Then there is another unfortunate combination of circumstances to affect the old man. Two of the assistant superintendents have been offered jobs as superintendents by other companies, and the boss is sounding carefully before consenting to lose them. Daily realizes this and, in consequence, is already nervous.

And only three years has passed since Daily broke the best previous record and held it for six months.

We were discussing it last week. "Tom," said the old man, putting his hand on my shoulder (I'm still Tom to him, just as I was ten years ago, when he gave me my first job as rodman on his crew) "Tom, three other companies tried to get me then, but I refused to be tempted; and you can't guess why. No, it wasn't company loyalty. It was the fear of losing my right to an old-age pension. In one more year she'll be mine, Tom. It's all that can save the old man now." Records, ginger, old-age pensions, and possible rivals—all to think of at one time. Do you wonder old men drop off suddenly sometimes?

Effect of Panama Canal on World's Coal Markets--III

By F. R. Wadleigh.*

SYNOPSIS—This is the third and concluding article discussing ex-Gov. MacCorkle's paper on this subject. This installment deals largely with the competition West Virginia may expect among the other domestic coals. Pennsylvania, Virginia and Alabama will all bid aggressively for the export business. In conclusion Mr. Wadleigh believes American shippers should devote greater attention to the possibilities of briquetting for the export trade.

In the state of Washington there are only three important producing coal counties, and the 1913 production was 3,823,000 tons, the average *price* at the mines in 1912 being $2.39.

As regards the quality of the Washington fuels, the article says: "Forty-nine determinations which are representative of this state show an average of 10,923 B.t.u.," and further, "Ninety-eight determinations of New River coal show an average heating value of 15,232 B.t.u."

The forty-nine determinations of Washington fuel mentioned are for coal as received, while the New River determinations are on dry coal, which is an obviously unfair comparison.

Of the Washington coals, 26 mine samples, dry coal, from the best fields show an average of 12,961 B.t.u. (Bulletin 22, Bureau of Mines.) The average of 116 mine samples from 42 mines in the New River field shows an average of 15,006 B.t.u. dry coal. This is rather a different story and a more accurate comparison.

After giving the average "price" at the mines of Washington coal as $2.39 per net ton and the average "value" of the New River-Pocahontas as a "fraction under $1 per ton," the author deduces that the actual *cost* of the latter coals at Hampton Roads ($1.40 freight plus $1 at mines) is practically the same as the *cost* of the Washington coals at the mines. Here is a confusion of terms between the cost of production and price received. The $2.39 figure for Washington coal is the *price received,* and their actual cost of production is not over $1.50 per ton.

We agree with Mr. MacCorkle, however, that the Washington product will not be a strong competitor with the West Virginia coals along the South Pacific coasts below San Francisco, as the British Columbia fuels are already gaining tonnage over the Washington, while oil is making still further inroads on their markets.

"Alabama Fields Cannot Compete"

The article says: "The expectation of Alabama is to get its coals to Mobile by self-propelling barges."

This is not only an expectation, but an accomplished fact. But the coals are also going to New Orleans, this being the principal tidewater market for Alabama fuels.

The following figures are given in the article to show that Alabama "can never become an enormous competitor with West Virginia in this field":

		Alabama	West Virginia
Production	1912	16,100,600 tons	66,786,687 tons
Value at mines..	1912	$1.29 per ton	$0.94 per ton

Alabama used 4,585,498 tons of coal in its coke ovens, or 28 per cent. of its entire production.

This is hardly a fair comparison as regards prices because:

First—The average *price* at the mines was $1.27 for Alabama coal, not $1.29.

Second—1912 was a low-price year in West Virginia, but not in Alabama.

Third—The lower-priced and inferior coals of West Virginia should not be considered in this connection; the average value at the mines of coal from the New River-Pocahontas area was 98 cents.

The figures from the 1909 Census returns showing a production cost of $1.12 per ton in Alabama and 83½c. in West Virginia are of no value today.

It is further stated in this connection: "Our New River and Pocahontas coals have far greater heating values than those of Alabama."

The average B.t.u. value of the different coals is as follows:

Coal	Samples	Mines	B.t.u.
Pocahontas	205	64	15 008
New River	116	42	15,006
Alabama	43	35	14,266
Pratt, Black Creek and Blue Creek..	...	9	14,883

As to prices, the article says: "New River and Pocahontas coals can be delivered at Hampton Roads at a lower price than Alabama can quote at either Mobile or New Orleans."

The present price of Alabama coals at New Orleans is $3.25 per ton trimmed into ship's bunkers, while the price of New River coal is $2.85 f.o.b. ship, not trimmed. When the water rate on Alabama coal is adjusted and settled, the above price will be cut considerably.

As to distances it is stated: "The sailing distance from Hampton Roads to Colon is 1778 miles, and from Mobile (or New Orleans) is 1376 miles. This relatively small inequality in distance makes practically no difference in the rate to the Panama Canal."

This "relatively small inequality" is 23%, quite enough, we would say, to make a very practical difference in rates, as it actually does.

Quoting Mr. MacCorkle:

"New York City Too Valuable a Port for Coal Shipment"

Under this caption the article states:

"Let us consider briefly our competition with Pennsylvania for this export trade. The ocean port at which Pennsylvania coals are loaded is New York harbor."

Then follows some reasons why New York cannot handle much export trade, crowded harbor, access to her shores over *a crowded and congested railroad* (is this the Pennsylvania or the New York Central or the Baltimore & Ohio?), lack of loading facilities, etc.

As a matter of fact, no coal is loaded for export in New York Harbor. Foreign ships take about 4 million tons per year (the figures for 1912 being 3,949,000 tons), but solely for ships' consumption. West Virginia coal

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cannot compete in this trade under present freight rates.

As regards Philadelphia the article says:

"Philadelphia, by reason of its natural situation, will not participate largely in the export business."

There is nothing in the natural situation of Philadelphia to prevent its participating, and, as a matter of fact, it is a large and increasing factor, the exports for 1913 being 939,900 tons, as compared with 791,500 tons in 1911. For comparison we give the following export figures for 1913, which show Philadelphia's importance in this trade:

Lamberts Point	Hampton Roads	1,284,189
Sewalls Point		307,794
Newport News		838,720
Philadelphia		939,900
Baltimore		870,750

If we deduct from the Hampton Roads exports the 475,317 tons shipped to the Panama Canal, which is for use in the canal work and not really export coal, this leaves only 1,965,387. It thus appears that Philadelphia actually exported more coal than any other port in the United States, if Sewalls Point and Lamberts Point be taken separately.

But it is said further: "In fact, Pennsylvania as a whole, by reason of her enormous and increasing consuming ability, will be less and less a competitor in the more distant export trade. She is devoting her energies largely to her great trade at the Lakes, Canada and New England."

While her consuming ability increases, so does her output. Why should she devote her energies to the Lakes, Canada and New England if she expects to consume all her coal at home? The above markets are just as much outside as are the foreign markets. Pennsylvania output of bituminous coal increased 12 per cent. in 1912 over 1911, and 10 per cent. in 1913 over 1912. Two counties alone produced about as much coal as the whole of West Virginia.

On the question of competition between Pennsylvania and West Virginia the article states: "While our coals are the equals of those of Pennsylvania, West Virginia does not compete in the Eastern markets with that state, except on water-borne coals to Providence, Boston and Portland."

This is not an accurate statement of the case. West Virginia coals compete with Pennsylvania in and around Philadelphia, New York, along the South Atlantic coast and in New England, both against water-borne coals shipped from Philadelphia and New York and all-rail coal from Pennsylvania mines.

Maryland and Virginia Coals

It is stated: "Our Fairmount region is farther away, but is shipping West Virginia coal into Baltimore in competition with that of Maryland." Fairmount coal is entirely different from that of Maryland and can hardly be called competitive. The Big Vein Georges Creek coal of Maryland is *one* of the best smithing coals, but it is also a very excellent steam coal, is used as such by the U. S. Navy and is preferred by many to either New River or Pocahontas for making steam.

Although Mr. MacCorkle mentions the possible competition of Virginia coals, he fails to discuss this point. Evidently he is not familiar with the Clinchfield coals and the aggressive efforts its owners are making to enter the export trade. The Clinchfield company is building a most efficient and modern coaling plant at Charleston, S. C., having a large storage capacity, and has already entered the Galveston and Gulf markets.

True, this coal is not quite equal to New River in heating value, but it will be sold more cheaply; it has the best and most uniform car supply of any group of mines in the country and an aggressive sales organization. The West Virginian operators cannot afford to ignore its competition, as it has already driven them out of some domestic markets. The Stonega Coal Company is also arranging to enter the Tidewater markets. This is an excellent coal, better even than the Clinchfield.

"How Canals Will Help West Virginia"

Mr. MacCorkle says that at Calvin Creek, the head of navigation on the Kanawha River, coal can be placed on barges at $1.15 per ton, and that such coal can be transported to New Orleans at $1.25 to $1.50 per ton. We presume that this is the actual cost and includes no profit (it certainly cannot include any on the coal), but does include all fixed charges, interest, depreciation and insurance; it does not include cost of transferring the coal to ships.

This makes the cost of coal on barges at New Orleans $2.65; to get this coal to Colon it must be transferred to ships, which will add at least 25c. per ton or a total or $2.90, f.o.b. ship New Orleans. Then the freight to Colon is given as $1 per ton, or a total cost at Colon of $3.90.

Admitting the correctness of these figures this still fails to show any advantage, as will be noted in the following:

Via Hampton Roads		Via New Orleans	
Cost of coal at mines..	$0.90	Cost on barges.....	$1.15
Freight, rail	1.40	River freight.....	1.50
Trimming, etc.....	0.10	Transfer to ship.....	0.25
Ocean freight c.i.f. Colon	1.395	Ocean freight c.i.f. Colon	1.00
Total	$3.795	Total	$3.90

And, if the freight from Hampton Roads to Colon can be cut to 90c. per ton, as estimated by the government, then the Hampton Roads route would be only $3.30 as against $3.90. Even with the present quoted price at Hampton Roads, $2.85 plus 10c. trimming, etc., Hampton Roads coal would still have a slight advantage.

Mr. MacCorkle then goes on to say that the great objection to this method of transportation is the difficulty of transferring coal from barges to ships, and that the United States Government, after careful investigation, proposes the building of 500, 1000-ton steel seagoing barges that can be towed on the Gulf and Carribean Sea. Under these conditions, Mr. MacCorkle estimates that West Virginia coal costing $1 or less at the mines could be shipped "anywhere to the coasts of North or South America and sold for $3 or less per ton." By the coasts of North or South America we presume is meant within the Gulf and Carribean Sea, although it is not so stated. How much profit would there be in $3 per ton at Colon?

In speaking of the New River-Pocahontas coals in the article they are called "smokeless" coals. It seems about time that we should stop the use of this misleading and incorrect description. These coals are not smokeless, except when burned under proper combustion conditions. Illinois coals with 35 per cent. volatile can also be burned without smoke. They make less smoke under any conditions than higher volatile coals, but, on the other hand, they make more smoke than the best Welsh fuels, and

there is plenty of Pennsylvania coal that has just as much right to be called "smokeless"; in fact, more so than any New River coal.

The proper term for these coals when they are to be described in "smoke terms" is "low volatile." The coals from the No. 1 or Eagle and the No. 2 or Gas seams of West Virginia are called "semi-smokeless" fuels, and, with the New River and Pocahontas, it is said, "will be the fuels which will be used at the canal." Coals containing from 27 to 35 per cent. volatile, as do the Eagle and No. 2 Gas coals, can hardly be termed even "semi-smokeless." They will never be used at the canal, because they are lower in heating value and not as good steamship coal as the New River-Pocahontas, in addition to which they are much more "smoky."

The proper field for the Eagle coal is in making by-product coke, for which purpose it is the best coal in this country when used unmixed. The No. 2 Gas coal has its field as a locomotive fuel, in making gas, for general steam use in nearby territory where the freight rates are in its favor, and in mechanical stokers. It is also extremely doubtful if the Kanawha splint coals are, as stated, "well suited for gas making."

Briquetting West Virginia Coals

There is another branch of the South American export coal trade that Mr. MacCorkle does not touch upon, probably because the West Virginia coal interests have never looked into it sufficiently. This is the making of briquettes. While the use of briquettes in the South is small, compared with that of raw coal, it is well worth looking into. In 1912, for instance, 453,000 tons of briquettes were shipped from South Wales to South America, Central America and Mexico, including:

	Tons
Peru	23,500
Chile	138,823
Argentine	33,300
Brazil	209,300
Uruaguay	7,700
Venezuela	16,700
Guiana	3,100
Costa Rica	4,500
Total	436,923

The establishing of a briquetting plant for New River-Pocahontas coals, either at tidewater or, preferably, at the port of consumption, such as Rio Janeiro, would enable briquettes from these coals to compete on favorable terms with those from South Wales. The cost of such a plant of 300 tons daily capacity would be about $100,000 at Hampton Roads.

The cost of briquetting at Rio would be approximately $1.20, which, with coal at $6.25, would make the total $7.45. The c.i.f. cost of South Wales briquettes at Rio today is about $8.26, the cost f.o.b. Cardiff being $5.10. To this must be added the cost of discharging, about 50c., making a total of $8.76.

As to quality, briquettes from New River-Pocahontas are superior in heating value, and just as good structurally and mechanically. The following is a comparative analysis:

	New River	Pocahontas	Cardiff "Star"	Cardiff "Crown"	Swansea
Fixed carbon	72.74	76.13	72.44	74.48	72.73
Moisture	2.70	1.06	0.80	1.46	2.70
Volatile	20.26	17.30	17.86	16.35	16.13
Ash	4.28	5.51	8.90	7.71	8.44
Sulphur	0.81	0.65	0.81	0.91	1.07
B.t.u.	14,886	14,836	13,446	13,499	13,241

These analyses of New River-Pocahontas coals were made from samples taken by the U. S. Geological Survey in 1907, briquettes made from run-of-mine coal. The Welsh analyses were from samples of actual shipments, the briquettes made from dock screenings and slack.

For making briquettes at Rio Janeiro or other unloading ports, sufficient screenings could be taken out of the run-of-mine coal, which would solve, to some extent, the problem of getting more lumpy coal for steam users.

This whole question of our coal exports and their possible increase is so important to the operators, shippers and allied interests that we should be careful to have full, reliable and accurate information. We should go into this matter with open minds, ready for any suggestions, willing to make use of the experience of our competitors, working out our method of operation on a systematic basis and investigating carefully each point. Our efforts should be continuous and not spasmodic, as they have been in the past.

Celebrating the Fourth in the West Virginia Camps

The Fourth of July was celebrated in the mining camps of the southern half of West Virginia on the most elaborate scale those camps have ever seen. Instead of being isolated places on Independence Day, as is generally the case, they were centers of gayety and the larger towns near them were deserted.

As a result of several weeks' planning the celebration began early in the morning and folk from the farms and the various country towns assembled in the mining camps. They made merry from sun-up until late in the night, as the guests of the coal operators and miners. Heretofore it has been the custom all over West Virginia for the railroads to run excursions from the mining camps to the towns in the several parts of the State. This year the process was reversed. Excursions were run from the county seats and the large towns along the lines to the mountain villages.

The celebration, in every instance, was in charge of committees composed of operators and miners, equally represented. In some communities several mining operations joined forces and the committees of arrangement were composed of employers and of employees from each of the participating mines.

West Virginia miners and operators decided to go back to the days of the fathers in the manner of observing the day. There was no work in the mines. The fun began early in the morning with the arrival of the farmers and their families with well filled baskets. These baskets were put on the tables with those brought by the families of operators and miners, and when the time came to feast, all lunched together.

After the arrival of the farmers with their teams and the people from the towns on the excursion trains, the celebration began with the reading of the Declaration of Independence and everybody sang "My Country 'Tis of Thee." Just as in the long ago, there was the Fourth of July oration. Every place of observance has procured some speaker of note. Young lawyers, middle-aged and old statesmen and politicians of all shades of political opinion told of the heroic deeds of the "boys of 1776" and of the greatness of this country. After the speeches the bands played "The Star Spangled Banner" and the lunch baskets were attacked.

In the afternoon there were baseball games, athletic contests and music by the bands. The operators and the miners joined in contributing to a fund sufficient to give everybody at least two "pokes" of ice cream.

The celebration ended with the fireworks at night. Hundreds of dollars were spent at each place for these fireworks and experts were on hand to set them off. At one place, where the mountains entirely surround the camp, men were stationed on the tops of the hills and at a given signal they blazed out three miles of red, white and blue light, while the miners, operators, farmer folk and townspeople stood bare-headed and the band played the national anthem.

In thin seams, even where the coal is cut by hand, a conveyor reduces the loading cost considerably, because the miner is saved the labor of double shoveling the coal to the car.

Electricity in Coal Mining

By David R. Shearer*

SYNOPSIS—This is the sixth article of the series on this subject. The essential differences in the various types of motors, series, shunt and compound wound, induction and synchronous are explained, as well as the distinctions between various types of locomotives ordinarily used in coal mining.

A motor is essentially a machine for changing electrical energy into mechanical power and is used at points where this power is needed for driving machinery. Two classes of motors are in common use, those used on alternating current and those used on direct. Each of these classes is then further subdivided into a great many types, each type having operating characteristics peculiar to itself and each suitable to certain kinds of work.

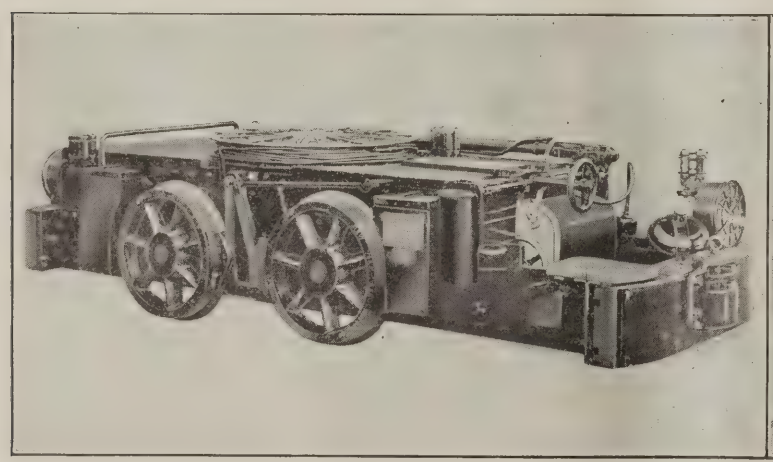
Considering the direct-current motor first, we find three types in use, the series, shunt and compound wound The chief characteristics of the series motor are that it has a large starting torque, is easily controlled in speed by resistances and varies in speed almost in direct proportion to the load. For these reasons, series motors are nearly always used on mine locomotives, hoists and other machinery operating at various speeds.

The real difference in these three types of motors is found in the field windings. In the series motor, the entire line current passes through the field and then through the armature, thus, when heavily loaded, the field is much stronger than when lightly loaded, the strength of the field varying in proportion to the line current. In the shunt motor, the field takes a definite amount of current continually, this amount depending not on the motor load but on the line voltage. Since the line voltage drops slightly, when the motor is heavily loaded, the field is to some extent weakened.

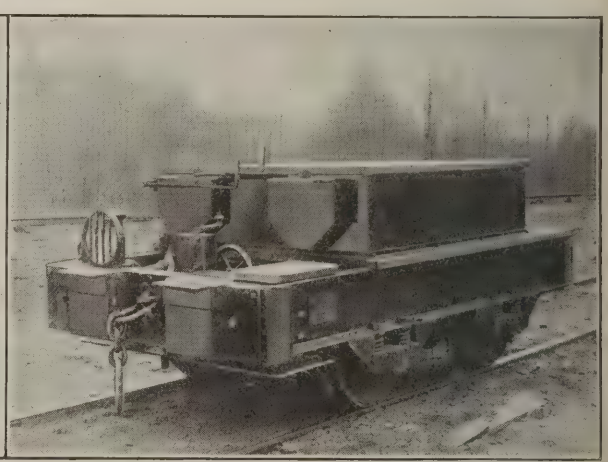
As a constant field tends to produce a constant speed, we secure a close regulation. If we weaken the field of a motor, the speed increases, and if we strengthen it the speed decreases. Thus a series motor without a load may run away and destroy the winding since the field is very weak when the motor is doing no work. The compound motor has both a series and shunt field and thus partakes of the nature of both of the preceding types.

Interpoles Are Now Frequently Used

Within the last few years an additional winding on the field of a motor has come into extensive use. This is called the interpole winding and is placed on auxiliary poles located midway between the main poles. The chief use of these additional poles is in reducing the sparking at the commutator.



A Gathering Locomotive



A Storage-Battery Locomotive

The shunt motor operates at very nearly the constant speed for which it is wound. The speed, however, drops to some extent upon the application of a heavy load but usually only a small percentage of the normal rating. Shunt motors are suitable for the operation of many types of machines, fans, pumps and other mechanical equipment not requiring a great variation in speed.

Compound motors, especially when equipped with interpoles, are used probably more than any other kind. The characteristics of this motor lie between those of the series- and the shunt-wound machines. They have the advantage over the shunt motor in that they start with a higher torque and are capable of assuming greater overloads. Such motors are suitable for operating practically every kind of machinery except that which requires great variations in speed, although some types of variable-speed compound motors are on the market.

In alternating-current motor practice, we have two general classes, single phase and polyphase. Although single-phase motors are used to some extent, the operating characteristics are not very satisfactory, owing to the difficulty of bringing the machine up to speed. The polyphase motor, however, and especially the three phase, is quite satisfactory in operation and rugged in construction. Three general types of the polyphase motor are in use, the squirrel-cage induction motor, wound-rotor induction motor and synchronous motor.

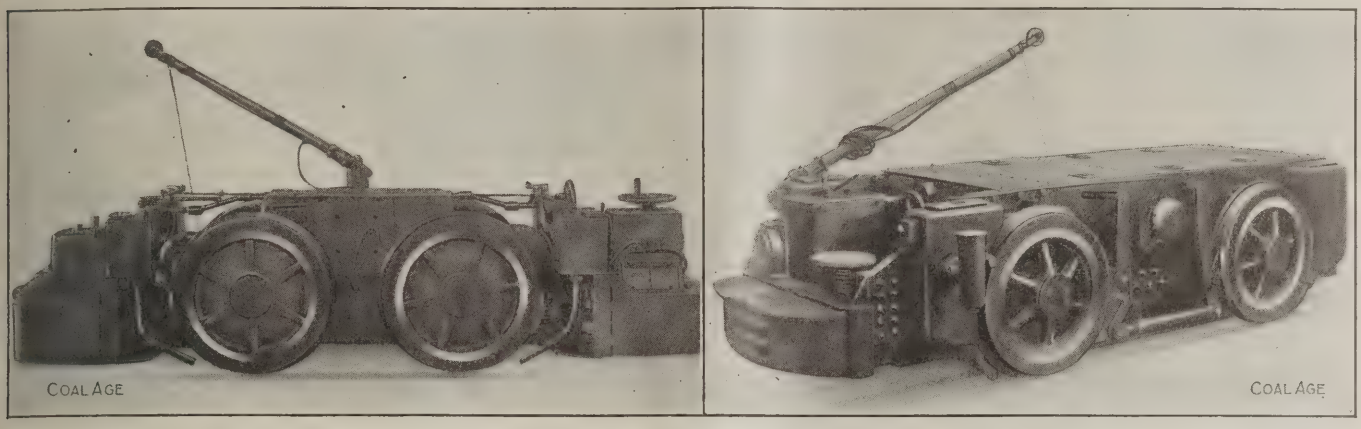
The squirrel-cage motor is similar in operating characteristics to the shunt motor, but has the advantage that no open contacts, brushes or commutator are used. Taking everything into consideration, this is probably the

*Knoxville, Tenn.

most rugged motor now used, the chief disadvantage now being that the speed is not easily varied except by a rather complicated method of changing the number of poles in the stator.

The wound-rotor motor is used almost exclusively where speed variations are necessary. As regularly equipped, a speed variation of 50 per cent. is possible by introducing a variable resistance in the rotor circuit. This motor, however, has open contacts as the windings on the rotor are energized through three set of brushes running on slip rings.

The synchronous motor is rarely used except in large units, as the starting torque is very low without a special induction winding for starting duty. When the machine is brought up to speed, however, it keeps in exact step with the generator supplying the current. Probably the greatest use for these motors is in substation work, where a synchronous motor is direct-connected with a continuous-current generator. Synchronous motors are often used for power-factor correction, since from the nature of the machine, when running with over-excited fields, it produces a leading current and thus counteracts the lagging current found on a supply system loaded with induction motors.



TWO TYPES OF TROLLEY LOCOMOTIVES

DIRECT CONNECTION MAY OFTEN BE MADE

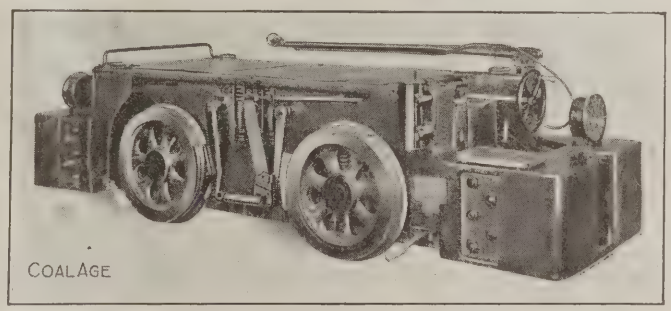
In the use of electric motors for mine service in connection with the various machines, found in such an operation, the characteristics of both alternating- and direct-current motors are such that in many cases they can be driect-connected or geared to the driven shaft in this manner, eliminating to a large extent friction losses and the first cost and upkeep of belts and countershafts. It is also possible to use a motor with each individual machine, obviating almost entirely line shafting and hangers.

This use of individual drive tends to increase the efficiency of a mining operation because no machines or shafts need be run except those actually in use. In the older methods, when operating by the use of the steam engine, the greater portion of shafting and belting was running continuously, thus increasing friction losses by an appreciable amount. In operating crushers, the momentum of the rotating part in a motor adds a flywheel effect which is perhaps of some advantage over a belted connection from a line shaft.

Practically all motors for use on both direct and alternating current are capable of carrying extremely heavy momentary overloads and 25 per cent. overload continuously without overheating. Ordinarily, the temperature rating of motors is considered 40 deg. C. (104 deg. F.) above the surrounding air when operating fully loaded and 55 deg. C. (131 deg. F.) under 25 per cent. overload.

Another advantage obtained in the use of individual motors is the ease with which power measurements may be made, for since each motor and the machine which it is driving forms a unit, instruments may be connected temporarily in the lines and actual power measurements of the machine load taken. This is of great advantage in that a machine may be worked at its full rated output and at maximum economy. This measurement also forms a check upon the operation of the motor, showing when it is overloaded or in need of repairs.

Still another advantage is in regard to peaks or overloads occurring at different points in the plant. The peaks rarely ever come on several machines at the same time, thus the electrical wiring system is in a sense distributive, supplying excess current immediately to those points which are overloaded. Any one of the motor units may be shut down temporarily for adjustments or repairs or even moved to another location with absolutely negligible effects on the remainder of the system.



A STRAIGHT HAULAGE LOCOMOTIVE

The ease of connection, flexibility and lightness in weight of electrical motors renders possible the use of portable machines and changes as to location or arrangement of machines in use may be made without interfering with the operation of the remainder of the equipment.

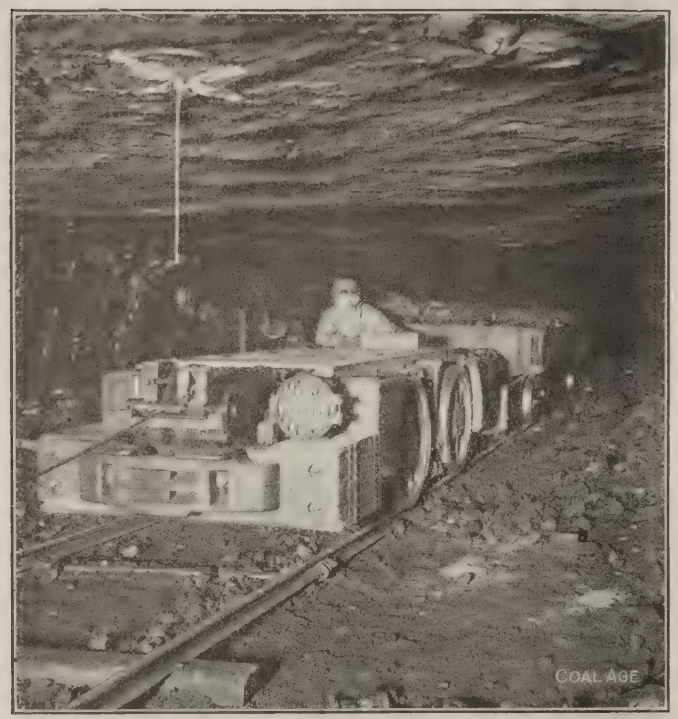
THERE IS A TENDENCY TOWARD STANDARDIZATION

The tendency in electrical-power applications to the use of coal mines is toward standardization, either in the

use of direct current throughout or by using synchronous or induction motors for work on the surface and direct current supplied by rotary converters or motor-generator sets for mine haulage.

In the use of a suitable power for mine haulage, the advantages and superiority of electric locomotives is generally conceded. This is due to the fact that an electric locomotive may be small in size, compact, simple of control, highly efficient and of great mechanical strength. Although compressed-air locomotives have been used to some extent, their efficiency is very low and at best they are cumbersome and require frequent charging from air lines laid in the mines.

Steam locomotives are almost entirely ruled out of mine work, owing to the large space required for their use and a smoke and fire hazard. Gasoline locomotives, too, have been used with some success, but are sometimes difficult to start, not able to withstand heavy overloads,



A Crab Locomotive at Work

they are expensive to maintain and have a lower tractive effort than an electric locomotive of corresponding size.

The life of a trolley-type electric locomotive is long. One is known which has been in use almost constantly for twenty-two years. No doubt, any other type of haulage motor would have been in the scrap pile after ten years' use.

Electric locomotives secure current for their operation by two methods. In one, the most commonly used, a trolley wire is carried on insulating supports into the mine above and alongside of the track. This forms one line of the electric circuit, while the rails upon which the locomotive runs form the other. Another type of locomotive secures current from a storage battery carried on the frame of the machine, which is charged at regular intervals from a direct-current supply.

There Are Three General Types of Trolley Locomotives

Three general forms of trolley-type electric locomotives are now in use, the straight haulage, cable reel or gathering and a combination or crab type. The standard weight ranges from two to 30 tons and some of the smaller sizes do not exceed 28 in. in total height. The straight haulage type is of undoubted value in hauling cars to the shaft or tipple in a mine having reasonably long haulage. This type is in use in practically all mines where electric service is available. For this service, the use of mules has practically been discarded, since one locomotive can deliver considerably more tonnage than several animals, can move faster, enter lower tunnels and, if necessary, operate continuously.

Gathering locomotives are very similar to the straight haulage machines, but in addition have a rotating reel operated by a small auxiliary motor, which carries a long length of electric cable, so that a locomotive of this type is able to go into cross-entries where there is no trolley line and be fed by current supplied through this cable, which it reels off on the ground when leaving the trolley line and winds up as it returns to the main track. The operation of this reel is entirely automatic, so that the driver may give his entire attention to the operation of the main or driving motor.

The crab-type locomotive is similar to the haulage machine, but with the addition of a hoisting drum operated by a strong compact series motor. A locomotive of this type may be blocked in an entry and by means of the hoist rope draw the loaded cars up the slopes and deliver them on the main haulage track. A few locomotives have been equipped with both the hoisting drum and cable reel, so that they may be used for practically every service required in haulage operation. Locomotives of these three types are shown in the accompanying illustrations.

In the operation of mines located a considerable distance from the tipple or breaker, it is possible to advantageously use much larger locomotives than those just mentioned. Since compactness is not required of these machines they may be of larger size and heavier framework.

Some makers use one motor only on a locomotive, connected to both axles by means of some form of gearing, others use separate motors connected to each axle. As a usual thing, the controller and all the more delicate parts, if any part of a mine locomotive may be called delicate, are thoroughly housed in, so that damage from falling rock, derailment or ordinary accidents is almost impossible. The controller is usually of the drum type, which consists of a series of contacts turned against a corresponding series of fingers placed in a closed steel case.

Some haulage motors are equipped with a heavy steel pinion, placed on the axle midway between the driving wheels, which engages a rack located in the center of the track, so that on heavy grades slippage is obviated and a high tractive effort is obtained.

The Storage-Battery Locomotive

The use of storage-battery locomotives is coming into extensive use, especially since marked improvements have been made in storage batteries within the past few years. When accumulators were first developed, the weight for a given output of current was out of proportion and the battery was to a certain extent fragile and liable to breakage, but some of the modern types not only withstand rough usage, but have exceptionally large output for a given weight.

As a usual thing, two motors are used on this type of

locomotive, each directly connected to a driving axle. The great advantage in the use of storage batteries for this work is that no trolley wire is required and the machine can go and come wherever the track is laid, regardless of connection with an outside source of current.

The chief objection to these machines is that they must receive regular charges and therefore be out of service part of the time. The storage-battery machines are built in sizes from two to ten tons and several makes of batteries can be supplied with any standard locomotive. Thus the buyer is enabled to choose to some extent the battery he intends to use.

The cost per charge for a storage-battery locomotive depends, of course, upon the size and the type of battery used, as well as upon the source of power and the efficiency of the charging equipment. The frequency of charge depends upon the conditions to be met, upon the load hauled and the number of hours per day in use. The number of ton-miles it is possible to secure from one of these machines upon one charge ranges from 100 to 200 at a speed from two to five miles per hour.

It is advisable in many cases to place a wattmeter or ampere-hour meter on an electric locomotive in order to check operating efficiency and determine if the operator uses sufficient care in conserving current. A registering instrument of some kind is especially necessary on storage-battery locomotives since this instrument forms the easiest method of determining when the machine needs a fresh charge.

Several illustrations, showing locomotives of the types mentioned, accompany this article, and much valuable information may be secured from the manufacturers covering the details of these machines, operating characteristics and cost per ton-mile of haulage.

The Auchincloss Mine Fire in the Anthracite Regions

By P. H. Dever*

SYNOPSIS—Brief description of what threatened to be a serious fire in a very gaseous district. The article includes a valuable table giving the variations in the evolved gases at different stages of the trouble.

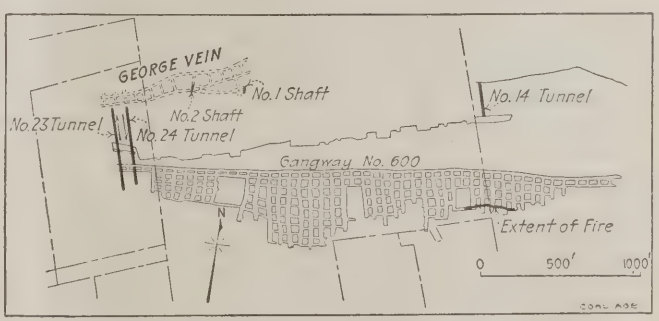
On the morning of Nov. 17, at about 10 a.m., a mine fire occurred at No. 2 shaft, Auchincloss Colliery, located in the borough of Nanticoke, eight miles south of the city of Wilkes-Barre. The mine is operated by the D., L. & W. R.R. Co.

The coal seams are being developed by two shafts, 14x50 ft. in size, each having two hoistways, one pumpway and one return airway. The shafts are located on the same surface elevation, namely 722 ft. above tide and 300 ft. apart. The deepest, or Red Ash bed, is penetrated at an elevation of 1000 ft. below tide. The part of the mine in which the fire occurred is locally known as the Nos. 23 and 24 tunnel section; these tunnels are located 500 ft. west of No. 2 shaft at an elevation of 95 ft. above tide in the George seam landing. They have been driven from the south dip of this seam across a synclinal to the George, Mills and Baltimore seams on the north dip; they are 600 ft. long, have a uniform rise of 2 per cent. and are 7x12 ft. in section. No. 24 tunnel is used as an intake airway and for haulage purposes, and No. 23 is used as a return airway. The tunnels are parallel and 60 ft. apart. A guibal fan, 35 ft. in diameter and running 52 r.p.m., with a water gage of 3 in., is employed for ventilating the workings in No. 2 shaft.

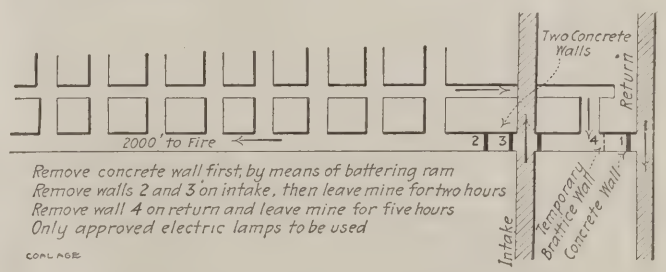
The air passing through this section of the mine is divided into two splits, 20,000 cu.ft. per min. passing through the Mills seam workings (fire section) and 40,000 cu.ft. passing through the Baltimore workings. An analysis of the return air shows 2 per cent. CH_4.

According to the second geological survey, the mine is located in the most disturbed part of the anthracite coal field. The various seams south of the shafts rise vertically 750 ft.

The employees working in this part of the mine use locked safety lamps, of the bonneted Clanny and the Acroyd & Best types. The coal is shot from the solid in both seams by means of Monobel No. 4 powder, tamped with clay and fired by electric battery. A patrolman is on constant duty for the purpose of seeing that no blasts are fired in places containing firedamp, and to look after the general safety of the workmen. But, notwithstanding these precautions, a serious fire started at the face of chamber 35, which is 2700 ft. east from No. 24 tunnel in the Mills seam. The chambers here are driven directly up the pitch, which is 25 deg., and the coal is eight ft. in thickness.



Sketch Showing Location of Fire



Plan Showing System of Recovery

*Coal-mining department, D., L. & W. R.R., Nanticoke, Penn.

Origin of the Fire

The fire is supposed to have been started by the breaking of the glass of a safety lamp dropped by a miner, the unprotected flame igniting some very strong gas feeders, which soon set the brattice and timber afire and finally the coal. The foreman and his assistant, being in another part of the mine, were promptly notified of the danger, and after a hurried examination they found that the fire had traveled through the crosscut leading to chamber 34.

While engaged in the work of fighting the fire, using water and chemical hose, it was discovered by the officials that the air current coming from the inside section contained 3½ per cent. CH_4, whereupon all persons were removed from the mine, and after a consultation it was decided to seal the affected section. While making preparations for doing this were under way, an explosion occurred, doing considerable damage to the mine and also destroying the ventilation. Temporary stoppings of brattice cloth were used in order that the recovery work might be done quickly and the men removed from the mine, care being taken to seal the return side first. About ten hours after installing the temporary stoppings, permanent concrete dams were erected, the return side, as before, being sealed off as in the case of the temporary first. Additional dams, forming an air lock, were then built in the intake and the walls were provided with a 2½-in. pipe, for obtaining gas samples for analysis and for water-gage readings.

On Dec. 6, nineteen days after the sealing up of the fire, Assistant Division Superintendent P. H. Dever, accompanied by foremen White, Richards and Thomas, equipped with Draeger helmets, made an inspection of the fire zone and found it to be entirely extinguished, the temperature on the gangway at the entrance to chamber 35 being 68 deg. F. The temperature at the face was 78 deg. and the rock and coal were still warm, but no sign of fire was found. It was then decided to restore ventilation, which was successfully done, using the method outlined on the accompanying drawing.

On Sunday, Dec. 7, all the CH_4 had cleared, which permitted us to make a minute inspection of the workings, after temporary stoppings were erected. We then learned that the explosion on Nov. 17, had been quite violent; all concrete stoppings, which were two feet in thickness, were blown out and pulverized. Several loaded cars were upset and broken, sheet iron, props, planks, etc. were carried several hundred feet from the point where they had been left.

Recently we drilled an 8-in. bore hole to a depth of 450 ft. from the surface to reach the Baltimore seam in the No. 24 tunnel section, on the apex of the anticline, The gas pressure generated in two minutes was sufficient to blow a yellow-pine plug, weighing 31 lb., 20 ft. vertically out of the drive pipe after it had been hammered down in the hole with a 10-lb. sledge.

MINE FIRE IN THE MILLS SEAM, NO. 2 SHAFT, AUCHINCLOSS MINE. CHEMICAL ANALYSIS OF GASES.

						Water Gage		Barometer		Temperature		Barometer	
Date, 1913	CO_2	O	CO	CH_4	N	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust
Nov. 18	0.0	19.5	0.0	3.2	77.3	1.0	0.5					28.98	29.08
Nov. 18	0.0	19.8	0.0	3.2	77.2	1.0	0.5					28.98	29.08
Nov. 18	1.2	7.8	0.0	3.0	88.0	1.0	0.5					28.98	29.08
Nov. 18	1.0	7.8	0.0	3.2	88.0	1.0	0.5					28.98	29.08
Nov. 19	1.0	7.8	0.0	2.6	88.6	1.0	0.5					28.94	29.04
Nov. 19	1.0	7.8	0.0	2.4	88.4	1.0	0.5					28.94	29.04
Nov. 20	2.4	8.4	0.0	1.3	87.9	1.0	0.5		No readings taken			28.88	28.98
Nov. 20	1.0	9.0	0.0	1.1	88.9	1.0	0.5					28.88	28.98
Nov. 21	1.2	8.8	0.0	**20.0**	70.0	0.8	0.3					29.10	29.20
Nov. 21	0.9	8.1	0.0	3.1	86.9	0.8	0.3					29.10	29.20
Nov. 22	0.0	2.2	0.0	**16.5**	81.3	0.6	0.1					29.14	29.24
Nov. 22	0.2	9.2	0.0	**11.0**	79.6	0.6	0.1					29.14	29.24
Nov. 22	1.0	5.1	0.0	**11.0**	83.8	0.4	1.0					29.14	29.24
Nov. 24	0.5	4.2	0.4	**55.8**	39.1	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 24	0.1	4.1	0.2	**57.0**	38.6	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 24	0.7	4.3	0.5	**52.6**	41.9	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 24	0.1	4.1	0.0	**55.7**	40.2	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 24	0.0	3.9	0.1	**55.0**	41.0	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 24	0.0	5.9	0.2	**55.4**	39.2	0.0	1.2	29.30	29.20	52°	56°	29.30	29.90
Nov. 25	0.3	4.0	0.2	**71.7**	23.8	0.2	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 25	0.6	3.4	0.1	**73.6**	19.9	0.2	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 25	0.6	4.1	0.2	**71.5**	23.6	0.2	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 25	0.4	3.9	0.2	**72.5**	23.0	0.2	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 26	0.3	3.0	0.0	**73.7**	23.0	0.0	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 26	0.4	3.1	0.1	**73.5**	22.9	0.0	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 26	0.3	3.0	0.1	**73.5**	23.1	0.0	1.2	30.00	29.90	52°	56°	29.40	30.00
Nov. 27	Holy Day												
Nov. 28	0.3	7.2	0.3	**74.6**	17.6	0.0	1.2	30.38	30.30	44°	56°	29.85	30.45
Nov. 28	0.3	7.9	0.2	**75.0**	16.6	0.0	1.2	30.38	30.30	44°	56°	29.85	30.45
Nov. 28	0.0	8.5	0.2	**74.8**	16.5	0.0	1.2	30.38	30.30	44°	56°	29.85	30.45
Nov. 29	0.6	2.0	0.0	**78.3**	18.9	0.1	1.2	30.36	30.28	46°	56°	29.66	30.32
Nov. 29	0.6	2.2	0.0	**77.5**	19.9	0.1	1.2	30.36	30.28	46°	56°	29.66	30.32
Nov. 29	0.5	2.1	0.0	**78.1**	19.3	0.1	1.2	30.36	30.28	46°	56°	29.66	30.32
Dec. 1	0.0	1.6	0.0	**68.4**	30.0	0.0	1.2	30.30	30.19	42°	56°	29.72	30.36
Dec. 1	0.0	2.0	0.0	**69.2**	28.8	0.0	1.2	30.30	30.19	42°	56°	29.72	30.36
Dec. 1	0.0	2.4	0.0	**70.8**	26.8	0.0	1.2	30.30	30.19	42°	56°	29.72	30.36
Dec. 2	0.7	2.5	0.0	**80.0**	16.8	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 2	0.2	4.2	0.0	**74.0**	21.8	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 2	0.1	2.7	0.0	**78.0**	19.2	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 2	0.5	1.8	0.0	**84.1**	13.6	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 2	0.4	1.9	0.0	**83.3**	14.4	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 2	0.3	1.7	0.0	**85.0**	13.0	0.0	1.2	30.29	30.18	46°	55°	29.70	30.35
Dec. 3	0.0	0.3	0.0	**80.0**	19.7	0.1	1.3	30.01	29.92	49°	56°	29.44	30.09
Dec. 3	0.4	1.8	0.0	**80.0**	17.8	0.1	1.3	30.01	29.92	49°	56°	29.44	30.09
Dec. 3	0.6	1.0	0.0	**74.0**	24.4	0.1	1.3	30.01	29.92	49°	56°	29.44	30.09
Dec. 4	0.3	3.0	0.0	**88.0**	8.7	0.0	1.3	29.84	29.75	44°	54°	29.27	29.90
Dec. 4	0.2	1.0	0.0	**84.0**	14.8	0.0	1.3	29.84	29.75	44°	54°	29.27	29.90
Dec. 4	0.3	2.2	0.0	**86.0**	11.5	0.0	1.3	29.84	29.75	44°	54°	29.27	29.90
Dec. 5	0.2	1.3	0.0	**86.0**	12.2	0.0	1.2	29.63	29.52	46°	54°	29.04	29.68
Dec. 5	0.0	1.1	0.0	**84.0**	14.9	0.0	1.2	29.63	29.52	46°	54°	29.04	29.68
Dec. 5	0.2	1.0	0.0	**82.0**	16.8	0.0	1.2	29.63	29.52	46°	54°	29.04	29.68

Note—⅓ of the vol. of CO_2 in CH_4 will make it non-explosive.
Note—**Full face** type indicate an explosive mixture of fire damp.

Of the total of 2444 coal cutters in use in 626 different British mines in 1912, 1134 (of which 593 were in Scotland and 290 in the Yorkshire district) were electric, against 1310 driven by compressed air. This was an increase of 136 electric and 162 compressed-air cutters. The mineral cut by electricity was nearly 12 million tons, as against about 8½ million tons by compressed air. Among the electrical coal cutters, there were 623 disk machines, 345 bar machines, 148 chain machines, 14 percussive machines and four rotary heading machines.

Coal-Dust Explosions at the Mine Inspectors' Institute Meeting

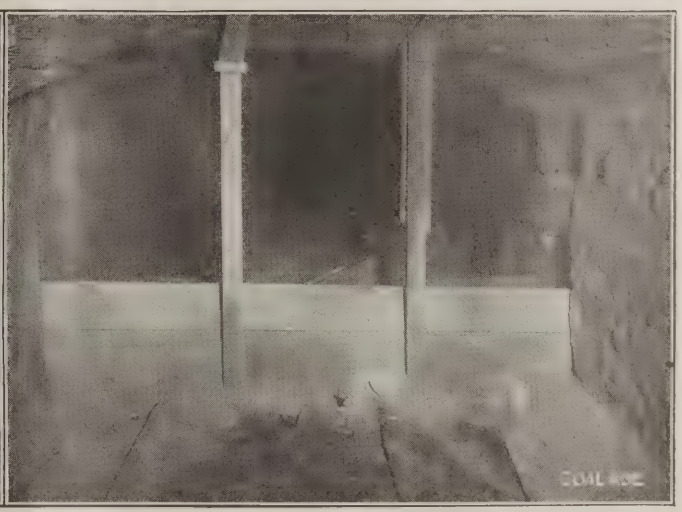
By George S. Rice* and L. M. Jones†

SYNOPSIS—A mild explosion was staged at the experimental mine, the mixture of rock dust with coal dust being almost sufficient to make the explosion impossible. Under these conditions the Rice barriers proved effective. The explosion was more violent toward the intake, and more speedy toward the return. However, neither difference was sufficient to establish any conclusions.

Test known as No. 120 of the series now being made at the Bruceton experimental mine was conducted in the presence of many members of the Mine Inspectors' Institute of America, who were assembled from various parts of the United States and Canada on June 11, 1914. Some operators and miners were also present. The purposes of the experiment were several: The most important was to determine the efficiency of various forms of rock-dust barriers in stopping the propagation of a dust explosion; another feature of great interest to many of the members, was the employment of a strong ventilating current prior to and at the time the explosion was started. The main entry was the intake and the aircourse, the return. The loading of coal dust in the two entries was made as nearly alike as possible and since the igniting shot was fired in an offset at the middle of the inmost crosscut, the conditions in the two entries were identical, except for the air current intaking on one and returning on the other entry.



Rice Concentrated Rock-Dust Barrier in Main Entry, after Explosion



Rock-Dust Stopping in Stub Heading to Right of Main Entry, after Explosion

Conditions of Test

The explosion was caused by a blownout shot of 4 lb. of FFF black powder, tamped with 3 lb. of clay stemming, discharged from a cannon at the face of a 20-ft. offset, on the north side of the 1250 crosscut at a point equidistant from entry and aircourse. (See figure on page 67.). The offset and 1250 crosscut were loaded with pure coal dust; that is, coal dust not mixed with other material. The distance from the cannon through the crosscut to the center of either entry was about 50 feet.

From opposite the 1250 cut-through, the entry and aircourse were each loaded on sides and cross shelves with a mixture of 60 per cent. coal dust and 40 per cent. shale dust at a rate of 3⅓ lb. per ft. The amount of coal dust per foot of entry way was 2 lb., which is equivalent to about one-half ounce per cubic foot of entry space. This loading extended for 550 ft. outby from the crosscut. The mixture had an ash percentage of about 38 to 40 per cent.

Concentrated Rock-Dust Barrier

At the end of this zone on the entry there was installed a Rice concentrated barrier loaded with 2½ tons of rock dust. The principal features of the barrier are as follows:

It has two hinged platforms, 7x7x1 ft., near the roof of the entry. The floor planks of the platforms are not attached to the side boards which are fastened to timber crossbars but are hinged at one end to the crossbar of a timber set, between the platforms. The other ends of the planks of each platform are supported by an angle iron, which in turn is held up by one of a system of levers.

There are vanes hung from the roof 100 ft. distant inby and outby the barrier, so arranged that when an explosion wave causes one to swing, the movement is reversed by a pulley and chain and a pull transmitted by wire to a trigger which trips a system of levers causing the dropping of the angle irons supporting one end of each platform. Alternate planks then fall about 9 or 18 in., depending on the length of chains fastening them to an overhead timber or to the roof. The side frame of each platform, however, is still held in position.

On release, the dust, which has been placed on the

*Chief mining engineer, Bureau of Mines, Pittsburgh, Penn.
†Assistant mining engineer, Bureau of Mines, Pittsburgh, Penn.

platforms, falls from the planks in a shower into the entry, blanketing the flame of the explosion as soon as it reaches the barrier. Should the advance-vane operating arrangement fail, another vane near the barrier, by means of a hinged bumping block attached to it, pushes the trigger, causing the barrier to act.

Box Rock-Dust Barriers

At the end of the mixed-dust zone on the aircourse were installed a set of 6 Rice box barriers, spaced 10 ft. apart from center to center, each containing from 600 to 700 lb. of crushed-shale dust. These boxes are 7 ft. long, 21 in. wide inside and 9 in. deep. They are built so that two bottom boards rest upon narrow bottom strips fastened to the box frame.

This frame is supported by 4 eyebars, the eyes resting on hooks, projecting from the roof. When the explosion wave reaches the box, it causes the latter to swing in the direction the wave is traveling until the side of the box knocks 2 hanging bars off the hooks, whereupon the frame falls, pivoting about the supporting hooks on the other side of the box, to which the other 2 eyebars are still attached.

The bottom boards do not fall with the box frame but drop a few inches when they are caught by supporting chains. More or less of the dust on these shelves either falls off as they swing or is blown off by the explosion wave. With a light preliminary wave, considerable dust may remain on the shelves which is a measure of protection against a following explosion wave.

Coal Dust Loaded beyond Barriers

Outby from both the concentrated barrier and the box barriers, were arranged 200-ft. zones of pure or unmixed coal dust to furnish fuel for continued propagation of the explosion, should it get through the stopping devices. These zones were intended to determine if the barriers just described performed their duties effectively. At the end of these coal-dust zones were placed Taffanel barriers to check the explosion should the coal dust become ignited.

First Right Butt

Across the mouth of this entry was built a rock-dust stopping which consisted of board sides with a compartment between them, 18 in. wide, filled with 2½ tons of shale dust The sides were braced just sufficiently to withstand the pressure of the dust filling, but not enough to give much additional strength. Coal dust was placed for 100 ft. inby from the stopping to test its efficiency.

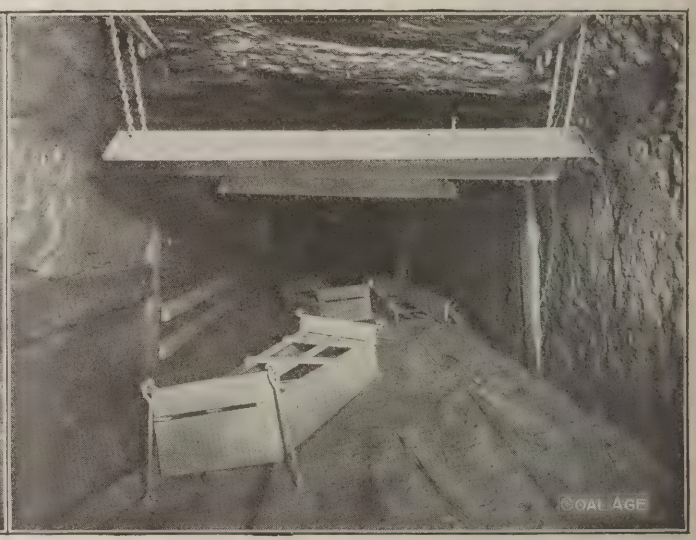
First and Second Left Butts

In these entries, 15 ft. in from the aircourse, were built rock-dust protected ventilating doors. These doors had compartments at each side and above them, containing rock dust. The door frame held the boards of the compartments in place. When an explosion wave struck the door, the frame not being strongly braced would tend to become displaced and the rock dust would be launched into the entry. The door in No. 2 butt opened outward, while that in No. 1 butt opened inward.

Unmixed coal dust was distributed in both butt headings to determine the efficiency of the stopping devices. To obtain symmetrical conditions in the aircourse and entry, no door or curtain was placed across the aircourse between the butts.



Rock-Dust-Protected Ventilating Door in Left Butt after Explosion



Rice Box Barrier in the Return Aircourse after Explosion

Ventilation and Humidity

An air current with a velocity of about 850 ft. per min. was intaking on the main entry and returning on the aircourse. It was thought that the symmetrical loading on the two headings would permit the observers to compare the relative violence and extent of the explosion in the face of and opposing an air current of high velocity, which gave, in this case, a volume of 46,000 cu.ft. per minute.

The mine was wet throughout, and in places the bottom was muddy, while the packed clay floor was everywhere slightly sticky. The roof was studded with beads of moisture.

Recording Instruments

Recording pressure manometers were placed in stations E-1150, 750, 550, A-1150, 750 and 550. Flame circuit breakers were placed at all stations in the mixed-dust zone, and others at intervals outby. Wires were connected to the stopping devices, terminating the mixed-dust zones, to determine the relation between the time of their operation and the passage of the flame. Matches and guncotton tufts were installed every 25 ft. throughout the mine.

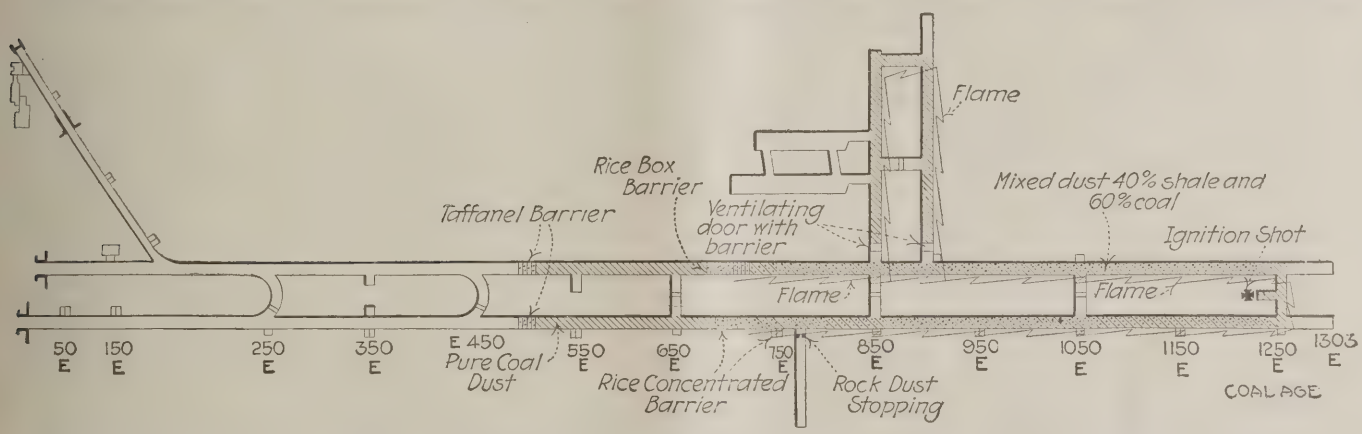
Explosion Appeared Mild at Mine Mouth

When the igniting shot was fired by the pressing of a button in the observatory, slight puffs of dust were noticed at the main entry and aircourse, accompanied by a muffled report. Shortly afterward more dust came from the entrances, particularly from the aircourse, and issued for some length of time. Externally the evidences of the explosion were not very marked. When the ventilating current was turned on after a cloud of rock dust had been expelled, the afterdamp accompanied by an extensive cloud of black smoke attested to a considerable explosion in the interior of the mine.

Extent of the Explosion

The flames of the explosion extended in the main entry and in the aircourse to the respective rock-dust barriers, which were placed at points 550 ft. from the outside of the mine or 700 ft. from the origin in each case. The barriers in both cases operated and flame was not communicated to the pure coal-dust zones beyond or outby the barriers.

The ventilating door in the second butt was evidently



Plan of Experimental Mine, Showing Manner of Charging with Coal Dust and Methods Adopted for Retarding and Extinguishing Flame

thrown down by the shock wave from the cannon, as indicated by the elapsed time as recorded on the chronograph. When the flame reached it, about 4 sec. later, there had been sufficient time to permit the rock dust to settle, so that the flame passed overhead and ignited the coal dust beyond, with the result that there was quite a strong inflammation at the head of the butt entries, sufficient to break the track and throw down shelving.

This indicated that the door frame had not been built with sufficient strength, because, for the proper operation of the rock-dust device, the frame should not have been thrown down until reached by the main explosion. This was the case with the first left butt ventilating door, probably because this door opened inward. The barrier surrounding this first left butt door was thrown down apparently by the main explosion, although it is not perfectly clear from the time records whether it may not have been thrown down by the explosion which came around from the second butt. In either case there was apparently sufficient rock dust launched into the air to quench the strong explosion coming out of the butt headings.

Pressures Produced by the Explosion

The pressures as recorded by the different manometers showed that the explosion was light, partly due to the dust being mixed, and perhaps also due to the wet condition of the mine. The maximum pressures at E-1150 was 2.4 lb., at E-750 5 lb. and at E-550 0 lb. The pressures at E-750 and 550 show the effect of the concentrated barrier in extinguishing the flame. In the aircourse the pressure at A-1150 was 1.4 lb. and at A-750 1 lb. This latter pressure, in view of the considerable development of force at the head of the butt entries, is rather surprising and indicates that the ventilating-door barriers in the butt entries, if they did not stop the explosion on entering, did so on the return wave. At A-550, outby from the box barrier, the pressure was zero.

Velocity of Explosion

The velocity of the explosion was slow; one of the slowest that has been recorded. It required 3.2 sec. to traverse a distance from the origin to the station at E-1150 in the entry, a distance of 150 ft., and 2.9 sec. to station A-1150 in the aircourse, also 150 ft. from the origin. The explosion required 6.5 sec. to reach station 750 in the entry and 5.1 sec. to reach the corresponding station in the aircourse. The average velocity of flame between stations on the return aircourse, 183 ft. per sec., was greater than the average velocity of flame between stations on the intake entry, which was 131 ft. per second.

Effect of Ventilating Current

It would not appear from the pressure and velocity records that the high velocity of the air current had much influence on the development of the explosion. About the only variation in the action of the explosion in the two entries was that the velocity of flame on the return side was somewhat greater than that on the intake side. While this may have been an effect of the ventilating conditions, it was probably more a matter of chance than an effect of the air current, since the explosion was so slow.

Concentrated Barrier

As the explosion was light, the concentrated barrier in the entry was not broken up or injured. The shelves had dropped until the supporting chains were taut and about 80 per cent. of the dust had fallen from them, the remaining 20 per cent. being still retained on the planks. The barrier operated 5.44 sec. after the shot was fired, while the flame reached it about 7 sec. after the shot; the rock dust that sifted down apparently made a sufficient curtain of dust to extinguish the flame.

Box Barriers

The box frames were found lying on the floor of the entry, only one being damaged to any great extent. The bottom boards were all suspended from the chains and only one had been broken. All the dust had fallen from the boards, which were supported at a tilted position. The boxes operated after 4.9 sec., while the flame reached the boxes about 5.5 sec. after the shot. The rock dust was well distributed along the air course.

Rock-Dust Stopping

The record indicated that this stopping had been blown down at least partially when struck by the shock wave from the igniting shot at a period 0.473 sec. after the shot. The stopping was probably built unnecessarily light. It operated effectively, for no flame passed it.

Rock-Dust-Protected Ventilating Doors

The door in No. 2 butt had been thrown down by the shock wave at period 0.429, while flame reached this point, it is estimated, after a period of about 4 sec. The dust compartment of No. 1 left door fell, according to the time of rupture of the wires, after a period of 4.9 sec., the flame reaching this point possibly a little before.

It is probable that the flame passed into No. 2 butt over the dust pile, which had fallen possibly enough in advance so that much of the dust in the air had settled. The flame may or may not have passed through No. 1 butt barrier.

The woodwork of both doors had been broken to fragments by the return wave from the butts and the fragments thrown out to the aircourse and lay in that heading, both outby and a short distance inby from the butt heading.

The failure of No. 2 butt door is undoubtedly due to the frame being braced too lightly. It should not have gone out with the shock wave. Also it would be better to hang some of the boards from the roof by chains, as in the case of the box barriers, in order to retain some of the dust for delayed flame.

Taffanel Barriers

All but one shelf of the Taffanel barrier in the main entry were thrown down by the explosion. All the shelves of the Taffanel barrier in the aircourse remained in place and about two-thirds of the rock dust was still on the shelves. Owing to the concentrated barrier and box barrier having stopped the flame, the Taffanel barriers were not brought into action.

Conclusions

The results are valuable as showing the effectiveness of the concentrated barrier and the box barrier in a weak explosion. Their method of operation permits a surer and more effective scattering of the dust than does the open shelf type of barrier, in which the amount of dust blown off the shelves depends upon the strength of the air current. In a weak explosion, the amount blown off might be too small to quench the flame effectively.

When putting down a diamond-drill hole in sandstone or limestone, the jamming of the drill when a water cavity is reached may be overcome by a good hydraulic feed. When the ground is rotten the hole should be lined to keep it from falling in, though this reduces the size.

The Lesson

By R. T. Strohm

Written expressly for Coal Age

There are lots of modes of teaching
How to order all our ways,
In addition to the preaching
In the churches, Sabbath days.
Though the parsons labor longer
To induce us to believe,
We may learn a lesson stronger
From a grease-cup on a sheave.

Not a whimper nor a grumble
At the irony of fate,
But instead, with manner humble,
Working silently and late.
No such weakness as resentment
Lurks within its grimy shell;
Filled with grease and deep contentment
It performs its duty well.

Every night its task is ended
Where its morning work began;
Though its travel is extended,
Yet it has not moved a span.
Still, dissatisfaction spurning,
It has jubilantly whirled,
Never tempted by a yearning
To be off to see the world.

Gamely it continues going
In its narrow little sphere,
And, in spite of usage, growing
More efficient, year by year;
Never longing for inaction,
Never seeking for a rest,
But, with quiet satisfaction,
Doing just its level best.

Utah Breaks Record

The production of coal in Utah in 1913 was 3,254,828 short tons, with a value at the mines of $5,384,127, according to E. W. Parker, of the United States Geological Survey. In 1912, for the first time, Utah's coal production exceeded 3,000,000 tons, the output in that year amounting to 3,016,149 short tons, valued at $5,046,451. In 1912 the industry suffered from a scarcity of labor, due to the exodus of foreign miners to the scene of war in the Balkan States.

The increased production in 1913 appears to have been due principally to activity among the metalliferous mines and the smelters, as nearly all of the increased production was in the quantity of coal made into coke, this item alone indicating a gain of 225,561 short tons out of a total increase of 238,670 tons.

Nearly 90 per cent. of the total coal production of Utah is mined in Carbon County, which contains a large part of the great Uinta Basin. This county produced in 1913 2,830,102 short tons, out of a total for the state of 3,254,828 tons. The industry was practically free from labor troubles in 1913, only one company reporting idleness from this cause, and only five men being disaffected.

The Labor Situation

SYNOPSIS—Several wage contracts have recently been signed. To western Pennsylvania and Iowa as states with completed contracts have been added West Virginia, as far as the union is recognized, and southern Ohio. A speedy agreement in Illinois is foreshadowed. In the other sections no approaches to a settlement have been made, but the effect of agreements elsewhere cannot fail to influence the result.

As stated in brief in last week's issue, the executive board of the United Mine Workers district organization (No. 17) in West Virginia declared the referendum vote in 19 out of 50 local unions had been cast illegally or returned in a manner not in conformity with the by-laws. It has been alleged that in two local unions more votes were cast than there were members on which capitation tax was paid to the organization, and in other cases the official seal had not been stamped on the returns.

ARBITRATION AND THE CHECK-OFF

The second vote was more definitely in favor of the arbitral proposition with the check-off than the first is said to have been. When the report was made, it was found that 1304 voted for the proposition and 949 against, giving a majority of 355 votes. As a result, it is said, 7000 men will go back to work.

The miners will now appoint a committeeman as they should have done long ago, had they acted in accord with the report of the board of conciliation. They will also go back to work, another point in which they failed to act as the board requested. D. C. Kennedy is appointed by the Kanawha Operators' Association as its representative on the arbitral commission.

THE AREA OF WEST VIRGINIA AFFECTED.

The strike commenced June 1, and has lasted barely over a month. Among the mines affected by the resumption are the Plymouth, Black Betsy, Raymond City, Blakeley, Campbell's Creek, Coal Fork, Quincy, Monarch, Shrewsbury, Ward, Mammoth, Big Mountain, Hughes Creek, Cannelton, Marting, National, Carbondale, Smithers, Longacre, Harewood, Boomer, Powellton, Elkridge, Columbia, Diamond, St. Clair, Eagle, Montgomery, Eureka, Crescent, Handley, Coalburg, Winifrede, Belmont, Crown Hill, Olcott, Rammage and Clothier.

The conclusion of the strike is hailed as a great victory for the administration by some parties. As a matter of fact, the only question at issue was the check-off, and as the operators realized that this did not come out of their own pockets, they were not disposed to make an urgent fight against it. Both parties conceded to the commissioners on the 10th of June that there was no wage dispute.

PAINT CREEK AND CABIN CREEK NOT IN THIS AGREEMENT

Nor does the decision, as has been reported, mark the end by conciliation and arbitration of the Paint Creek and Cabin Creek disturbance, for none of these mines is included in it, the mines along these creeks having settled their difference with the miners long ago. The area covered is quite restricted and does not even include the whole union field. Thus a 3-year working contract was concluded between the union and the operators of the Pomeroy Bend district of West Virginia on June 10 at Hartford City, Mason County. In this agreement also, the check-off was conceded.

On the 30th of June, the Scotford Mines of the Bell Coal Co. on Bear Creek in Clay Co., signed a working contract with the union. At last reports, the Four States Coal Co. and the Milburn Coal Co. were still idle. Now the dispute is settled with the Kanawha District Operators' Association, it is likely that the difficulty at the mines of these companies will be pushed to a conclusion.

THE SOUTHERN OHIO COAL FIELDS COMMENCE WORK

In Ohio, as we mentioned last week, the operators of the Hocking, Pomeroy, Jackson and Crooksville districts remained in session with the United Mine Workers after the eastern Ohio and Cambridge operators withdrew. As a result, the operators and miners finally agreed on a scale providing 47c. per ton of mine-run coal mined by machine, and 67.6c. for pick-mined coal.

The full text of the general agreement follows:

(1) All coal to be paid for on the mine-run basis.

(2) The price for machine-cutting, hand-drilling and loading of clean merchantable coal in wide work to be 47c. per ton.

(3) The price for pick mining to be 67.6c. per ton.

(4) The present differential above the Hocking Valley scale to be retained on a relative basis.

(5) All narrow work to be paid for in the same proportion as under the Cleveland agreement.

(6) The price now paid for inside work to be affirmed.

(7) Eight hours to constitute a day's work.

(8) All internal questions, both as to price or conditions, to be referred to the different districts for adjustment. In adopting the mine-run basis, it is proposed that the coal shall be mined in a careful, workmanlike manner and that, in all scale districts, a rule or rules will be agreed upon requiring that such be done.

When the agreement is ratified by a referendum vote of the miners in the districts affected, mining will be resumed. It is believed that the referendum vote can be taken and counted in less than two weeks. While the scale is not satisfactory to the operators they will make an honest effort to work under it. The Ohio Industrial Commission will now have the task of fixing rules to govern the percentage of slack and impurities.

Operators in eastern Ohio, Cambridge and a portion of Crooksville are arranging to meet the miners in conference next week. The miners insist they will not give a lower scale in the districts that have not signed up.

THE PITTSBURGH VEIN OPERATORS ASSOCIATION

It may be stated that the Pittsburgh Vein Operators Association feels much aggrieved at the statements made that it has been unreasonable. It states truly in a long advertisement in the "Martins Ferry Daily" of July 3, that it has been willing to sign the old scale as have the other operators in other districts, as for instance, those in the Pittsburgh region, but the union and the law demand alike a new scale. It has offered an equivalent scale giving 99c. for lump coal and 2c. for slack. It has also agreed to give 41.12c. per ton for run of mine, that being also, it declares, the equivalent of the Pittsburgh price.

The association quotes the failure of several companies working on a mine-run scale as evidence of the unfairness of the competition existing where a mine on that basis has to compete with one where only lump coal is paid for, though at a higher compensatory rate. It declares that the steady operation of the eastern Ohio mines which has been secured by the building of docks in the Northwest by the Ohio operators, will be entirely destroyed if the mine-run scale, which the union proposes and which the Pittsburgh vein operators declare is inequitable, is adopted. The latter claim that for 5 or 6 years, the dock trade, secured at much expense, has caused the eastern Ohio district to be more steady in operation than the adjoining fields in the same state.

THE QUANDARY OF THE OHIO MINERS

It is clear that the miners in eastern Ohio are suffering severely from the present idleness. They are certainly to be commiserated. They are victims of their own successes. They have long succeeded in holding the wages of the Ohio district, with its generally less desirable coal, on a level with those of the Pittsburgh region. As a result, the number of days worked has been low. In 1912, the mines in Ohio operated only 199 days as against 255 in the Pennsylvania bituminous regions.

The reason for their action in trying to maintain wages is perfectly reasonable. The coal is dirtier for the most part and needs more cleaning. The bands are often large and the removing of them troublesome. Why should not the wage scale be at least as high as where the coal is cleaner? The answer of the operators, which seems so hard to devise, is however easy—the coal being inferior must sell at a lower price, and if the miner and operator cannot agree to mine it at that price, they must leave the market. As the operators profits are infinitesimal, the only hope lies in the miner accepting a lower recompense or in his vacating the state of Ohio where only lower wages can be paid.

The miners assembled at Martins Ferry on June 26 and condemned the practice of sending away the money collected at home for the benefit of strikers elsewhere. They feel that if they had not done this in the past, none of them would have had to seek charitable relief during their present dispute.

Most energetic attempts have been made by the Industrial Workers of the World to induce the impoverished miners to

commit acts of violence, but to the great credit of the union miners, it must be said it has been entirely without success and it tends to prove that where the unions are strongly entrenched, they may tend to seek concessions which the economic situation does not merit but they do not evidence a disposition to riot. And it may be here stated that none of the strikers has received more than $1.50 since the strike started on the first of April. Their financial condition certainly is desperate; that their counsels are not equally desperate under the urgent incitation of unscrupulous agitators testifies to their law-abiding disposition.

The miners held a mass-meeting at Bellaire, O., in the auditorium of the city building. One resolution, apparently by an I. W. W. sympathizer, urged all miners' local unions to hold mass meetings to fix a limit of 15 days during which the operators were to be required to sign a scale as demanded by the officials of the organization and failing to reach an agreement by that time, all settlements to be declared off for a specified time. The resolution urged the state officials to raise funds to carry the strike to a successful issue, and also urged the investigation of the policy of the national organization in withholding benefits from the Ohio miners.

The second resolution, even more clearly coming from an I. W. W. source, urged "That we ask that all miners who are working, stop in sympathy with the Ohio miners and that if there is not a settlement soon, we ask that steps be taken to prevent the delivery of coal, which is now being hauled through Ohio, stopped."

The I. W. W. men tried to break up the meeting and the officials left in disgust. Police were summoned to the hall and an executive session was called, the reporters being expelled. The I. W. W. men were left in full control of the meeting but apparently no resolutions were passed.

A UNIFORM WAGE SCALE

Advocates of uniformity of wage scales and working hours, such as Dr. D. W. Boone, the Bellaire city health officer, overlook the need which must always exist for diverse wages unless men are to be deported from one state to another where the coal is better or more favorably located. A federal law calling for all fields of wheat to be of equal productivity would be almost as effective.

In fact nothing but a readiness of labor to accept lower wages or to be satisfied with shorter periods of work enable some coal areas to produce. The Ohio miner has been obliged to accept the work available when the price of coal in the market was good. Had he subjected himself to a differential, he could have worked steadily. He is in the unfortunate position of the man who farms a stony or hillside field; he must work harder and receive less or hunt a better field for nature is inexorable and the will of man inadequate to make redress. However, it must be conceded that the Ohio miners are competing with some operating concerns whose scale of wages is too low.

NORTHERN OHIO, CENTRAL ILLINOIS AND INDIANA

A break in the union in the Fifth sub-district which includes Belmont County is expected. It is even said that an ultimatum has been delivered by the men to the union officers that, if in 30 days no settlement is effected, they will sign up individually with the operators and return to work.

The Central Illinois Coal Operators' Association has agreed with the United Workers of America upon a scale in the Springfield district making the machine-mining rate 80 per cent of the pick-mining price.

In Indiana the minority in the union has called for a special convention for July 21. Seventeen locals have sent petitions asking that a special convention be called to consider charges that state union officials have violated the terms of the wages contract in settling grievances and did so in favor of the operators. Specific charges are brought against William Houston, president, and Thomas Moss, member of the executive board.

THE SOUTH-WESTERN COAL FIELDS

The conference at Kansas City, Mo., still continues. John P. White regards the situation in this section as so serious that he is giving it his personal attention. He is, moreover, in an excellent location to keep an eye on the Western situation.

The trial of P. R. Stewart, president of the Arkansas district of the U. M. W. of A., and others charged with violating an injunction by interfering with the operation of the Mammoth Vein Coal Co.'s plant, began at Forth Smith, Ark., on July 2. The conditions leading up to this trial were described in our issue of July 4. Joseph Hayden, a hardware dealer of McAlester, Okla., testified that Fred W. Holt, secretary of that district, bought from him between 20 and 25 rifles and 100 rounds of ammunition for each, to be sent to the strike fields.

NO CHANGE IN COLORADO

In Colorado, we hear that J. C. Osgood, president of the Victor-American Fuel Co.; J. F. Welborn, president of the Colorado Fuel & Iron Co., and C. W. Brown, president of the Rocky Mountain Fuel Co., conferred with the legislative committee on the miners' strike on June 25. Hywell Davies has been traveling through the strike zone and William R. Fairley has been in conference with the strike leaders. But so far, from what can be learned, no action has been decided on.

ALBERTA STRIKE

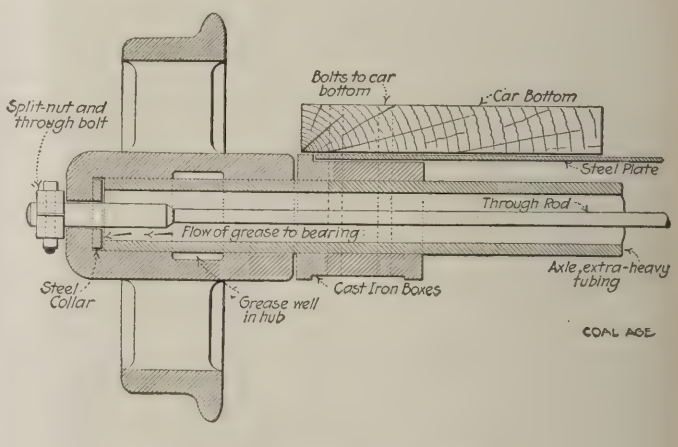
Three hundred miners of the Brazeau Collieries Ltd., at Nordegg, Alta., are on strike, demanding a wage increase. In April these men became organized in the United Mine Workers Union, but the officials from Fernie could not get the company to sign an agreement. A verbal contract was made by which the scale then in force would continue until June 15, and promising that a new schedule suitable to both parties would be drafted by that date. Apparently the men sought to assure themselves of a satisfactory scale by striking in the closing weeks of June.

WALES VERSUS U. M. W. OF A.

On July 1, a jury was completed at Binghampton, N. Y., to try the case of A. D. Wales against the United Mine Workers of America to obtain $200,000 for services in settling the anthracite coal strike in 1902. The evidence of Theodore Roosevelt given in New York City and to which reference was made editorially in our issue of June 6, will be read to the jury.

A New Mine-Car Truck

To meet the growing demand for a running gear that will be reliable, economical to lubricate, and one that will operate with a minimum amount of friction without the use of rollers the truck illustrated herewith was invented and developed by J. F. Fox, of Birmingham, Ala., and manufactured by the Southern Wheel Co.



Cross-Section of Truck

The main feature of the construction is the axle, which is made of extra-heavy steel tubing, and acts as a reservoir for the lubricating grease. This lubricant is fed out of the open end of the axle into the wheel hubs by the side motion of the car and the force of gravity. This method produces practically a bath lubrication.

The wheels are held in running position by means of a round rod, which passes through the axle and the wheels and is secured at the end by means of a split nut and through bolt which clamps the nut on the rod. Since the fastening rod is free to turn with the wheels there will be no friction, and therefore no wear between the wheel hubs and the nuts, except the small amount due to the difference in velocity of the wheels in rounding curves.

This method of fastening is extremely simple as removing one small nut releases the wheels and axle from the car and furnishes a frictionless wheel fastening that cannot be destroyed by wear.

These trucks have been tried out for the past 15 months under the most severe conditions by the largest operators in the Birmingham district, and have fully met the expectations of the designer, and are filling a long-felt want in the mining industry.

Beehive Oven Coke

By a Pennsylvania Superintendent

SYNOPSIS—Coke ovens were first employed in the United States in 1841. Although Connellsville coke is regarded as a standard with which to compare other metallurgical fuels, byproduct ovens, on account of their greater economy, are steadily increasing in numbers.

To those who are not familiar with the usages in vogue when coke was first made in this country, I will outline briefly the original methods employed. Coke was first made in this country in 1817. It was not burned in bee-hive or rectangular ovens but in pits in the ground. The coal was taken from the Pittsburgh or what at this time is better known as the Connellsville seam. Many experiments were made in using this fuel for iron smelting, etc., up to 1825, while the first reliable information we have on coke ovens relates to the year 1841.

The U. S. Geological Survey has published a report showing the progress of the manufacture of coke as follows:

COKE IN THE UNITED STATES

Year	No. of Companies	No. of Ovens Built	No. of Ovens Being Built	Coal Used, Tons	Coke Prod., Tons	Yield
1880	186	12,372	1159	5,237,741	3,338,300	63%
1890	253	37,158	1547	18,005,209	11,508,021	64
1900	396	58,484	5804	32,113,543	20,533,348	63.9
1901	423	63,951	5205	34,207,965	21,795,883	63.7
1902	456	69,069	8758	39,604,007	25,401,730	64.1
1903	500	79,334	6175	39,423,525	25,274,281	64.1
1904	506	83,599	4430	36,531,608	23,661,106	64.8
1905	519	87,564	4751	49,530,677	32,231,129	65.1
1906	532	93,901	4519	55,746,374	36,401,217	65.3
1907	552	99,680	2546	61,946,109	40,779,564	65.8
1908	551	101,218	2241	39,440,837	26,033,518	66.0
1909	579	103,982	2950	59,354,937	39,315,065	66.2
1910	578	104,440	2567	63,088,327	41,708,810	66.1
1911	570	103,879	2254	53,278,248	35,551,489	66.7

IN PENNSYLVANIA IN 1911 THERE WERE

Bee Hive Ovens		Byproduct Ovens		Total Number	
Built	Building	Built	Building	Built	Building
53,612	971	1292	300	54,904	1271

From the above may be seen the steady gain in byproduct ovens.

The chief requisite in coking is to obtain from any given quantity of coal the maximum amount of coke with the least consumption of the fixed carbon of the fuel. A bee-hive oven is a circular vaulted firebrick chamber built on a good foundation of tamped clay. An opening is left in the top whereby the oven is filled. This also allows the gases evolved in coking to escape. An arched door is provided at the bottom through which the coke is drawn.

The Quality of Materials Used Means Much

Care must be taken in the choosing of brick, tile for the bottom, jambs for the doors and arches. As the oven attains a great heat, 2000 to 3500° F., it is necessary to use material which will withstand this high temperature. The filling is an essential part in the construction of ovens. Filling which has lime or iron in its make up should not be used as when the oven attains its greatest heat, these constituents become viscous, run, make holes in the brickwork and cause the ovens to cave in.

To get good coke, ovens must at all times be kept in good condition. Crowns should never be exposed, but should have from 8 in. to 18 in. of good loam filling to take care of winds and rains and hold the heat to insure the quick ignition of the coal, thereby producing at all times the maximum amount of coke from the coal charged. It is better to overcharge an oven than to undercharge it because the maximum heat should be retained as nearly as possible, up to the time when the oven receives its next charge.

In the making of good coke, leveling is one of the most important processes. Either through ignorance or neglect on the part of superintendents, and other officials, this detail is usually left to the levelers, who are not always properly trained to the work, and who, being paid by the piece, naturally desire to level as many ovens in a day as possible.

Improper leveling leaves different heights of charge which coke to the bottom in different periods of time, with the result that the top surface of the coke is exposed to the action of the air admitted for the completion of the process and some coke is burned and lost. On the other hand, the high places will not entirely coke through and leave black butts and part coke or coal on the bottom.

Coke Varies Physically and Chemically

Coke varies in external appearance, physical properties and chemical composition. It may be dull gray, light gray, or light gray and silvery in color. It may be rough, but that part of the charge next to the walls of the oven is often smooth.

The color of coke is due mostly to the kind of coal it is made from. Coke should only be watered once, both to insure a good appearance, and to keep heat in the ovens. Watering should not be done with part of the door up, as this floods the oven and cools the bottom, thus retarding the catching up of the following charge, not allowing it a sufficient time to burn, thereby either lowering the quality or decreasing the tonnage secured.

All coke is more or less cellular, generally it is permeated by a fine system of inter-communicating pores.

Pennsylvania has from the beginning of coke making in the United States maintained the supremacy in production. The bee-hive oven coke from the Connellsville district is still considered the standard coke.

Some time ago, ovens were not expected to yield over 66 per cent. of the weight of coal charged, but now it is a superintendent's or yard boss' business to get the greatest yield possible. In many cases in the Connellsville field 70 per cent. of coke is taken from the ovens. This is brought about by employing coke burners—men who know just when an oven has reached the state wherein the different changes have taken place and a further continuance of the process would result in waste. The oven is then sealed up and held to this stage until drawn.

The making of coke, while not the most pleasant kind of work, is yet very interesting, for what will apply to one locality will not in many cases hold good in another. The coke maker must determine the condition of the charge from the flame given forth through the tunnel head and be guided accordingly.

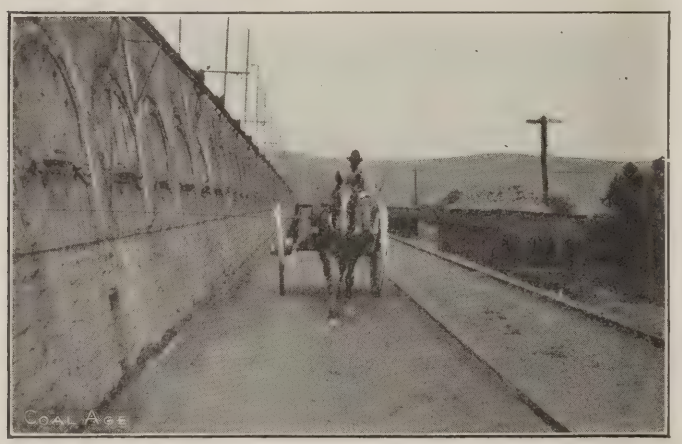
The Denbo Mine of the Reliance Coke Co.

SYNOPSIS—A modern plant erected with uptodate rapidity and producing with economy the limited demand of the ovens which it is to supply.

There is an atmosphere of satisfaction about the ordinary coke plant, which compares somewhat strangely with the evidences of strain around the ordinary coal mine, for the most manifest condition at a shipping colliery is the daily striving to beat a previous record. There is no rest; the record once established will have to be broken tomorrow. But in the coke plant, there is a fixed limit. Once it is reached safely, the need for increased output is entirely at an end, and the management has time to approach questions of efficiency and economy.

The Coke Ovens

The plant at Denbo has nearly reached its maximum tonnage—just enough to supply with coal the 200 ovens in blast and the 106 houses in the mine village. There



A View of the Coke-Oven Yard, Showing the Projecting Track at the Tops of the Ovens from Which the Doors Are Hung before Being Opened

are 36 ovens not in commission, and when another 64 are built, the plant will increase its output accordingly and mine about 1000 tons per day. But a deep ravine cuts off the ground suited to this extension, and consequently it may be some time before the ovens are built.

The ovens are of the Mitchell type, 30 ft. long, and the doors by which they are closed are illustrated in an article in this issue entitled, "Some Types of Coke-Oven Doors." The ovens are built entirely without any taper from one door to the other, and there is no difficulty in pushing them despite that fact. The coke shrinks sufficiently on cooling so that it does not bind in the oven. The equipment of the ovens does not vary in any way from the ordinary battery of Mitchell ovens with machine operation, except perhaps in the doors, and consequently further description is unnecessary. Each oven is charged three times a week, the furnace-coke charge being about 27 or 28 in. deep and the foundry about 33 inches.

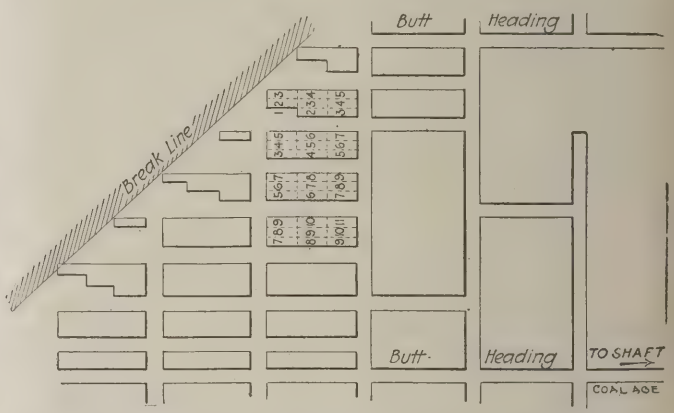
The Shaft and Storage Bins

The mine shaft is 78 ft. deep, so that the coal is at a level with the bed of the Monongahela River. Yet, though the valley is narrow, so that it is hard to find room for town and plant, there is little water in the mine. The headframe is of steel and was erected by the Riter-Conley Mfg. Co. It has self-dumping cages, and the coal falls, on being dumped, into a 200-ton capacity steel bin.

It is then crushed in a crusher, manufactured by the Williams Patent Crusher & Pulverizing Co. This reduces the coal till it will all pass a screen of 2½-in. mesh. The coal is not washed, but goes directly to an 800-ton steel bin, where it is stored and discharged into the electric larries for distribution to the coke ovens. These were supplied by the Connellsville Manufacturing & Mine Supply Co., but are of a special design.

The Power Used Underground

The bed mined is the Pittsburgh, and the coal is from 7½ to 8½ ft. thick. Consequently, a 2-ton car is used. This is made of wood and holds 50 bu. when loaded level full. To make it stiff, it has a strong steel bottom frame.



Proposed Method of Mining at the Denbo Mines. Shortwall Machines Will Be Used. Cuts Will Be Taken in the Order in Which They Are Numbered

At present the gathering is performed by horses, but General Electric locomotives are operated on the main entries. It is the intention eventually to dispense with animal power throughout, substituting electric locomotives in its place.

The current used in the mines is at a pressure of 250 volts, and is generated by two 250-kw. Westinghouse dynamos. This current actuates not only the haulage motors, but the coal crusher, all the oven machinery, three Goodman breast machines, two Sullivan shortwall cutters and the hoisting machine by which material is lowered into the mine. The hoisting of coal is not performed electrically, but by a Vulcan 24x30-in. hoist.

Coke Breeze Furnishes Power

The three 350-hp. Rust boilers are fired with coke breeze, which is hauled from the ovens by horses and carts, and dumped above the boilers. The slope of the hill enables these to be set at a low level, so that the breeze need not be elevated. A little coal is mixed with the fine coke, and the mixture is fed to the boilers by Parsons

stokers. The boilers are capable of 100 per cent. overload. A 150-ft. steel stack, 6 ft. in diameter, supplies the draft. One man tends the boilers and another the generator and hoisting engine. The boiler ashes drop down into bins over a tunnel and are removed by small industrial cars.

The Underground Conditions

The coal is cut on the bottom of the seam and shot down with Miner's Friend "Safety Powder" exclusively. There is a good 30-ft. sandstone roof above the 10-in. draw slate and 10-in. rooster coal. Ventilation is secured by a 14-ft. Jeffrey blower fan having 4-ft. blades. This is capable of supplying 250,000 cu.ft. of air per min. at 6 in. of water gage. Ultimately, the fan will be used as an exhaust. As the mine is damp, the entering air is not moistened with steam.

The second opening is the material slope, the hoist of which was previously mentioned. This is 250 ft. long and concreted at the top, bottom and side. The mouth of this escapeway is shown in the accompanying illustration. The whole shaft bottom is supported by 15-in. I-beams at 6-ft. intervals, resting on other 15-in. I-beams, which are themselves carried by brick pillars which are spaced 12 ft. apart and are 18 in. square. All the



The Concreted Slope Serving as Second Opening, Manway and Material Hoistway with Coke Ovens and Yard in Rear

brattices in the mine are of brick set in cement, and all doors on the airways are of steel.

The track in the bottom is of 65-lb. steel; the haulage roads are laid with 45-lb. steel and the rooms with 20-lb. Wood ties are used throughout the mines. The mine is being worked on the room-and-pillar system, but the plan of shortwall mining, illustrated in the accompanying figure, is proposed and will probably be installed. It is said that in another mine, in a working area 900 ft. long and 900 ft. wide, a tonnage of 1500 tons a day was obtained using this system. The butt headings will be about 300 ft. apart and the room crosscuts will be made about every 35 ft.

The general appearance of the plant is strongly in its favor. The power and repair houses are both of brick and are covered with cement tile. The repair shop measures 40x100 ft. and contains in the blacksmith, carpenter and machine shops, all the tools needed for rapid mine-repair work.

Quick Construction Work

That the mine is quite new and that all due speed was used in opening it, can be judged from the fact that the shaft was not started till October, 1912. The coke ovens were put into operation September of the following year. The headings to be driven before coal could be obtained in operating quantities were quite lengthy, between 3200 and 3800 ft. long. This was because the shaft had to be sunk at the edge of the coal territory. However, this driving was speedily effected, the headings each progressing 65 ft. a week with only two shifts at work. Goodman breast machines were used, which sumped 7 ft., assuring 6 ft. 6 in. of actual progress per cut. No work was done on Sundays.

The town is more than usually pleasant, though the miner's houses are all double. There are six foremen's houses, all piped with hot and cold water and fitted with baths and electric lights. There are 50 five-room and an equal number of four-room houses for miners. Each has an outside closet, with an outlet to a sewer. This is flushed occasionally, the water passing into a large cesspool.

The town is netted with a 4-in. water line, carrying river water and affording fire protection. The supply for drinking is derived from wells bored about every 300 ft. These are cased for about 35 ft. of their depth. The wells are from 50 to 60 ft. deep, excellent water being found in the sandstone above the coal.

No Smoke and Many Healty Trees

The houses are placed up the river, so that the full length of the steam plant and a little park lies between the ovens and the bulk of the town. That little park is itself the best evidence of the truth of the assertion that only about three times in two years has the wind blown up the river and carried the smoke formed at Denbo and at Alicia, which is across the river, toward the mine houses. The little trees are quite fresh and healthy. The town is lighted throughout with 150-watt Mazda lamps. There is a two-story commissary with cemented cellar and a refrigerating plant for cold storage and ice-making.

Fritz Hofwing is manager and mining engineer, and G. C. Landis, of long experience in the coke business, is superintendent.

Pacific Coast Collieries Co.—In connection with a new bond issue this company has made the following statement re its properties: The holdings comprise large coal areas owned, licenses, rights, etc., on the east coast of Vancouver Island, mine plants, railways, employees' houses, docks, surface lands, timber lands, a terminal property of over 100 acres at deep water on Boat Harbor, with bunker (storage capacity, 4000 tons), and washing and sizing plant of an output of 900 tons per day (less than half the output of coal is to be washed). On the South Wellington and the Suquash properties alone there is estimated to be over 200,000,000 tons of coal. The coal in the South Wellington Mines is a high-grade bituminous coal, for both steam and domestic use. The Suquash mine, upon which development work was started only very recently, is situated about 100 miles north from the South Wellington Mines.

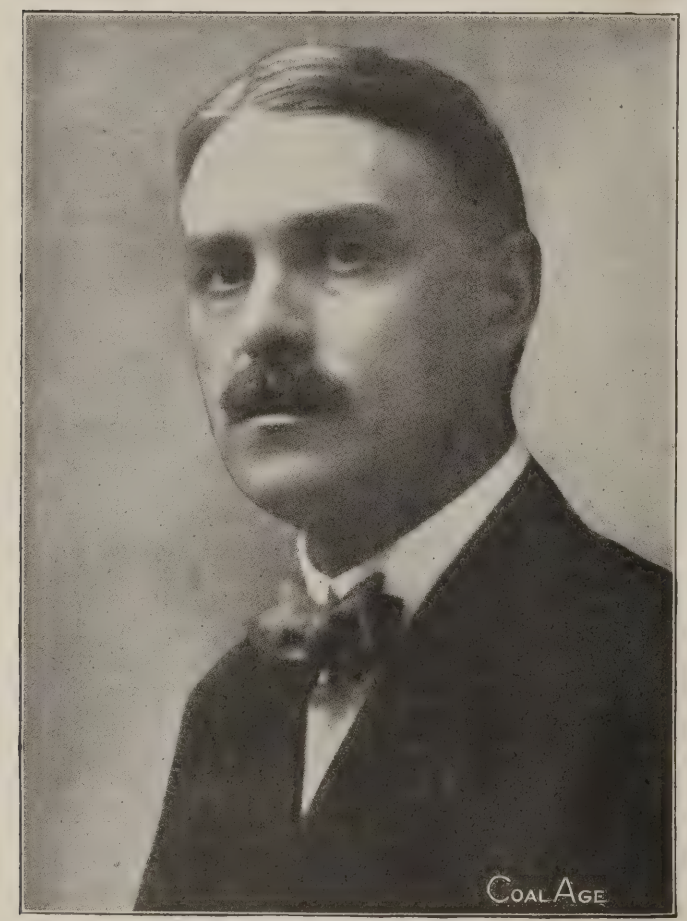
With the completion of the 12-mile railroad, and with the equipment now being installed, the company will be able to handle up to 2000 tons per day.

Sinking fund from May 1, 1915, 7c. per ton of 2240 lb. run-of-mine coal, the minimum annual $60,000, to redeem the bonds at not over 105 and interest.

Wellington Mines Nos. 1 and 2 have been in operation for some years, while No. 3 mine is practically now ready for production. Two 650-ft. shafts having been sunk and equipped for an output of 1500 to 2000 tons a day. Exclusive of the Suquash property, the General Manager estimates the production from Wellington Mines Nos. 1, 2 and 3 for the year 1914-15 at 400,000 tons and for 1915-16 at 750,000 tons, on which basis they should show, after allowance for deple-

Who's Who in Coal Mining

The Allegheny River Mining Co., with headquarters at Kittanning, Penn., is one of the live coal corporations of the Keystone State. At the present time the output of this company's mines is about 9000 tons per day. Several new mines are under construction or have been planned. The progressiveness of the Allegheny company is principally due to the determined efforts and shrewdness of its president, Dwight C. Morgan. He is the mainspring of the company's present organization and is regarded generally as a most important factor in Eastern coal-mining circles.



Dwight C. Morgan

Mr. Morgan was born at Dwight, Ill., in 1868. He comes of a line of ancestors of wide reputation in science and engineering. He is descended from Dr. Richard Price, who was famous as an economist. His grandfather was Richard Price Morgan, Sr., a graduate civil engineer, who made the first surveys for the New York Central & Hudson River R.R., and the first surveys for the Chicago & Galena Union R.R., which was the first steam road built out of Chicago. His father, Richard Price Morgan, Jr., also a civil engineer, is generally known as the father of the elevated railroad system of New York City. He was greatly interested in the development of engineering in American universities and was given the degree of Doctor of Engineering by the University of Illinois.

After receiving his early education in the public schools of his native town, Mr. Morgan graduated from the University of Michigan, in 1893. Aside from being president of the Allegheny River Mining Co., he is vice-president and director of the Pittsburgh & Shawmut Railroad Co., president and director of the Allegheny River Realty Co., director of the Armstrong County Trust Co., and president of the Allegheny River Improvement Association for river navigation between Pittsburgh and Oil City.

In his earlier days, Mr. Morgan was engineer in charge of the valuations of the railroads of Minnesota and at one time was commissioner of the United States Supreme Court to settle the boundary-line dispute between Iowa and Missouri.

He is a member of the Western Society of Engineers, Duquesne Club, Railway Signal Association and Pittsburgh Traffic Club, and has lectured on engineering topics at the Universities of Illinois and Minnesota.

Fire at Cinderella, W. Va.

A fire occurred recently at the mines of the Sycamore Coal Co., at Cinderella, W. Va., and five men who were in the mine at the time were suffocated. It is said that more would have been in the mine and would have succumbed to a like fate had they not stayed on the surface to celebrate appropriately the first day on which West Virginia "became dry." The fire broke out late in the evening of June 30.

Cinderella is a new plant, built by G. S. and S. W. Patterson, of Vivian, W. Va., the proprietors of the ill-fated Bottom Creek mine. It is located east about 4 miles from Williamson, in Mingo County. The company is mining two seams of coal, the Coalburg and Winifrede, roughly 60 ft. apart, both ventilated by the same fan. Fire, probably originating from crossed electric wires, started in the fan house, destroying that structure. Apparently the fan continued to run and forced the fumes down into the mine, where the men were at work.

The fire in the Coalburg or upper seam was so severe that it destroyed a brattice 40 ft. from the drift mouth, where the first left entry led off. All the men were in this left entry and it was impossible for the rescuers to enter it. As the main entry passes through the mountain, the rescuers were able to reach the fire from the front and behind. In a short time, however, both coal seams were on fire, but with a hand pump the blaze was soon extinguished in the Winifrede seam.

A large pump was brought from Vivian to play on the fire, pipe having been laid for that purpose before the pump arrived. It was thought futile to reach the men through the burning entry, and so Engineer Maurice made a survey in the underbrush before daylight, using carbide lamps, to discover which was the most feasible place for an opening from the surface through which to reach the men. The entry was struck about 2 p.m. on July 1.

The rescuers had no trouble entering as the air was good. A suction fan had been placed in the drift mouth early in the morning to draw out the bad air and lower the temperature and it is thought that had the men retreated to the rear end of the workings and barricaded themselves in, they might have been saved.

According to the U. S. Geological Survey, West Virginia miners work an average of 266 days each year. The only other states that work more days than West Virginia are Utah, where the average is 285 days, and New Mexico, where the average is 284 days per year.

Editorials

Some Psychology

President Wilson recently said that our present financial condition was due to psychological causes and some barren wits have changed his statement and now make him allege that general stagnation of business was psychological and not real. This is untrue; causes may be mental, that is psychologic; conditions never are. In fact, nearly all our present well-being as compared with the ill-being of savages is psychologic.

For the material for well-being was just as much present two thousand years ago as today, but men did not have the present viewpoint which has changed the face of the earth. The change is psychological in its origin though material in its result. We have permitted and shall permit ourselves to use the scholiast's word "psychologic," but perhaps the word "mental" is a better and a less pedantic expression, because the viewpoint is mind itself and would not be changed even if there were no psychology, which is merely the science of the mind.

We have spoken of business, but it is not of the present depression in trade of which we are thinking. We are not going to show that our disease of mind has been the only cause of the decline of business. We are not about to demonstrate that imports have increased only slightly and that we have as much export trade as ever and that England and Germany have also a period of trade doldrums in place of trade winds. Rather, we are proposing to apply psychological truths, that is, facts relating to the mind, to the prosaic questions of coal-land values.

Certain worthy contributors and some enlightened national coal-land officials and a few of our leading experts have tried to base the values of coal lands on the laws of mathematics. As a matter of fact, when a man would buy a piece of land, he asks himself how much he has to spend and whether it will buy him what he seeks to purchase. Very rarely will he say, "A portion of what I desire to purchase sells for so much. If I am going to buy so many portions in so many years at so much per portion, what would be its equivalent now?" And thus it is that first cost of coal land is not based on probable royalties and in fact is usually far less than the present value of current royalty rates.

In fact, it is the allurement of small present expenditures which makes the well-to-do so willing to pay dime and quarter tips, the poor man so ready to buy a bucket of coal at $20-per-ton rates, and the London east-ender so indifferent to the cost of tea so long as he can buy a farthing's worth for his supper.

This readiness to pay in small installments and pay outrageous prices is the reason why pianos sell so readily much above their value and why also coal lands purchasable at $20 per acre have been known to draw the self-same year 10c. per ton royalty with a minimum output placed at 200,000 tons per annum.

And moreover, the rate of interest on which the present-day value is usually figured is so low that the average business man is not well pleased to accept it as a basis for his calculation. It is true in some cases that the coal man has his money in his business year after year without profit and in some years seems to be exchanging his good United States dollars for those of Mexican coinage, yet in his mind, when he buys, he is figuring on 10 or 20 per cent. interest on his money or he will turn the project coldly down. In fact, he will tell you that anyone who figures on 10 per cent. may earn perhaps 5, but if he estimates on 5 per cent., he may find himself without any profit whatever.

The whole basis of figuring from royalty values is wrong until you arrive at the condition when some rich estate of absolutely unquestioned value, having been acquired at a low figure, is held by some heirs of a speculator who are satisfied to get a steady income from the lands. Then, perhaps, it will be found that the royalty rate bears a favorable relation to the present-day selling cost, because the parties are not disposed to sell and regarding the coal as an investment, figure the interest at the rate bonds would bring.

But what the relation actually is between selling price and royalty is not a mathematical but a mental factor and depends not on the laws of interest, but on the personal equation which, to solve, demands a knowledge of human nature rather than of logarithms.

We are not opposed to mathematical calculations. They are excellent things, if people will make them; so are eugenic marriages. But as a matter of fact, few take such careful count, and purchase, like matrimony, has some of the elements of a lottery. If scientists must figure, why not estimate royalty from present value and not *vice-versa?*

When the Miners Celebrate

The celebration of our national holiday presented an opportunity for observing sociological conditions in the mining regions that seldom occurs. With the American warships maneuvering in Mexican waters and the stars and stripes floating over Vera Cruz, perhaps the event this year carried a particular significance. Certainly the true, full-blooded American entered more heartily into the spirit of the occasion and thought more seriously of patriotism and all the latent possibilities connected therewith at the present time.

But disregarding these aspects of the celebration, a study of the rank and file of the mining communities in their gala dress presents interesting food for thought. Especially is this so to the uninitiated public at large to whom the expression "mining camp" usually conveys the impression of a single straggling road, lined with dilapidated shacks, inhabited by a gun-fighting population.

On the contrary there were probably few sections of the country where the day was recognized with a greater patriotism and less disorder than in the coal-mining communities. And the casual observer at a mining village

could not fail to be impressed with the high general average of the men participating in the parades. It is true that the large majority carried the unmistakable stamp of foreign origin, ranging from the swarthy Italian to the fair-haired Pole. But it is equally true that some of these nationalities almost eclipsed the native Americans in their enthusiasm over the occasion.

For example one of the most impressive sections of the Summit Hill (Carbon County, Pennsylvania) celebration was a Slavish company caparisoned with scintillating helmets and brilliant uniforms that evoked spontaneous applause from the assembled throngs. In the ultimate analysis, it is upon these men that we must depend for the brawn and sinews to keep the wheels of our industries moving, and this hearty support and hopeful intent are most gratifying to observe.

A salient feature of the celebrations generally was the note of good living and general prosperity that pervades the districts. The paraders as a whole were a sturdy class, clear-eyed, generally quick witted and with an elastic step that comes only with clean, healthful living. Among the younger generation evidence of a moderate affluence was observed in the cut of their clothes, which was supplemented with a modest finery. Indeed in a "mining camp," the Fourth of July throws a new and interesting side light on the coal industry.

Selection of Mine Foremen

The members of the executive boards of the first, seventh and ninth districts of the United Mine Workers of America met in executive session on June 5 and passed a resolution against the certificating of men as mine foremen or assistants unless they have had experience as practical miners. It is not sufficient, in their belief, that they shall have worked in the mines the statutory period, but that they shall have dislodged and loaded coal for that period of time.

We can hardly blame the workingman for that stand For hundreds of years the educated classes have kept up their aristocratic domination by urging that only those who had spent so many years in college were fit or could be fit for employment in certain preferential occupations and offices. There was enough logic in the stand to make it appear plausible and men who had brains and education but not the mere residence in college were effectually excluded, and men who had neither brains nor real education but the required amount of residence received the emoluments and controlled the offices.

Which was all wrong, and so is the restriction of mine foremanship to miners. A fit man should not be excluded if he has the qualifications. A knowledge of mining is not only to be gotten at the end of the pick or the handle of the drill, though many a good thinker is loading coal. In fact, this desired restriction is class legislation in another shape.

Our consideration of the matter thus far has been based on the idea that the miner desires this restriction because he wants to reserve all the official jobs around the mines for himself, but as large an element we readily concede is the desire to have in authority men who are expected to be competent and considerate instead of men whose experience is different and whose sympathies are not with the men they control.

As far as competency is concerned, the mining operation will, from year to year, become more and more the work of machines, and increasingly will it be important for the men in authority to understand them. Nor do we believe that competency consists alone in knowing how things have been done in the past. The really competent man is the man who discovers a new way, and such men are quite frequently those whose line of work or even of life has been a trifle different to that pursued in the occupation of which they eventually come into control.

For instance, the complete stranger in pitching mines wonders at the loose way in which steep slopes are unguarded. He wonders if it is necessary to omit hand rails and ladderways in steep pitching breasts. The miner scoffs at these dangers and he knows they must continually be faced under normal conditions at the breast, and he has grown so calloused to them that he does not seek their removal where a remedy is simple and inexpensive. Now, while the mine foreman should certainly never be so ingenuous as a complete stranger, we believe that there are men who have worked five years around the mines who will see errors in mining methods that the miner will never see.

As to the matter of sympathy and solidarity, we think also that permitting other workingmen in the mines than miners to qualify for foreman is to be commended. There is no one so much in sympathy with the miner as the man who has never entered a mine. Those who have worked in them but have not done the laborious work are more prone to be thoughtful of the miner's difficulties and dangers than a miner himself.

Who is worse to work for than a man who, being told that there are six inches of water over the rail in a gangway which should be removed, responds with an oath that it was always that way in some place or other in the mines when he was digging coal. There are many workingmen in authority who can never forget how soon they went to work, how low some of the coal was, how long they waited for cars, how much water they had to wade, how murky was the air and how dangerous the place, and they take a sort of unholy delight in perpetuating the past and in pleading that such inconveniences and dangers are and ever must be a part of the business Whereas, put a man with a somewhat different line of experience in charge and all these things seem unnecessary.

In fact, it has been a surprise, and not altogether a pleasure, to see how the miner who has gotten into office as foreman or inspector will often be more considerate of corporation purses than the operator himself would be if he were put in the same place. "What has once been endured, can be endured again," is the complacent motto of many of such one-time miners.

Do not misunderstand our position in this matter. Mine foremen, of course, should have had much experience in the mine, but it is not by any means certain that the miner will be best cared for if all appointments are made from those of his own vocation.

It is estimated that the provision of electric cap lamps for the miners of the Pittsburgh district will cost the coal-producing companies $2,500,000. Alterations to the coal tipples of Ohio to enable the operators of that state to conform to the new anti-screen law will necessitate an outlay of $2,000,000. These two instances illustrate the enormous expense which is incurred by the industry in making the comparatively trivial changes which working conditions, agreements, or statutes render necessary.

Legal Department

When Is Coal Delivered to Buyer?

By A. L. H. Street*

SYNOPSIS—The New York Supreme Court, Mr. Justice Kruse dissenting, decides that the seller, and not the buyer, of coal must bear the loss which accidentally occurred while it was awaiting unloading.

The question whether the buyer or the seller of two boatloads of coal should bear loss arising while the boats were waiting to be unloaded, was involved in the case of Westmoreland Coal Co. vs. Syracuse Lighting Co., 145 *New York Supplement,* 420, which was recently before the Appellate Division of the New York Supreme Court, fourth department. It was decided that there had been no such delivery of the coal as to pass title to the buyer, and that, therefore, the loss fell on the seller.

Plaintiff sold defendant 50,000 tons of coal to be delivered "alongside" defendant's dock at Syracuse. The two boatloads involved in this suit approached to within 300 or 400 ft. of defendant's dock, which is on a canal, but they could not be docked and unloaded because two other boats then occupied the dock. Accordingly, to comply with rules governing traffic on the canal, the boats in question were moved by the carrier to the side of the canal opposite the dock to await their turn for unloading. Defendant was notified of the arrival of the boats, and entered them on its books as having arrived at the dock. Two hours later, a break occurred in the canal, and without any fault on the part of the plaintiff the boats and their cargoes were drawn into the break and lost. On these facts the Supreme Court held:

The Carrier as the Seller's Agent

"If the coal in question had not been in fact delivered to the defendant before it was lost, then the carrier still remained the agent of plaintiff for the purpose of making delivery of it under the contract. It is clear that the carrier's duty in making the delivery had not at that time ended. He still had to place the boats alongside defendant's dock. This he had not in fact done, though the boats at one time had approached within a few hundred feet of the dock. . . . Defendant was not responsible for this delay in laying the boats alongside the dock. . . . Plaintiff was fully advised before the contract was made that the capacity of the dock was limited, so that only two boats could be unloaded there at the same time." The court concludes that the carrier, in taking the boats to the side of the canal opposite the dock, was acting as the seller's, and not the buyer's, agent.

Entry of Arrival No Acceptance

According to the decision, the fact that defendant entered on its books the arrival of the boats does not show an acceptance of the coal by defendant; the entry being merely a concession to plaintiff's interest for the sole purpose of fixing a time from which subsequent possible claims of boat captains against plaintiff for demurrage could be corrected and verified.

Answering a contention made by plaintiff that when it placed the coal on the boats there was an appropriation of it in fulfillment *pro tanto* of the executory contract for delivery of coal, the court said:

"While this may have been an actual appropriation by plaintiff to that end, yet it did not complete what it had agreed to do before title passed to the defendant. . . . Delivery of the coal at the place specified in the contract was required to be made, and then only would the defendant's assent to such appropriation in part fulfillment of the contract be established."

Mr. Justice Kruse, presiding judge of the court, refused to concur with the holding reached by a majority of the justices constituting the court, and adhered to an opinion that title had passed to the buyer and that the loss must fall upon it. Judge Kruse said in part: "If there was an appropriation of the specific coal to the contract, assented to by the defendant after the coal reached Syracuse, as I think should be found as a fact from the evidence, the title passed to the defendant, and the loss must fall upon it. . . . Not only did the defendant know the precise time and place of arrival of the coal, but a record of the quantity, as well, was made by it."

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Recent Judicial Decisions

Injury to Miners in Washington Mines—A Washington mine operator is not liable for injury to a miner caused by failure of a fireboss to make tests for gas before firing shots; the boss being regarded as a fellow servant of the injured miner and not a representative of the operator. (United States Circuit Court of Appeals, Ninth Circuit; Pacific Coast Coal Co. vs. Brown; 211 Federal Reporter 869.)

Dangers Against Which Employer Need Not Warn—Although a mine operator owes a duty to his inexperienced employees to warn them against dangers of their work which are unknown to them, there is no obligation to warn against an obvious danger involved in the very nature of the work, as where employees are engaged in timbering a mine. (Illinois Supreme Court, Kalinski vs. Williamson County Coal Co., 104 Northeastern Reporter 1096.)

Consignee's Duty to Unload Shipment—When a car containing a single shipment of bulky freight is placed in a proper place for unloading there is a constructive delivery of the freight to the consignee, especially where the shipment is an interstate one and the railway company has filed with the Interstate Commerce Commission schedules containing a provision that the consignee shall do the unloading. (New York Court of Appeals, Lewis vs. New York, Ontario & Western Railway Company, 104 Northeastern Reporter 994.)

Removal of Coal Near Boundary Line—In view of the West Virginia Statute which prohibits removal of coal within 5 ft. of the line of an adjoining owner's land, a deed to coal underlying a tract described by metes and bounds, giving the purchaser "all the usual mining privileges for the removal of same and every part thereof" from the land, cannot be regarded as authorizing the purchaser to mine within 5 ft. of land retained by the seller. Each separate encroachment subjects the offender to a separate penalty under the law mentioned, and a coal company is liable for its employees' acts whether the officers of the company knew thereof or not. (West Virginia Supreme Court of Appeals, Darby vs. Davis Coal & Coke Co., 81 "Southeastern Reporter," 1124.

Discussion By Readers

How to Buy Coal

[In presenting the interesting inquiry of J. A. Flood, secretary of the Venango Manufacturing Co., Franklin, Penn., p. 39 of the last issue, we offered a few brief comments bearing, in a general way, on the selection of fuel for economic consumption, in the production of power. The remarks were not intended as an answer to the question asked, but to stimulate its discussion. We are glad to be able to publish the following able reply from an authority on the purchase of coal.—ED.]

Referring to the letter of the Venango Mfg. Co., COAL AGE, July 4, p. 39, concerning the price and value of coal based on analyses, permit me to say, in the first place, comments should be made upon the details of this letter and then approximate values can be given.

First. Regarding the analysis and price, given in the first paragraph, for coal to be delivered at $2.05 per ton. From our experience, this would seem an example of a far too common practice of certain coal producers, to take any form of analysis that may come to their hand and use it as representative of their coal. The analysis here shown represents one of the best grades of a highly volatile coking coal and one that would carry with it a quick-sale price, of at least $1.60 per ton, f.o.b. mines, which with a standard freight rate of $1.55, would make the coal, delivered, worth $3.15 per ton.

Second. This coal, used for steam purposes, is a very expensive type of coal. Being a gas coal, high in volatile matter, it would take its place, in sale, with a higher priced gas coal; and, because of its high volatile matter, would be an uneconomical steam producer.

Third. The two analyses made of coal delivered, represent two entirely different coals. Neither one is of the type quoted upon, as shown by the first analysis. It is unnecessary to comment here, in detail, upon these two analyses of deliveries; their value will be shown later. Because of a few minor troubles, such as low evaporation, plenty of shoveling of coal, loss of grate bars, etc., these deliveries would probably cause the loss of all the help in the boiler room, especially in the case of the Car No. 72,494. It would have been economy to have paid for the coal and dumped it in the nearest river.

Fourth. The analysis, given of the Pittsburgh-district coal, costing $2.40 per net ton, delivered, represents, in a way, this type of coal, which also is a highly volatile coking coal. It is not possible to use this analysis in comparison with the other, for the reason that the B.t.u. value of 13,480 is altogether out of proportion for this type of coal, in comparison with the remainder of the analysis. There must be an error in the analysis, or a weathered or extraordinary sample was taken to obtain such results. A normal heat value for such a coal, upon the basis of 1.70 per cent. moisture, would be about 14,150 B.t.u.

Fifth. Now, as to the commercial values of the deliveries of the two cars of coal mentioned, as compared with the quotation of $2.05 per net ton upon the first analysis, comparison may be made in many different ways. We choose, in this case, to compare values by an average of the usual amount of debit and credit, as applied to coal deliveries by corporations buying on specifications. We will use, in this regard, a basis of 2c. deduction per unit (1 per cent.) of ash; 2c. deduction per unit of B.t.u. (100 B.t.u.); and 2c. per unit (½ per cent.) of sulphur. Upon this basis, the value of the delivery representing car No. 62,462, as compared with a price of $2.05 per net ton upon the submitted analysis, will show a value of $1.66 per ton for this coal delivery, with these debits applied. In the case of car No. 72,494, in the same way, the value will be $1.01 per ton. This will show the comparative values of the two deliveries.

Sixth. In order to arrive at another comparison of the relative values of these coals from their analyses, we may reduce them all to a uniform basis of "dry B.t.u." For example:

Analysis No. 1, 14,510 B.t.u. reduced to dry basis, is 14,605 B.t.u.

Analysis No. 2, 13,347 B.t.u. reduced to dry basis, is 13,510 B.t.u.

Analysis No. 3, 11,760 B.t.u. reduced to dry basis, is 11,866 B.t.u.

Analysis No. 4 (corrected), 14,150 B.t.u. reduced to dry basis, is 14,400 B.t.u.

A 100-hp. boiler evaporates in one year (300 days) approximately 9,000,000 lb. of water (30,000 lb. per day). If, from the above dry B.t.u. values, we calculate the evaporation, by dividing the dry B.t.u. by 965 and taking 70 per cent. of such value, as representing the comparative value between the theoretical and practical evaporation factors, or the actual pounds of water evaporated by one pound of coal, assuming a 100-hp. boiler, we find as follows for the amount of each coal that would be used in a year:

Analysis No. 1, 14,605 B.t.u. gives an evaporation factor of 10.60 lb., which shows a requirement of 425 tons of coal for the year, at a price of $2.05 per ton, with a net cost of $871.25.

Analysis No. 2, 13,510 B.t.u. gives evaporation of 9.8 lb., which shows a requirement of 454 tons of coal for the year, at a price of $2.05 per ton, with a net cost of $930.70.

Analysis No. 3, 11,866 B.t.u. gives evaporation of 8.50 lb., which shows a requirement of 529 tons of coal for the year, at a price of $2.05 per ton, with a net cost of $1058.82.

Analysis No. 4, 14,400 B.t.u. gives evaporation of 10.44 lb., which shows a requirement of 431 tons of coal for the year, at a price of $2.40 per ton, with a net cost of $1034.40.

The above comparative figures do not include the relative difference of cost of removal of ashes (local cost reckoned at 20c. per ton) and the effect of lost grate bars, a considerable factor in the case of coal No. 3, Car No. 72,494.

F. P. HARRIS, The Harris Laboratory.

New York City.

The "Safety-First" Call

Letter No. 3—In view of the fact that the larger proportion of our mining population is composed of Latin Europeans, fresh from the feudal agricultural districts of southern Europe, and totally unacquainted with the hazardous nature of the industry in which they engage, the question of properly safeguarding this class has been, is and will continue to be one of serious consideration and vital importance to the people of this country, in both its humanitarian and sociological aspects.

In the solution of this problem, in many cases, the physical man alone is generally considered. While the preservation of life is absolutely necessary, it frequently happens that the misapplication of principles and the injudicious adoption of unsuitable means to this end, make practically impossible the accomplishment of the desired result. No individual can attain to the full dignity of the higher physical, mental and moral development while he is surrounded by conditions that render impossible the full and free exercise of his faculties.

In striving to educate the class of labor that is coming in such large numbers to this country, regard must be had to the conditions that surrounded them at home. The majority of these people are the product of centuries of mental and moral misrule. Their mode of life has been regulated very largely by the law of class distinctions; their mental attainments are proscribed by ignorance and superstition. Their knowledge of civil and moral law is confined to the breach, rather than to the observance of the law. A violation of law is to them *justifiable,* while being caught in the act is *criminal.* In a sense, they are automatons.

Such, in brief, is the raw material that the American mine official must convert into a finished workman. Additional safeguards will not accomplish this end, but will rather perpetuate the ignorance and superstition of their darkened minds. The first requisite to regenerate such a class and give to such men an impetus toward self-improvement is to cause them to feel their individual responsibility for their own safety and that of their fellows. Self-preservation, which is the first law of nature, is supposed to be intuitive; but its recognition as a law, by the individual, involves a sense of responsibility.

And, here, it will be well to recognize a broad principle that any form of safeguarding that goes further than to impart the necessary instruction and to enforce the observance of the mining law and mine regulations by every worker, operates to curtail the sense of individual responsibility and retards the accomplishment of the desired end.

Following this line of action, the foreign workman should be given all possible instructions how to perform his work with safety to himself and others. He should be made fully acquainted with the mining law and mine regulations, and made to understand the danger of violating the same. A strict surveillance should then be kept of the workers, in order to maintain the firmest discipline throughout the mine.

In closing, permit me to emphasize my belief that it is the failure to recognize the absolute need for individual responsibility that suggests a necessity for additional safeguards, which, with proper discipline, should not be required. Perhaps, the chief characteristic of the average foreign worker is a bland, simple and childlike dependence that veils a stategic cunning that is inbred in their nature. This foreign trait too often imposes upon the credulous American mine official, who fails to deal out justice to the foreigner for a violation of law, in the same measure that he would to another worker. Greater safety would prevail in every mine if this feature were more broadly recognized.

T. C. Parfitt.

Jerome, Penn.

Working Coal Seam with Heavy Parting

Letter No. 3—The inquiry on p. 981, June 13, asking if it would be practicable or profitable to work a 5-ft. seam of coal, having a parting in the middle of the seam varying from 6 to 18 in. in thickness, calls to mind an experience I had in working a similar seam in South Wales, some years ago. Although the conditions, in that case, were not as favorable as those described in this inquiry, we were able to work the seam at a profit. In our case there were 18 in. of bottom coal and 2 ft. of top coal, separated by 26 in. of a stone parting. The longwall method was employed in working this seam.

At first, the bottom coal was worked out and the stone spragged. Then, the stone was taken down and after cleaning up the refuse the top bench of coal was dropped. This method proved dangerous, however, many accidents resulting from the fall of stone and coal while mining the lower bench of the seam. On this account, a change was made and the top bench of coal mined first, the stone being then taken out and the bottom bench mined last. The top bench of coal was thus kept about 3 ft. in advance of the bottom coal. This was a great improvement and I do not remember that any accidents occurred after making the change. I believe the same method could be employed in the present case.

My reasons for advising the adoption of the longwall method of mining is that a larger output of coal is produced and the ventilation is kept up to the face, whereby the sanitary condition of the mine is greatly improved. An important feature favoring the use of the longwall method is the fact that no explosives are required for blasting the coal and the latter is obtained in better condition, less fine coal and slack being produced. The mining can be done either by pick or machine, in the parting just below the top bench of coal. The weight of the roof will break the top coal, and this is taken out first. The tendency of the bottom to heave may be sufficient to loosen the remaining portion of the stone; but, if not, a light shot can be placed in the stone above the bottom bench of coal. After the stone is removed and the refuse cleaned up, the lower bench of coal is lifted.

In opening a mine in such a seam as is described in this inquiry, I would adopt the room-and-entry system at first, until I had secured the first weighting of the roof; then I would cut across the pillars at the face and lay a face track, 300 ft. in length, between roadways. I believe this method would prove the most economical one to adopt, as it would eliminate the question of yardage in driving the entries and produce the largest output of coal, at a minimum of cost for haulage and material.

W. James, Mine Foreman.

Mystic, Iowa.

A Longwall Proposition

Letter No. 5—In reply to the inquiry of Mr. Hartsuff, COAL AGE, June 6, p. 944, permit me to say that I consider the conditions he describes as ideal conditions for the adoption of the longwall method of mining. Many years of experience and observation in this class of work leads me to favor its adoption under conditions similar to these.

I recall an instance of a mine having a very hard roof and worked on the *room-and-pillar* system. Great difficulty was encountered by the heaving of the floor. Very often during the working hours, the floor would heave to such an extent on the main-haulage road, that the cars would catch the roof and the haulage of coal had to cease until the trouble could be remedied by lifting bottom. As this happened frequently, it can be well imagined what an item of expense this proved.

The same mine was eventually operated on the *longwall* system with great success. It was found, in this system, that the roof settled firmly on the gobs and packs, so that roof and floor practically came together. I feel certain that the same good results would be obtained in Mr. Hartsuff's case, especially as he states that the bottom heaves slowly in narrow work.

In this connection, allow me to refer to my article on Starting Longwall in Room-and-Pillar Work, COAL AGE, Apr. 25, p. 697, which gives information on the building of packwalls in longwall mining. The cost of shooting down the roof and building the packs should be about $1 per ft. of thickness, per lineal yard. The cost may slightly exceed this when back ripping must be done to keep the roads open, as it will then cost a little more to haul the dirt away and pack it in the gob.

The method of working any seam naturally depends on the local conditions in the mine. Speaking generally, however, the system of mining adopted will be determined largely by the thickness of the coal and nature of the roof, floor and coal. Seams not exceeding 4 ft. in thickness are the best adapted for longwall work because it is possible to build good, solid packs to this height. Longwall work in thicker seams is generally more dangerous because of frequent fall of roof and sides, owing to the insecurity of the packwalls and the lack of a proper amount of stowage. The expense for timber is also greater in thick seams.

To obtain the greatest advantage in longwall work, there must be: A fairly good yielding roof; a moderate thickness of seam; little or no inclination; a coal of moderate hardness; and freedom from slips and other faults and water in the strata.

HARRY MARSON.

Piney Fork, Ohio.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Unequal Splits—To illustrate the formulas used in the calculation of the natural division of an air current between two or more airways and the pressure and power on the air, assume a current of 75,000 cu.ft. per min. is passing in the following three splits, starting from the same point of the main airway or at or near the intake opening. The lengths given for the several splits include the return, in each case; and the pressure and power are for the circulation in the splits only.

Split A, 6 × 10 *ft.*, 2000 *ft. long*; $a = 60$ *sq.ft.*; $o = 32$ *ft.*; $l = 2000$ *ft.*
Split B, 6 × 8 *ft.*, 1500 *ft. long*; $a = 48$ *sq.ft.*; $o = 28$ *ft.*; $l = 1500$ *ft.*
Split C, 4 × 12 *ft.*, 2500 *ft. long*; $a = 48$ *sq.ft.*; $o = 32$ *ft.*; $l = 2500$ *ft.*

The lowest relative values are as follows: Areas, 5, 4, 4; perimeters, 8, 7, 8; lengths, 4, 3, 5.

Relative split pressure potentials, $X_p = a\sqrt{\frac{a}{lo}}$; $X_{pa} = 5\sqrt{\frac{5}{4 \times 8}} = 5\sqrt{0.1562} = 1.976$

$X_{pb} = 4\sqrt{\frac{4}{3 \times 7}} = 4\sqrt{0.1905} = 1.746$

$X_{pc} = 4\sqrt{\frac{4}{5 \times 8}} = 4\sqrt{0.1000} = 1.265$

Sum of potentials, ΣX_p 4.987

Natural division of air current, $q_a = \frac{X_a}{\Sigma X_p} Q$; $q_a = \frac{1.976}{4.987} \times 75{,}000 = 29{,}720$ *cu.ft.*

$q_b = \frac{1.746}{4.987} \times 75{,}000 = 26{,}260$ *cu.ft.*

$q_c = \frac{1.265}{4.987} \times 75{,}000 = 19{,}020$ *cu.ft.*

Total circulation, Q ..... 75,000 *cu.ft.*

To calculate the pressure and power of the circulation, it is necessary to employ the part-potential values, instead of the relative values; thus,

Part potential values, $X_p = a\sqrt{\frac{a}{lo}}$ $X_{pa} = 60\sqrt{\frac{60}{2000 \times 32}} = 1.837$

$X_{pb} = 48\sqrt{\frac{48}{1500 \times 28}} = 1.623$

$X_{pc} = 48\sqrt{\frac{48}{2500 \times 32}} = 1.176$

General part potential for splits, ΣX_{po} 4.636

Pressure, $p = \frac{kQ^2}{(\Sigma X_p)^2} = k\left(\frac{Q}{\Sigma X_p}\right)^2$ $p = 0.00000002\left(\frac{75{,}000}{4.636}\right)^2$

$= 5.2$ *lb. per sq.ft.* (1 *in. w.g.*)

Horsepower on the air, $H = \frac{kQ^3}{33{,}000\ (\Sigma X_p)^2}$ $H = \frac{0.00000002 \times 75{,}000^3}{33{,}000 \times 4.636^2}$

$= 11.9$ *hp.*

The Coal Age Pocket Book

Secondary Splits—Primary splits are best indicated by the large letters, as Splits A, B, C, etc. Secondary splits are named after the primaries in which they occur; thus A_1, A_2, etc., or B_1, B_2, etc.

The corresponding split potentials are indicated thus:

Primary potentials, X_a, X_b, X_c, etc.
Secondary potentials, X_{a1}, X_{a2}; X_{b1} X_{b2},; X_{c1} X_{c2}; etc.
General split potentials, X_{ao}, X_{bo}, X_{co}
General mine potentials, X_o

To illustrate the calculation of the effect of making a secondary split in the above mine, assume the air is again split in C, at a point 500 ft. inby from the main or primary split.

Splits A and B are the same as before, while Split C is now 500 ft. long; Split C_1, 1200 ft. long; and Split C_2, 800 ft. long. The part potential values for the splits are, then,

Split A, $X_p = a\sqrt{\frac{a}{lo}}$ X_a (*as before*) = 1.837

Split B, X_b (*as before*) = 1.623

Split C, $X_c = 48\sqrt{\frac{48}{500 \times 32}} = 2.629$

Split C_1, $X_{c1} = 48\sqrt{\frac{48}{1200 \times 32}} = 1.697$

Split C_2, $X_{c2} = 48\sqrt{\frac{48}{800 \times 32}} = 2.078$

General split potential, $\Sigma X_c = 1.697 + 2.078 = 3.775$

Combining this general potential for Splits C_1 and C_2, with the potential for Split C, in tandem, we have,

Part potential values, (*Tandem circulation*) $\frac{1}{X_c^2} = \frac{1}{2.629^2} = 0.1447$

$\frac{1}{(\Sigma X_c^2)} = \frac{1}{3.775^2} = 0.0702$

Tandem value, $\Sigma\ (1 / X_{co}^2)$ 0.2149

General part potential, (*Primary split C*) $X_{co} = \frac{1}{\sqrt{0.2149}} = 2.157$

Part potential, Split A, X_a = 1.837
Part potential, Split B, X_b = 1.623
Mine pressure potential, X_{po} 5.617

Mine power potential, (*After splitting*) $X_{u2} = \sqrt[3]{5.617^2} = 3.160$

Mine power potential, (*Before splitting*) $X_{u1} = \sqrt[3]{4.636^2} = 2.780$

For a constant power, the quantity ratio is equal to the power-potential ratio; thus,

$\frac{Q_2}{Q_1} = \frac{X_{u2}}{X_{u1}}$; $\frac{Q_2}{75{,}000} = \frac{3.16}{2.78}$; $Q_2 = \frac{75{,}000 \times 3.16}{2.78} = 85{,}240$ *cu.ft. per min.*

Mine pressure, $p = k\left(\frac{Q}{X_p}\right)^2 = 0.00000002\left(\frac{85{,}240}{5.617}\right)^2 = 4.6$ *lb. per sq.ft.*

Power on the air, $u = k\left(\frac{Q}{X_u}\right)^3 = 0.00000003\left(\frac{85{,}240}{3.16}\right)^3 = 11.9$ *hp.*

Inquiries of General Interest

A Coking Question

I would very much appreciate an answer to the question, Can an oven bottom be made too hot when coking coal, and how will this affect the quality of the coke produced?

J. T. MULLEN,

Chestnut Ridge, Penn.

In response to the above question submitted to him, J. R. Campbell, chief chemist, H. C. Frick Coke Co., very kindly sends the following interesting reply.

Referring to your recent communication, permit me to say that I would not like to answer the question, "Can an oven bottom be made too hot to make good coke?", categorically, as by so doing one might easily be led into a controversy. In the genuine beehive oven, the coking process is naturally downward toward the bottom of the oven, in order to produce coke having no cleavage. But, shutting off the draft by closing the dampers in the doors and covering the trunnel-head and allowing the oven to stand thus for several hours, the bottom of the oven may be made hot enough to start coking upward. A cleavage would then result in the coking mass some distance above the bottom, similar to what occurs in the byproduct oven, which, however, is not objectionable as long as the bottom bench is A No. 1 coke. In some instances, the same result is produced by means of flues. In my opinion, coking upward from the bottom of beehive ovens would not always be productive of the best results, as the ends of the coke would be apt to be charred and spongy.

J. R. CAMPBELL.

Everson, Penn.

Study Question--Acceleration of Load in Hoisting

A former examination question answered in COAL AGE some time ago (Vol. 4, p. 357), gave the unbalanced load hoisted in a shaft, including frictional resistance, as 4550 lb., which was the load on the engine. The ascending load, including the weight of the coal, car, cage and friction, was 7700 lb.

Some of us would appreciate a fuller discussion of this problem, showing the method of calculating the acceleration of the load when hoisting. In other words, when starting the loaded cage from the bottom, through what height would it ascend before attaining the full velocity of the hoist (20 ft. per sec.); and, again, at what distance from the upper landing would the engineer close the throttle, so that the ascending loaded cage may come to rest naturally, just above the "keeps?" This is, of course, a purely theoretical question; but it draws attention to the fact that the best engineers, who make the easiest landings, learn the point when to shut off the steam so as to land the cage easily on the "keeps," assuming the ropes are even.

S. A. DRIVER, Supt.,
Sibley Bros. Coal Co.

Warrior, Ala.

Hoisting, in a double-compartment shaft or a balanced hoist, is similar to the operation of the well known Atwoods gravity machine of physics, used for determining the force of gravity by experiment. In this case, the accelerating force is the difference between the descending and ascending loads, or the load on the engine (4550 lb.), while the entire mass accelerated is represented by the sum of these loads. When the loaded cage is at the bottom of the shaft, the weight of the rope hanging in the shaft (640 lb.) must be added to the ascending loaded cage, making the total ascending load 7700 + 640 = 8340 lb. The load on the engine being 4550 lb., the effective descending load is 8340 — 4550 = 3790 lb., and the sum of the two loads is then 8340 + 3790 = 12,130 lb. The acceleration (f), under these conditions, is

$$f = \frac{4550}{12{,}130} \times 32.16 = 12.06 \text{ ft. per sec.}$$

The height above the landing at which the ascending loaded cage would attain the full velocity of 20 ft. per sec., is, then,

$$h = \frac{20^2}{2 \times 12.06} = 16.5 \text{ ft.}$$

When the loaded cage arrives near the top of the shaft, the weight of the rope has been transferred from the ascending side to the descending side, making the ascending load, 7700 lb. and the descending load, 4430 lb. The difference between these two loads, or the accelerating force, is now 3270 lb., while the weight accelerated remains unchanged. The calculation is the same as before, the acceleration being 8.67 ft. per sec.; and the height below the upper landing at which steam should be shut off is then 23.07 ft.

Mining Coal with Heavy Parting

Referring to my previous inquiry, in this regard, COAL AGE, June 13, p. 981, the point I am particularly anxious to ascertain is what will be the probable difference in the cost per ton of producing coal, when workng a seam of clean coal, 4½ to 5 ft. in thickness, as compared with the seam previously mentioned, consisting of two 30-in. benches of coal separated by a dirt parting varying from 6 to 18 in. in thickness. Further, cannot coal be produced as cheaply or even more so, in the working of a 5-ft. seam containing 12 or 14 in. of parting, than in the working of a thin seam from 2½ to 3 ft. in thickness, other conditions of roof, floor and overburden being the same in each case?

FRED MORCK.

Warren, Penn.

In attempting to answer this question, it must be considered whether the extra coal in the 5-ft. seam with a 12- or 14-in. parting will pay for the handling of the dead material in the parting. In most cases, this question would be answered in the affirmative. In actual practice, much will depend on whether the dirt in the parting can be separated readily from the coal and whether it can be mined or if it will require to be blasted from the seam. These practical conditions always determine the question of economical mining. We shall be glad to have the question fully discussed as it has an important bearing on the mining of many seams in different coal fields.

Examination Questions

Mine Managers' Examination Held at Springfield, Ill., June 15, 1914

(Continued from last issue)

Ques.—The distance between a pair of cross-entries is 500 ft.; from the main entry to the boundary line is 1000 ft.; the thickness of the seam is 6.5 ft.; and the loss or wastage, in slack and dirt, is 15 per cent. The specific gravity of the whole seam is 1.3. Estimate the tonnage of coal that can be mined from this block, if 25 per cent. of the coal is left for pillars.

Ans.—The coal having a specific gravity of 1.3 weighs in the solid $62.5 \times 1.3 = 81.25$ lb. per cu.ft. The number of cubic feet of solid coal per ton is, therefore, $2000 \div 81.25 = 24.6$ cu.ft. Allowing 15 per cent. for loss in mining and 25 per cent. for pillar coal not to be taken out, the coal mined is $100 - (15 + 25) = 60$ per cent. of the capacity of the seam. The cubic capacity of the coal mined is, therefore, $0.60\ (500 \times 1000 \times 6.5) = 1{,}950{,}000$. Under the assumed conditions, therefore, this volume of coal represents a tonnage of $1{,}950{,}000 \div 24.6 = 79{,}269$ tons; or, say 80,000 tons.

Ques.—With a fan 8 ft. in diameter, making 250 r.p.m. and passing 62,000 cu.ft. of air per min., if the water gage reads 1 in., what is the equivalent orifice of the mine?

Ans.—The term "equivalent orifice" is antiquated, and the question is, further, somewhat misleading in giving the diameter and speed of the fan, as these factors do not enter into what has been understod as the equivalent orifice of the mine, which is

$$\textit{Equivalent orifice} = \frac{0.0004 \times 62{,}000}{\sqrt{1}} = 24.8\ \textit{sq.ft.}$$

As applied to the fan, this term is a misnomer, for the reason that fan calculations are all made on a basis of power. A centrifugal fan has no fixed ratio of water gage to quantity, which depends on the mine resistance.

Ques.—A tank measures 3x4 ft. and is 2 ft. deep; it is made of ½-in. boiler plate. If placed in water, how deep would this tank sink?

Ans.—The superficial surface of the bottom of the tank is $3 \times 4 = 12$ sq.ft.; and that of the sides, $2 \times 2\ (3 + 4) = 28$ sq.ft., making the total superficial area of the tank $12 + 28 = 40$ sq.ft. Allowing 10 lb. per sq.ft. for each ¼ in. of thickness of the boiler plate, the weight, in this case, is 20 lb. per sq.ft. of surface, which gives for the total weight of the boiler plate $20 \times 40 = 800$ lb. To this must be added, say 10 per cent. to allow for the additional weight of laps and rivet heads at the joints, making the total weight of the tank, say 880 lb.

The depth to which this tank will sink is determined by the volume of an equal weight of water which it displaces. The volume of this water is $800 \div 62.5 = 14.08$ cu.ft. The area of the bottom being 12 sq.ft., the depth to which the tank will sink is $14.08 \div 12 = 1.173$ ft., or, say 14 in.

Ques.—A tank measures 4x4 ft. and is 5 ft. deep; when placed in water, it sinks 9 in. What is the weight of the tank?

Ans.—The depth of the tank (5 ft.) does not enter this calculation. The area of the bottom of the tank is $4 \times 4 = 16$ sq.ft. Since 9 in. is ¾ ft., the volume of water displaced is $¾ \times 16 = 12$ cu.ft. The weight of this water, which is also the weight of the tank, is, then, $12 \times 62.5 = 750$ lb.

Ques.—If a seam of coal rising 1 in 8 meets an upthrow fault 12 ft. high, how far back would a tunnel rising 1 in 5 require to be started in order to reach the coal at the top of the fault?

Ans.—Assuming the rise in each case is based on horizontal measurement, and that the upthrow fault is vertical, and calling the required distance back for starting the tunnel to meet the seam beyond the fault, x; since the rise of the seam is 1:8, its total rise in this distance is $x/8$. Likewise, the total rise of the tunnel in the same distance is $x/5$. The difference between these two rises or the amount of upthrow being 12 ft.,

$$\frac{x}{5} - \frac{x}{8} = 12$$

$$8x - 5x = 40 \times 12 = 480$$

$$3x = 480;\quad x = 160\ ft.$$

The tunnel must therefore be started back 160 ft.

Ques.—Two shafts are on the same surface level and each is 300 ft deep. The water gage at the bottom of the upcast shaft reads 29 in. What will it read at the bottom of the downcast?

Ans.—This is an unintelligible question. The given reading (29 in.) may refer to the reading of the *barometer* at the bottom of the upcast shaft, instead of a "water-gage" reading, as stated. It would be impossible, however, to tell what the reading of the barometer would be at the bottom of the downcast shaft, without knowing the reading of the water gage, due to the mine resistance. This water-gage reading has evidently been omitted from the question. However, assuming, for sake of convenience, that the water-gage reading is, say 2.72 in.; since mercury is 13.6 times as heavy as water, the corresponding difference in barometer readings, due to the mine resistance, would be $2.72 \div 13.6 = 0.2$ in. In this case, the reading of the barometer at the bottom of the downcast shaft would be greater than that at the bottom of the upcast shaft by 0.2 in.; or the reading at the downcast shaft would be 29.2 in., under these conditions.

Ques.—The depression produced by a fan is equal to a 1-in. water-gage, and the fan is consuming 10.4 hp. If the efficiency of the fan is 60 per cent., how many cubic feet of air is the fan producing?

Ans.—The efficiency of the fan being 60 per cent., the power on the air, in this case, is $0.60(10.4 \times 33{,}000) = 205{,}920$ ft.-lb. per min. Since 1 in. of water-gage corresponds to 5.2 lb. per sq.ft., the quantity of air in circulation is $205{,}920 \div 5.2 = 39{,}600$ cu.ft. per min.

Coal and Coke News

Harrisburg, Penn.

Bills for the state tax of 2½ per cent. ad valorem on the anthracite coal prepared for market were mailed by the auditor-general to 110 coal companies of the state on July 1. The bills will run close to $2,300,000, and the companies will have the usual period in which to pay or appeal to the courts.

The bills are for the tax on the output for 1913, being calculated on the reports filed by the companies. The sending of the bills is independent of the action now pending in court to test the constitutionality of the act, on which briefs were recently submitted by a number of companies and by the attorney-general.

What Is a Miner?

An answer to the mandamus proceedings brought to prevent issuance of certificates as mine formen or assistants to miners who, it is claimed, did not have five years' experience cutting coal will be filed in the Dauphin County Court at an early date, and in all probability the case will be argued before the end of the summer. The action was brought by the United Mine Workers of the Schuylkill region and raises an interesting question of what constitutes experience as a miner. The preparation of the state's side of the case has been delayed by the illness of Chief of Mines James E. Roderick, whose department will be represented by Deputy Attorney-General J. E. B. Cunningham.

Miners throughout the state are paying particular attention to this mandamus proceeding, as the chief of the Department of Mines holds that five years' experience in mining does not necessarily mean five years' actual work at the face, cutting coal. The miners' attorneys contend that miners must work five years at the face. The decision will affect hundreds of miners and may have an important bearing on the miners' certificate law, as well as on the bituminous miners.

Some Railroad Rates

The Public Service Commission has granted permission to trunk line carriers to postpone until Oct. 29 the tariffs previously issued by them providing for charges for so-called spotting service performed by such carriers. The tariffs were originally issued to become effective May 27, but by permission of the commission were postponed until July 1, and are by this latter action again postponed until Oct. 29, to which date such issues were postponed by the Interstate Commerce Commission. This has the result of delaying until Oct. 29 any attempt on the part of the carriers to enforce charges for spotting on either interstate or intrastate traffic.

The Pennsylvania R.R. on July 3 filed with the Public Service Commission a joint answer in behalf of the Northern Central, Philadelphia, Baltimore & Washington, Cherry Tree, Dixsonville & Monongahela railroad companies that the rates complained of by the Spreckels Sugar Refining Co. on coal consigned to Philadelphia for harbor delivery have been canceled and wants the complaint dismissed.

High Production Last Month

The production of anthracite coal last month was larger than that of June, 1913, and the official figures of the Bureau of Anthracite Statistics, which will be issued in a short time, will show shipments of over 6,000,000 tons. All of the principal companies, except one or two, report an output equal to or greater than the corresponding month last year. The Lehigh Valley Coal Co. expects that its final figures for the month will show 900,000 tons mined, which will be its high record for any one month. In May, 1911, it mined 800,668 tons, and in March, 1912, it produced 814,679 tons.

At the beginning of last month production as a whole was about 2,000,000 tons behind that of last year, but the summer discounts are proving attractive, and the consumers seem to have learned the wisdom of buying coal when coal is cheap. According to statistics recently compiled, 50.3 per cent. of the total shipments were sent out during the winter months last year, and 49.7 per cent. in the summer months, the difference betwen winter and summer shipments being less than 350,000 tons.

The labor situation in the anthracite fields is quiet, though there have been a few "button" strikes here and there, and complaints are heard from many of the operators about agitators trying to stir up trouble among the mine workers, who are glad of the increase in the number of working days during the summer months. From 1892 to 1901, the average time worked in the anthracite region was 179 days. Since the summer discount went into effect in 1902, in only one year, 1906, when there was a long suspension, has the number of days worked fallen below 200. In 1913 it was 257 days.

PENNSYLVANIA

Anthracite

Thropp—The union miners of this community are protesting against the making of motion-picture films depicting strike scenes. The men believe that these pictures will cause an unfavorable attitude toward the miners in places where they are not known. A moving picture company has been making the film for some weeks.

Plymouth—Operations at the breaker of the Parrish colliery of the Lehigh & Wilkes-Barre Coal Co. were suspended July 1. The colliery will remain idle for three months, after which time the output will be prepared for market at the new Buttonwood breaker at Breslau. About 100 men were employed in and about the breaker and the majority of them will be obliged to seek work elsewhere.

Ashland—A daring attempt to dynamite a Lehigh Valley pay train with $50,000 aboard was frustrated on June 30 by huckleberry pickers near Ormrod. The berrypickers discovered that the tracks had been blown up, ran eastward and flagged the train, which they knew was to arrive at Centralia to pay the empioyees of Centralia and Continental collieries.

Girardville—A 15-year lease between the Girard estate of Philadelphia and the W. R. McTurk Colliery Co. for the colliery at Girardville was placed on record in Schuylkill County recently. The lease runs until Dec. 31, 1928, and calls for the taking over of coal lands in the township of Butler and the borough of Girardville.

Glen Lyon—A large mule barn of the Susquehanna Coal Co. was entirely destroyed by fire on July 1, together with a large quantity of grain, hay and straw. The barn was a large one and represents a loss of about $17,000. The structure, which was about 50 ft. in width and 200 ft. in length, was of wood with a slate roof.

Hanover—There was excitement at No. 21 colliery of the Lehigh & Wilkes-Barre Coal Co. recently, when the headhouse of the air shaft was discovered on fire. The employees soon had a stream of water on the blaze, but were handicaped by lack of water pressure. The blaze was extinguished before much damage was done.

Bituminous

Glendale—Fire which broke out in the Glendale mine of the Pittsburgh Coal Co. on July 5 was extinguished the following day. The blaze started from an electric wire in one of the shafts. Men returning to the shaft shortly after noon found smoke curling from the entrance. The miners worked in relays finally extinguishing the blaze.

Cyrilla—The auction sale of Cyrilla No. 5 plant of the Sunshine Coal & Coke Co. has again been postponed until Sept. 12. This action has been taken after a second failure to receive satisfactory bids.

Charleroi—Poor shipping conditions on the Ohio River are given as the reason for the closing down of a number of coal mines along the third and fourth pools of the Monongahela River Consolidated Coal & Coke Co. and other firms. Practically all available barges have been filled and shipped to Pittsburgh to await such time as they may be shipped elsewhere. The remaining barges are on the Ohio tied up at storage places.

Rockwood—A test hole was completed on June 20 on the Barkman farm by Lewis brothers, who are operators and owners of a large mine at Hooversville. They have under option 3100 acres, the majority of which is in Milford township, underlying the farms of Jacob Barkman, Harvey Myers and Peter Koontz. The test hole was driven 300 ft. and

passed through two seams of excellent coal, specimens of which are now in the laboratory of a chemist for analysis. If the coal is of good quality, development of the field will begin at once.

Windber—Through the efforts of the Berwind-White Coal Mining Co., which offered prizes for the best kept premises, for flower beds and for lawns, the town of Windber is putting on a handsome appearance, hitherto unknown to the coal-digging suburb. The smart and well-kept miners' homes are attracting much favorable attention in neighboring communities.

Bentleyville—One of the largest new coal mining operations in the immediate Pittsburgh district in some years is being developed in Washington County, where the Pittsburgh-Youghiogheny Coal Co. is sinking a shaft and will shortly open a new mine that will employ over 450 miners and will have a daily output of approximately 3000 tons of coal. The mine is located in what is called the Van Voorhis district and the company has 1000 acres of coal land there to work.

Carroltown—The Carroltown mine of the Ebensburg Coal Co. is to be disposed of within a short time to the Carroltown Coal Co., according to reliable reports. The Carroltown mine is known as Nanty-Glo No. 2 and is one of the best openings in the northern end of Cambria County. The coal is the quality that seems to be always in demand. The Carroltown Coal Co. is also negotiating for the purchase of the Candy mine, near Spangler.

Monongahela City—Considerable uneasiness prevails over the Monongahela Valley mining district, as the result of various coal companies closing down on July 4 twelve mines, throwing out of employment from 3500 to 5000 men. It was announced that the mines would not be reopened for at least two months. The cause given for the layoff is that all the available barges are full and ready to be towed south. With this superabundance of fuel, it was stated, further mining is not necessary. The output of June was extremely low in all the mines along the valley compared with the usual tonnage.

Colver—An unusually heavy production of coal was recently made from mine No. 1 of the Ebensburg Coal Co. The output for June exceeded 92,000 tons and the officials and employees are highly pleased at this showing.

WEST VIRGINA

Charleston—Over 7000 men in the Kanawha district, idle since June 1, following a strike over the terms of the new wage agreement, have returned to work as a result of a favorable vote on a proposition submitted by the operators. The men will work under a limited check-off system, pending the adjustment of the wage scale by a board of arbitrators to be chosen by the two sides and the Secretary of Labor. It is understod that the wage scale will be worked out on a competitive basis with adjoining districts.

Williamson—After working 14 hours continuously, rescuers completed an emergency tunnel into the burning mine of the Sycamore Coal Co. late July 1, and found the bodies of five miners entombed by a mine fire the day before. It is believed this mine fire originated from a faulty electrical connection in the fan house, the draft of the fan carrying it into the mine and cutting off the five men from escape at the mine entrance, also the rescures from penetrating to them.

Eccles—Report has been made to the State Department of Mines that the operations of the New River Collieries Co. which were wrecked by an explosion on Apr. 28, are rapidly being repaired and that it will be possible to resume operations within the next six weeks. When the present repairs are completed, the mines will be in better shape than before the explosion took place.

ALABAMA

Birmingham—Orders aggregating over one million tons of coal have been closed in local circles during the past few days, and another is pending. It was recently announced that the Southern Ry. had confirmed its contract for approximately 700,000 tons, while the Atlantic Coast Line placed its requirements at 235,000 tons. Other roads owned by the Southern are now in the market for 150,000 tons of coal, while the Seaboard Air Line recently placed an order for 400,000 tons.

The Banner Mines of the Pratt Consolidated Coal Co. produced 45,000 tons of washed coal during June, breaking their record. The Flat Top mine of the Sloss-Sheffield Steel & Iron Co. produced 32,000 tons of coal during the same time.

Reports from Chief Mine Inspector Nesbitt's office show that the production of coal in Alabama for the first six months of 1914, is approximately 10,000,000 tons, and the indications are that the tonnage mined during the entire year will break the 1913 record. Mr. Nesbitt states that activity is being shown at all mines, improvements being made, machinery put in repair, and other necessary requirements to run full time and at full capacity.

Brilliant—W. H. Parker of Cullman, Cullman County, Ala., is developing a new mine at Brilliant, in Marion County.

KENTUCKY

Whitesburg—The Perry County Collieries Co. will soon start a coal operation on First Creek, Perry County's new coal field.

Hazard—Operations have been resumed by the Kentucky Jewel Coal Co. after a shutdown for six weeks on account of lack of power. The new generator has been installed and work will be pushed from now on in an effort to make up for time lost in filling orders. The Hazard Dean Coal Co., it is understood, has shut down for a lack of power, though pressed with orders. This firm also will install its power plant at once.

Barbourville—Pittsburgh capitalists are said to have completed a deal for 26,000 acres of coal and timber land in Clay county at the rate of $10 per acre. This constitutes the largest single deal ever made in Clay county and forecasts an early railroad extension into that county from here. The reputed purchasers were in Barbourville early in the season on an inspection tour. A railroad has been projected for some time from here to Manchester to traverse the coal and timber regions, rights of way have been obtained and activity in real estate has increased.

Harlan—Harlan county people, mine operators as well as others, are jubilant over the record of increased output shown by the coal fields of the county. In 1910 (before the railroad entered the county), it produced no coal. In 1911 the tonnage was 15,814, in 1912, it increased to 384,427, while for the calendar year of 1913, according to the figures of the state department, the total output reached 851,412 tons. This year, although the operations in the early part of the season did not immediately show the increase expected, the total output will compare with the gains in previous years and reach somewhere near the 2,000,000 mark.

OHIO

Columbus—Upon the application of Attorney James M. Butler, C. E. Haskins has been named receiver for the Starr-Hocking Coal Co. which has operations in Athens County, he giving bond in the sum of $20,000. He was the superintendent of the company.

Bellaire—The coal mine of the Carnegie Steel Co. on Indian Run was recently inspected by several of the state mine officials and found to be in first-class condition. The inspectors highly complimented mine superintendent R. F. Marling on the manner in which he had obeyed the state mining laws.

INDIANA

Terre Haute—The minority in the U. M. W. members in Indiana has called a special meeting for July 21, to consider charges that state officers have violated the terms of the wage contract in settling grievances in favor of operators. There are specific charges against William Houston president and Thomas Moss, member of the executive board.

ILLINOIS

Maxwell—The mines and mining committee of the County Board of Supervisors have set July 22 as the date for the inspection and survey of the Star mine, which is said to have been driven under county property. On that date the county engineer will go over the operation accompanied by a committee of supervisors to determine whether the mine actually extends beyond the property line of the Clarke Coal Co., which owns the mineral rights to the property.

Duquoin—A snake 5 ft. long and 4 in. in diameter crawled into the feed pipe from the pond at the Paradise mine last week, causing the property to be shut down, and throwing 400 men out of work for a day, until a new pipe was placed.

Hiram Thornsberry, first engineer at the Majestic mine, while oiling the machinery recently leaned too close to a flywheel and was picked up by it and crushed to death.

Belleville—Prospectors are drilling a test hole between here and Marissa to locate the thickness of vein No. 5, which underlies vein No. 6. Owing to the fact that a large portion of vein No. 6 is worked out, the property owners want to ascertain the value of the underlying coal bed in order to dispose of the mining rights.

Carterville—In one of the mines adjacent to this place, a rule has been put into effect that no miner shall load more than 9 tons of coal in 8 hours. The miners' union is in favor

of this, because it gives employment to a larger number of men, and there are thousands of miners idle in southern Illinois at the present time. The operating companies favor it because it gives the men more time to clean their coal and load it properly.

MISSOURI

Kansas City—The meeting of the executive board of the International Mine Workers was held in Kansas City during the week ending July 4. John P. White, president of the U. M. W. A., presided. Thirty delegates attended. The strike at Vancouver, B. C., was the chief topic of consideration.

Cainsville—The coal mine at Cainsville probably will resume operations in the near future. H. R. Waterman, manager, has secured new leases which give the landowners a royalty of 5 cents instead of 10 as in the past.

Warrensburg—George M. Boyd & Sons have purchased a steam shovel and will begin work on the George Burkarth farm near Warrensburg. The mine is the only one in that city.

KANSAS

Osage City—An ordinance fixing the prices to be charged operators for electric current has been passed by the city council. The charge to be made is 3 cents per kilowatt hour for all current supplied to mines outside the corporate limits of the city, provided that the operators will agree to pay a monthly minimum charge not to fall below $83.33 for each mining machine.

MONTANA

Bozeman—The Star Coal Co., of Musselshell, has purchased the steam plant of the Gallatin Valley Mining Co. at Belgrade and the hoisting engine of the Northwest Improvement Co.'s mine at Mountainside, and will shift both to Musselshell where the coal company is opening some valuable property.

PERSONALS

Charles Harvey, one of the best known mine foremen in the Lehigh region, who has been in the employ of the Lehigh Valley Coal Co. for the past five years, tendered his resignation on July 1.

B. P. Friend, a coal operator of Prestonburg, Ky., has been critically ill at the Palace Hotel, at Cincinnati. He was a spectator at a fire when an ammonia tank exploded. It is said that the vapor he inhaled caused his illness.

Cornelius P. Tory has been appointed superintendent of transportation of the Hocking Valley Railway company, succeeding Thomas R. Limer who died recently. Mr. Tory has worked his way up to his present position from the bottom.

John F. Brown, a miner, of Cannel City, Ky., has been appointed to the state board to examine applicants for mine foremanships by Governor McCreary. The law which created the board provided that one of the members must be an employed miner.

A. G. Spillman, General Superintendent of the St. Bernard Mining Company Earlington, Ky., was recently appointed by Governor McCreary as a member of the Board of Examiners, which under the new state mine law grants certificates to mine foremen.

Erskine Ramsey, Jones D. Moore, James E. Strong, W. S. Kahn, and Edward Husband were recently appointed by the governor of Alabama to serve on the State Board of Examiners. Erskine Ramsey was the only former member of the board retained.

OBITUARY

Richard White, aged 64 years, a retired coal operator of Pottsville, Penn., was found dead in his bed on the morning of June 30. He had been engaged in coal operations for the past 25 years and was well and favorably known throughout the entire anthracite region. Mr. White is survived by 8 children.

James McCormick foreman of the Jamison Coal Co. formerly of Latrobe, Penn., but who has resided at Barrackville, W. V., for some time past died recently after a brief attack of heart trouble. Mr. McCormick was 64 years of age, had been in the service of the Jamison company for some time and was a valued and trusted employee. He is survived by his wife and four children.

CONSTRUCTION NEWS

Windber, Penn.—John and Thomas Locthrie, who recently acquired the Manges coal tract, have started work on an opening on the Manges farm.

Nanticoke, Penn.—The Jenkins Contracting Co., of Mt. Carmal has been awarded the contract by the Susquehanna Coal Co., to sink a shaft at Nanticoke 540 ft. deep and 15x25 ft. in cross-section.

Whitesburg, Ky.—A new industrial city is being laid out below here in Perry County, one mile from Hazard, and equidistant from the four operations of the Ashless Coal Co., the Kentucky Jewel Co., the East Tennessee Coal Co. and the Virginia Coal & Coke Co. Already numbers of lots have been sold and several stores are in course of construction.

Bower, W. Va.—The Davis Colliery Co. is building one of the best store buildings to be found anywhere in this section of the state, to replace the one burned down some time ago. This structure will be of brick and cement and made as near fireproof as possible. The approximate dimensions are 35 ft. wide, 82 ft. long and three stories high with a basement the full size of the building.

Imperial, Penn.—Plans are being made by the Montour & Lake Erie Coal Co. for the opening of a new mine in Imperial. The full supply of machinery has been purchased and construction work will begin in a short time. The output of the mine will eventually be about 150 tons daily, and 350 men will be given employment. The work will be under the direction of Andrew Wilson.

Leavenworth, Kan.—W. J. Squire, president of the Squire Electric Co., of Kansas City, has taken over the old Brighton mine near Leavenworth and proposes to spend about $500,000 in its rehabilitation. The mine will be electrified and a power house will be built at its mouth. Other capitalists also are interested with Mr. Squire and the group has asked the city of Leavenworth for a franchise to sell light and power in that city.

Buffalo, N. Y.—Work has begun on the by-product plant of the Niagara Coke Corporation, which sometime ago bought 40 acres of land adjoining the works of the Lackawanna Steel Co. It is stated that $2,000,000 will be spent in setting up the plant and that it will be in operation with 100 ovens early next summer. The capacity will be doubled if necessary. The coke will be sold in the open market and the gas to the steel company.

Highland, Penn.—The G. B. Markle Co. houses at this place are at present in the hands of a force of carpenters, who will greatly improve the buildings and enhance their appearance. Front porches will be erected on every house, new fences constructed and additional improvements made to the interior. The roadway will be repaired and side walks laid. The company is to be commended upon the improvements being made to its mining towns in general.

Columbus, Ohio—The route of the proposed freight line of the Chesapeake and Ohio from Portsmouth to Columbus, Ohio has been finally determined upon. This action was taken by the board of directors at a recent meeting held at Maysville, Ky. According to the plans approved, the Ohio river bridge will be built at Sciotoville, seven miles east of Portsmouth. From that point the line will follow the Little Scioto River to a point east of Stockdale in Pike County where it will turn westward and meet the Scioto River. Neither Circleville nor Chillicothe will be touched. It is expected that the construction of the line will be completed in two years. Application to the U. S. War Department for permission to build the bridge will be made at once.

Whitesburg, Ky.—At least five branches are to be built by the Louisville & Nashville R.R. Co. this year into the Letcher-Perry coal field. One already started, will extend 5 miles up First Creek from Typo station to the development work of the Perry County Colleries Co. Another, of three miles, is to parallel Carr's Fork to the Knott county border, where an Eastern syndicate will start a coal and timber development. Davidson Creek will get a three mile branch just above Hazard, where the East Tennessee Coal Co. and the Ashless Coal Co. are starting big developments and from which they expect to be shipping coal within two months. A fourth line is being pushed up Big Leatherwood Creek as far as Daisy where developments are underway. Of the fifth and sixth extensions, one is to run from 12 to 16 miles to Line Fork, while Rockhouse Creek may be the terminus of the other. The Potters Fork, Yount's Fork and Bottom Branch lines of the L. & N., have been completed and the three branches are carrying coal and lumber.

NEW INCORPORATIONS

Linton, Ind.—The Twin Oak Coal Co. has dissolved.

Fargo, N. D.—The Dunn Coal Mine Co. at Leigh has been reorganized into a new firm to be known as the Black Diamond Coal Mine.

Charleston, S. C.—The Dry Fork Coal & Timber Corporation has been given the right to increase its capital stock from $45,000 to $300,000.

Wilmington, Del.—The Banner Coal Mining Co., has been organized with a capital stock of $50,000. Charles Francis Brown is at the head of the new concern.

Williamsburg, Ky.—The Letz Jellico Coal Co. has been incorporated with a capital stock of $100,000; the incorporators are J. W. Latham, J. R. Zimmerman and C. M. Smith.

Kansas City, Mo.—The Chilhowee Coal & Coke Co. has been organized with a capital stock of $200,000. The incorporators are Milton Walsh, H. B. Henry, and Arthur Nelson.

Pittsburgh, Penn.—The Peters Creek Gas Coal Co. has been chartered with a capital stock of $30,000. The chief incorporators are Charles W. Braznell, of Pittsburgh, and R. A. Braznell, of Edgewood.

Clothier, W. Va.—The Spruce Fork Coal Co., has been organized with a capital of $50,000, the incorporators are William B. Watkins, J. A. Wilcox, John L. Montgomery, H. E. Marlor and Andrew W. Border.

Scranton, Penn.—The Temple Iron Co. has been reorganized with a capital of $4,000,000 divided into $2,000,000 of 8% preferred stock and $2,000,000 of common stock. There will also be $2,500,000 in 5% bonds.

Nelsonville, Ohio—The Carter-Spencer Coal Co. has been organized with a capital stock of $50,000 for the purpose of mining coal. The incorporators are John Carter, Harry Ball, George S. Evans, J. T. Thompson, and J. N. Smith.

Tams, W. Va.—A charter has been issued to the Wyoming Fuel Co., which will have its chief works at Slab Fort in Wyoming County. The capital stock is $100,000 and the incorporators are W. P. Tams, Jr., John W. Wilson, James O. Watts, G. M. Vaughn and P. T. Watts, Jr.

Uniontown, Penn.—The W. A. Stone Coal & Coke Co., has surrendered its charter in West Virginia and has discontinued business as a corporation in that state. Albert Gaddis, of Uniontown was president of the company, the property of which has been purchased by the W. A. Stone Fuel Co.

Lexington, Ky.—The Commonwealth Coal & Timber Co. has been incorporated with a capital stock of $10,000 to develop coal and timber lands in Perry, Knox, Leslie and Letcher Counties. The incorporators are Samuel W. Wilson, president, Clinton M. Harbison, vice-president and treasurer, Samuel H. Halley and T. M. Smith, of Lexington, George S. Shanklin, Jr., of Whitesburg, secretary, L. W. Fields, of Whitesburg, manager, and Jesse Morgan, of Hazard.

Bristol, Tenn.—The Empire Coal & Land Corporation which failed two years ago as a result of a temporary financial stringency is to be reorganized and rehabilitated. A meeting of the holders of the $750,000 of the company's bonds was recently held at which a committee composed of H. G. Morrison, of Johnson City, T. F. Hogan and H. E. Jones, of Bristol and A. K. Morrison, of Big Stone Gap was appointed to draft a plan for reorganization.

INDUSTRIAL NEWS

Birmingham, Ala.—The Gulf States Steel Co. has recently put 300 coke ovens in operation at its Virginia mine after a short shut-down.

Drifton, Ala.—C. C. Gravelee has taken over the Borden Mines at Drifton, Walker County, Alabama, and will take steps to immediately increase the output.

Taits Gap, Ala.—The Taits Gap Coal Co., with mines at Taits Gap, Ala., is making improvements that will double its output. Watt Brown of Ragland, Ala., is president.

Scranton, Penn.—C. D. Simpson recently purchased the interest of the Yost estate in a tract of coal land comprising about 820 acres near Shenandoah for a sum said to be in the vicinity of $2,000,000.

Hamilton, Ontario—A large by-product coke plant is projected for supplying gas to the iron furnaces at Hamilton, Ont., in which the owners of the furnaces are said to be interested. The amount of natural gas developed in that vicinity in the near future will have a bearing on the new undertaking.

Columbus, Ohio—Owing to the prolonged coal strike, a big decrease is shown in the net and gross earnings of the Hocking Valley Railway company for the month of May, the report for which has just been made public. The operating revenue for the month was $442,016 as compared with $755,450 for May of 1913.

Hurricane, Va.—C. E. Bockus, vice-president of the Clinchfield Coal Corporation, Dante, Va., has just placed a contract with the Roberts and Schaefer Co. for approximately $50,000 for the design and installation of a Marcus patent, five-track steel coal tipple with a 600-ft. inclined car haul, all to be electrically operated, at the mine at Hurricane, Virginia.

Chicago, Ill.—The Chicago branch of Keuffel & Esser Co., of N. Y., has completed its removal to its new quarters, 516-518-520 South Dearborn St., Chicago. The company recently purchased this building and occupies the greater part of it. It is situated near the "loop" and half a block from an "L" station, being midway between Van Buren and Harrison Streets, on the west side of South Dearborn Street.

London, England—A new idea was presented at a recent meeting of the Iron & Steel Institute in London, concerning the by-products from coke making and the utilization of blast furnace gases. It is believed that synthetic rubber may be produced from coke oven gases, the President saying that "the experiments which have been made permit the foreshadowing of the manufacture of artificial rubber."

Fleming, Ky.—Beginning July 15 the Elkhorn Mining Corporation will make some large increases in its plants in Fleming, Haymond and Hemphill. The Lexington & Eastern R.R. has recently completed branch lines into Haymond and Hemphill and the shipment of coal has started on a large scale. Several hundred additional hands will be put to work on the 15th. The company contemplates opening some new mines.

Knoxville, Tenn.—A meeting of the creditors of the bankrupt Ideal Block Coal Co. was recently held in the Federal Court at Knoxville. The receiver, E. G. Stooksbury, of Knoxville, was unanimously elected Trustee and at the request of the creditors, was instructed by the Court to close out the affairs of the company and sell all tangible assets as soon as possible; pay off the preferred creditors, and report to the Court again on July 16.

Kansas City—The ouster order registered by the Missouri supreme court against the Central Coal & Coke Co. last fall has been withdrawn so long as that company, and others involved in the same case, show a disposition to obey the state laws. The fine of the company was reduced from $50,000 to $30,000. Though lumber companies were principally interested several coal and mining concerns were included in the list.

Cincinnati, Ohio—Judson Harmon, former governor of Ohio and Rufus B. Smith, both of Cincinnati have been appointed receivers of the C. H. & D. R.R. Co. The suit for receivership was filed by the Bankers' Trust Co., of New York. At the same time a mortgage for $36,000,000 held by the trust company is asked to be foreclosed. The petition declares the total bonded indebtedness of the road is $75,000,000. The cause for the receivership is given as the devastation of the flood of 1913 together with the business depression which has followed.

Columbus, Ohio—For the third time since a workmen's compensation act has been in force in Ohio, the commission having charge of the administration of the law has announced a radical reduction in the rates of insurance charged employers, the cut this time averaging about 6 per cent., as against a reduction of 10 per cent. in July, 1913, and of 22 per cent. in November, 1912. That of last year was made retroactive, and involved the return to employers of over $70,000. It is estimated that the latest cut, which is also retroactive, will involve the refund of $100,000 to employers, out of the surplus of nearly $2,000,000 in the hands of the commission. Over 1400 industries receive the benefit of the reduction, while two, stevedoring and freight car manufacturing, have had their rates increased, as a result of the experience of the commission showing the high cost of the insurance. Coal mining, among about a dozen industries, is left uncharged as to the rate charged, which is entirely satisfactory to operators, as they had anticipated an increase at the time of this readjustment of the rates.

Coal Trade Reviews

General Review

Curtailed mining in the anthracite regions and the market continues under heavy pressure. Eastern bituminous situation dull and weak, but gradually improving to the westward. Lake movement unsatisfactory. Agreement reached on the Ohio wage scale.

The heavy curtailment throughout the hard-coal regions last week had little effect upon the anthracite market, and further restrictions were necessary during the current week, with every indication that this will continue until the fall demand opens up. Under existing conditions, it is useless to urge sales. A large increase in the Lake movement is noted for last month, but the tonnage for the season is substantially less than last year.

The bituminous market continues generally heavy in all parts of the country, with down east New England points leading the slump. Large tonnages of consignment coal are coming in, while demurrage bills are accumulating, and there has seldom been such a wide margin between prompt and contract prices as now rules. Competition on new contracts is unusually aggressive. Shipments are confined more closely to requisitions on contracts, which have increased somewhat; but, on the other hand, the heavy export business of the past few weeks has slowed down materially. Operations in the mining districts tributary to the Eastern markets were somewhat stronger during the current week, although this was probably the result of the shutdown over the Fourth of July.

Reports of a car shortage at the head of the Lakes, with a consequent congestion on the docks, probably accounts for the slowing up in Lake shipments out of the Pittsburgh district. Some indications of an improvement are noted, and many of the agencies are optimistic over the outlook, though without tangible evidence of their reasons. Prompt business is invariably subject to substantial cuts, and even moderate concessions are heard on new contracts. The final agreement on the wage scale in most of the Ohio districts, subject only to the referendum vote of the miners, now places the operating companies there in a position to negotiate new contracts. As a result, there is considerable activity in trade circles, but the agencies are compelled to work hard for orders. Lake shipping continues slow, though with prices holding relatively firm, and some indications of an improvement.

The demand is somewhat brisker to the South, where the surplus tonnages are being used up, and there is less coal on demurrage than for a number of months; buyers are also showing less hesitancy about contracting, and negotiations are usually for longer periods. The Middle Western market is steady, with a strong rising tendency. The abnormally large crops and the uncertainty as to the possibility of a severe car shortage have created a moderate anxiety among consumers, who are now seeking to accumulate some surplus coal. Half-time operations are the rule at the moment, but this will be gradually increased as the crop movement gets under way.

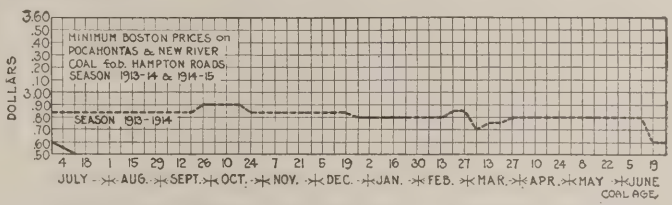
ATLANTIC SEABOARD

BOSTON

Market coal still an affliction in this territory. Prolonged delay in disposing of cargoes. Hampton Roads grades still continue accumulating and no improvement in sight. Only a small movement of the Pennsylvanias. Dock screenings in short supply at the anthracite piers.

Bituminous—There is apparently no let-up to the volume of market coal being sent to the New England ports. Prices on Pocohontas and New River are therefore as weak as ever and perhaps the only change in the situation is in the longer time it takes to dispose of the coal. The demurrage bills must be heavy and the query is how long will West Virginia operators be willing to sand both the low level of prices and the expensive charges for vessel destination.

The few contracts still unplaced are soon coming into the market and all the agencies are interested to see what prices are developed. There has seldom been a season, however, when the discrepancy was so great between spot and contract coal for delivery over several months or a year. Some large buyers who usually make contracts are still buying from hand to mouth as bargains offer, and no doubt they have made a very large saving in doing so. The accumulation at Hampton Roads is still heavy, and once a loading order is issued it is only a matter of hours and minutes before the cargo is on the way. In all the ports there are steamers, barges, and sailing vessels awaiting charters and few in the trade can recall a time so absolutely dull in steam coals as the present.



In the Pennsylvania grades there is practically no improvement. Shippers of the preferred coals are able to keep mines running, although on short time, by selling at 10@15c. less than the season contract basis, but the less favored grades are having great difficulty in moving any tonnage whatever. Space in anthracite barges from Philadelphia is now available to most of the Pennsylvania coals and a somewhat better movement is expected in the course of the next few weeks.

Georges Creek is put on wheels only on firm orders and for application to contract. For spot sale there is almost nothing doing. Prices are nominal on the same figures.

Anthracite—So small an amount of domestic sizes has been dumped over the piers the last week or so that the supply of dock screenings is short. The large city dealers rely on a fairly regular supply and are scurrying around to procure shipments of rice and barley as a temporary expedient. July promises to be dull in anthracite also and no demand is looked for until stocks begin to move to the consumer in September.

Current prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.85@1.45	$1.20@1.60	$1.67@1.77	
Philadelphia*.....	2.10@2.70	2.45@2.85	2.92@3.02	
New York*.....	2.40@3.00	2.75@3.15	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.50@2.80
Boston†.....	.....	.....	.....	3.15@3.63
Providence†.....	.....	.....	.....	3.20@3.68

* F.o.b. †On cars.

NEW YORK

Temporary improvement in bituminous but aggressive competition for business prevails. Anthracite trade soft with all grades in easy supply.

Bituminous—Some slight increase in orders has developed during the week. Requisitions on contracts are a trifle heavier and mining operations have been increased at some points. Although this has created a somewhat better feeling among the trade, the improvement is due, in most part, to the curtailed operations over the holiday of last week, and, in any event, it is not of sufficient proportion to create any general optimism.

What few contracts remain to be closed are subject to aggressive competition among the selling agencies. Of these, the most important yet to be signed is the contract for the New Haven subsidiary companies involving about 120,000 tons of coal, and this is usually low priced business. Some minor contracts are being signed up, from time to time, as they expire. Consumers who have held off contracting this year have done much better than those closing early in the season, which is in direct contradistinction to conditions prevailing last season.

A little western Maryland coal is still occasionally reported on demurrage, but the volume is insignificant and the market is in unusually good shape in this respect. Bunker-

ing trade continues light. Prices are not quotably changed from last week, which we continue as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The market is generally soft on all sizes. Stove coal is now the only grade selling at the full circular, and some additional tonnages of this might be used in some instances, but, as a rule, orders can be promptly filled. There is an unconfirmed rumor to the effect that the Reading Company has 400,000 tons of chestnut coal in storage. Pea and buckwheat grades are, of course, going into storage but not in such large volume now that mining operations have been restricted.

Egg and nut coal can only be moved by giving the buyer a certain proportion of stove; even under these conditions, concessions of 10 to 25c. are made on egg coal and 15 to 40c. on the regular circular can be done on nut. Straight nut has been offered at $4.75 at the lower ports. Pea is in about the same condition, selling at 30 to 40c. off the circular. The low-grade buckwheats are quoted at from $2 up, with the high grades at $2.55; the low grades of No. 2 are at a minimum of $1.50, with the high grades at $2.15, while the high and low grades of No. 3 can be obtained at $1.60 and $1.25 respectively.

The New York hard-coal market is now quotable on about the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.90	$4.60@4.90	$4.85	$4.55@4.85
Egg	5.15	5.00@5.15	5.10	4.90@5.10
Stove	5.15	5.15	5.10	5.10
Chestnut	5.40	4.95@5.40	5.35	4.75@5.35
Pea	3.55	3.40@3.55	3.50	3.10@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.00@2.75
Rice	2.30	2.15@2.30	2.00@2.25	1.50@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

PHILADELPHIA.

Little change noted in anthracite market. Curtailed operations generally in effect. No immediate improvement looked for. Bituminous maintains its listless attitude, with demand weak.

Anthracite—Judging from reports emanating from all sections of the country, the anthracite situation is not likely to show much improvement during the coming two months. Retailers generally claim that the industrial depression has made funds so low, that they hesitate to put coal out on orders, where the customer states that it is likely to be well into the fall before he will be in a position to settle the bill.

Curtailed operations at the mines has improved the situation to a certain extent, but the market still fails to absorb certain sizes. Broken egg and stove seem to be moving fairly well, but the balance of the sizes are in excess of the requirements, and as a result, there are reports that considerable coal is still going into stock. It is nevertheless a fact that the large operators are handicapped in placing their output because of the heavy concessions offered by the individuals. April and May prices for egg and chestnut are plentiful; pea is selling at even less than contract price, and where this fails to bring results the added attraction of the absorption of the state tax, is made.

The demand still centers on stove size, which is moving freely. In fact, it is understood that none of the companies have been able as yet to accumulate any of this grade, which is in marked contrast with two years ago, when stove was practically in the same position as now exists with chestnut. What remedy will be applied is problematical, but the continued falling off in demand for chestnut, is likely to force the issue.

Bituminous—Purchasing agents are shopping around the market at the present time, and solicitations that they contract, meet with slight success. The future holds out little hope for improvement either in demand or prices. Fair Pennsylvania coals are quoted at 90c. to $1 and the better grades $1.25 to $1.35, at the mines.

BALTIMORE

Market continues dull and flat. Severe car shortage anticipated this fall. Exports for June break all previous high records.

Except for the contract business the coal trade East remains remarkably dull. Efforts to force the market has resulted in some sacrifice sales, and the move is not being pushed. The West Virginia gas-coal situation is still being aided by call from the Middle West, and three-quarter that is selling East around 85c. is good for 10c. higher to Western customers in many cases. Pennsylvania fuels remain steady in the face of a listless call.

Car movement continues poor. This condition has been a figure now for several weeks and there seems little prospect of a change. Coal men fear that when the rush of business comes in the late summer and fall that the railroads will be in worse shape for prompt movement than has been the case for a number of years past. Less has been expended for equipment and upkeep recently than has been the case for a considerable period.

In anthracite the usual summer deliveries are now being made. Most dealers report things flat, but believe that the trade will have a busy and profitable late summer and fall season.

With a splendid total of 116,313 tons of bituminous exported for the month of June, the records of the port of Baltimore on this class of business were shattered. The highest previous record was made in June, 1913, when a total of 110,091 tons was exported. The shipments last month have a total value of $323,125. About one-quarter of the coal went to France, a comparatively new purchaser in this field, and the balance was widely distributed, being taken by the Philippines, Cuba, Italy, Egypt, Costa Rica, Porto Rico, Panama and Spain.

HAMPTON ROADS

Shipments for week somewhat light. Few inquiries for spot coal. Dumpings for month of June totaled 965,991 tons.

While coastwise shipments for the week have been about fair, the foreign movement was light, few cargoes moving. The largest shipments have been to Genoa and Venice, with some coal moving to Canal Zone, La Plata, Montevideo and Cuba. In addition to this the government has loaded one steamer with a cargo for the naval station at Cavite and Olongapoo, P. I.

Little if any high-volatile coal is being moved and there is no demand for this or prepared coal. There are few inquiries even for New River or Pocahontas run-of-mine, and such shipments as have been made so far as can be ascertained have been mostly on contract.

The total dumpings at the piers for the month of June amounted to 965,991 tons. Of this the Norfolk & Western dumped 500,444 tons, or more than the combined tonnage of the Chesapeake & Ohio and Virginian Rys., the Virginian dumping only 222,837 and the Chesapeake & Ohio 242,710 tons. While the tonnage for the month has not been as heavy as for the same period in 1913, conditions have also been somewhat different, and the total was more than was expected generally.

LAKE MARKETS

PITTSBURGH

Demand slack and mining operations slightly reduced. Lake movement decreased rather than increased Prices still irregular.

Mining operations in the Pittsburgh district have undergone a slight decrease, apart even from the decrease which naturally comes from the celebration of the national holiday. The line demand has fallen off a trifle and there has been a little decrease in Lake shipments. The ore movement continues relatively light so that vessel tonnage is not very plentiful and from the Northwest come reports of car shortage and consequent congestion of docks.

The market continues ragged as to prices, large contracts when negotiated, frequently going at concessions from the regular list, while free coal almost invariably is subject to cutting. Slack is selling at 50@60c. for prompt lots. Circular prices remain: Slack, 80@90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Indications of an improvement in bituminous. The fall car shortage will create a shortage. Small consumers coming into the market. Anthracite will not move till fall, but will be brisk then.

Bituminous—There are a few jobbers who claim to see an improvement. They say that the wave of returning business is starting and that it will be here with the movement of the fall crops. There is better buying on the part of most of the small consumers, but the railroads and other large concerns are still holding off. There is a good reason for the demand being light. With the salesmen it has been a matter of how much they could urge upon the consumer, ever since the car supply became plenty last fall. In fact it was the car shortage alone that produced the brisk trade last summer.

Meanwhile the bituminous trade will hold a firm hand and see that there is very little coal on track unsold and where it has to be turned over unexpectedly there will be

great care and dispatch in doing it. The margin on any sale is too small to admit of any loose practices. In fact some mine owners are confessing that they cannot operate at a profit.

There are plenty of jobbers who refuse to sell coal at reduced prices, although others having off grades are accepting reductions. The circular remains at $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. The market for slack is especially dull. Allegheny Valley prices are 15 to 25c. below Pittsburgh for sizes. The mines are not running much above half-time.

Anthracite—It is useless to urge sales, as the consumer seldom purchases in midsummer and is, if anything, buying less now than usual at this time of the year. When the cool weather sets in, there will be the usual rush. The mines are not running strong, as there is a prospect of a filling up of all storage space before the movement begins. As a rule the small dealers are not trying to help out. They cannot be made to see that there is profit in carrying a stock of coal through the summer.

Shipments of anthracite from this port for the week were 173,000 tons and for June, 805,879 tons, as against 642,110 tons for June last season. For the entire season the amount was 1,409,325 tons and for last season to July, 1,785,974 tons. The gain of more than 150,000 tons last month after a slow start shows the eagerness to make the most of this movement during the slack season.

COLUMBUS

Agreement on the wage scale in most of the Ohio fields stimulates some activity. Considerable contracting. Domestic business increasing and prices stronger.

With the settlement of the strike, more activity is shown in Ohio markets. Steam users who have been getting their supply from West Virginia and Kentucky are looking to make contracts for Ohio coal. Due to the suspension, very few steam contracts had been made recently. Manufacturing is still slow as a result of business depression and requirements are at a low ebb. Railroads are making steam contracts at a lower figure than prevailed last year.

In the domestic trade more activity has also developed. Dealers' stocks are generally small and they have been loath to push trade under those conditions. With better supplies they will soon be in a position to furnish coal for stocking purposes. There is a marked preference shown in this market for Pocohontas and re-screened varieties. Domestic prices show a slight strengthening. Lake trade is also expected to be more active in the near future and preparations are being made to ship a large amount of coal to the Northwest via the lakes.

What quotations are being made in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$1.50@$1.40		$1.50@$1.40	$1.50@$1.40
¾-inch	1.35@ 1.30	$1.20@$1.15	1.35@ 1.30	1.30@ 1.25
Nut	1.30@ 1.25		1.25@ 1.20	1.25@ 1.20
Mine-run	1.15@ 1.10	1.10@ 1.05	1.15@ 1.10	1.10@ 1.05
Nut, pea and slack	0.85@ 0.80		0.85@ 0.80	0.80@ 0.75
Coarse slack	0.75@ 0.70	0.85@ 0.80	0.75@ 0.70	0.70@ 0.65

CLEVELAND

Midsummer inventories and holiday shut-downs have reduced the coal requirements for the time being. Settlement of Ohio wage-scale. Fourth of July holiday causes a congestion at Lake ports.

Following the shut-down for the Fourth of July several large industries in Cleveland and surrounding cities have closed for repairs and inventory, thereby curtailing the demand, but without bringing a material reduction in prices. The trade continues to hold to orders and very little free or consignment coal is on track. The demand is for current use and prices vary not more than 5c. from quotations. Unless coal is sent on consignment or was purchased when the market was lower, no important concessions are being made.

Fairmount coal is coming in in small quantities as the gas-coal operators there are holding to higher prices. Youghiogheny, Pittsburgh and Richland, West Va., No. 8 are the only coals being offered on the market. Fine coal, which is about the only size in any demand, is being sold at $1.60 to $1.65.

With the adjustment of differences with the miners in the Hocking, Jackson, Pomeroy, and part of Crooksville districts, some Ohio coal will be offered here within a few weeks. These fuels do not come into this market as a rule unless prices are high, and there is little reason to expect much Ohio coal as the Lake trade will take all the Hocking produced before Oct. 1. It is a general practice to ship the Lake trade all the Hocking up to Sept. 15 or Oct. 1, after which the all-rail business is taken care of.

The Lake trade is not improved from what it was a week ago. Youghiogheny, Fairmount Gas, splints and Pocohontas have been going forward, but not in as large quantities as they should. The Pocahontas operators have not been able to dispose of the slack produced in making the prepared sizes and therefore have curtailed shipments of these grades as much as possible. This has resulted in the Lake contracts getting the benefit, though a broader market for slack would increase Lake shipments.

Hocking shipments will increase the Lake trade somewhat and will probably also increase the congestion at the docks in Toledo. With the exception of the C. H. & D. dock at Toledo every coal loading dock on Lake Erie was shut down on both July 4 and 5. The C. H. & D. had thirteen vessels waiting July 2 and several boats were due July 3. Boats arriving at Sandusky, Lorain and Toledo July 3 were mostly too late to go out before the docks shut down for the holiday.

There were so many boats waiting to unload at Lake Erie ports Monday morning that congestion was the rule. This resulted in a large number of vessels being sent to the coal docks to wait for coal to come in, and it will be a week or ten days before the docks are able to load ships as promptly as they have the last two weeks. Vessels have been held two to three days up to this time.

Quotations, Cleveland prices, for shipment are as follows:

	Pocahontas	Youghiogheny	Fairmount
Lump	$3.60		
Lump, 1¼-in.		$2.35	
Lump, ¾-in.		2.25	$2.05
Mine run	2.60	2.10@2.15	1.95
Egg	3.60		
Nut		2.20	
Slack	2.20@2.35	1.55@1.60	1.65

CINCINNATI

Dullness continues in all departments. Demand so poor that operators have difficulty in disposing of even a limited production.

With July well started, the coal trade has been expecting almost daily indications of an improvement in the market, but so far it has failed to materialize. Failure of the steam market to pick up is not difficult to understand, in view of the fact that most of the manufacturing industries are operating on slow time; but it is not easy to see why the domestic market remains dull. Operators are of the opinion that substantial stocks have been carried over from last season, both by dealers and domestic consumers. But on the other hand the demand during the latter part of the winter was very dull, the consumers apparently relying upon their diminishing stocks to carry them through. Even with fairly liberal transportation facilities available on the Lakes, the movement there continues slow, indicating that the market is fairly well supplied.

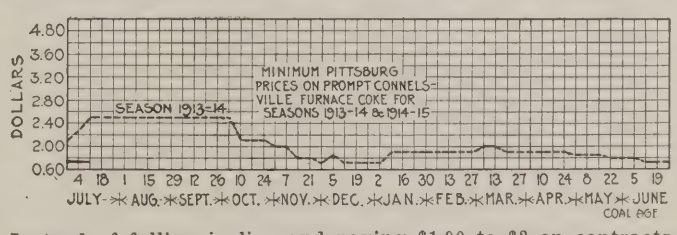
Locally the demand continues slow for domestic grades, smokeless being the sole exception, as usual. Dealers are apparently not at all anxious as to supplies later on, despite the shortage which must inevitably result from the situation in the Ohio and West Virginia fields. A better tone is anticipated, although there seems to be little tangible reason for this.

COKE

CONNELLSVILLE

Market receives setback. Consumers buy July coke at much less than demanded on second-half contracts.

The coke market has received a decided setback. Sellers were greatly encouraged by contracts placed some ten days ago, three lots aggregating 27,000 tons a month over second-half going at $2, the top price asked for some time.



Instead of falling in line and paying $1.90 to $2 on contracts—the coke sold at $2 being of particularly high quality—the other consumers who were uncovered have proved that they could buy prompt and July coke of fair grade at about $1.75, and have covered for short periods at this price, so as to put off the necessity of making contracts. The operators who were holding out for $2 maintain the position but recognize that they can hardly obtain the figure until iron and steel conditions improve considerably. Such an improvement is now fully expected. The market is quotable as follows:

Prompt furnace (including July) $1.75@1.80; contract furnace, $1.90@2; prompt foundry, $2.30@2.50; contract furnace, $2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ending June 20 at 271,553 tons, a decrease of 1022 tons, and shipments at 270,397 tons, an increase of 10,132 tons.

BUFFALO

There is said to be a special reason for the general dullness in coke. The byproduct coke manufacturers are active and increasing, so that it is not believed that the Connellsville district will ever fully recover its lost ground. The economy of the byproduct oven is hard to compete with. Prices are as dull as ever, being on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.25 for stock coke.

BIRMINGHAM

Coke market exceedingly quiet, both on foundry and furnace grades.

There is really nothing much to say regarding the Birmingham coke market. With the exception of a little spurt about last December, the market in this district has been very weak. Some of the manufacturers of high grade 72-hr. foundry coke state that their business has been fairly satisfactory, while the manufacturers of 48-hr. furnace coke complain that there is nothing doing. No immediate improvement is looked for, at least until the iron market picks up.

CHICAGO

The coke market is slack. There is sharp rivalry for what business develops in foundry coke with a tendency to cut prices. The circular price for byproduct advanced July 1 to $4.75 Chicago, and gas-house coke has been reduced from $4.25 to $4.15. Connellsville and Wise County are quoted at $5@5.25.

SOUTHERN

BIRMINGHAM

Lump coal market weak and steam grades only fair. Blacksmith coal about the same. Fairly good tonnage of pig iron sold, though prices are low.

The lump coal market is very weak, few sales of any importance being made, and the indications are for a rather hard summer. Steam coal is little better than lump. Although some contracts are being made, these were more in the nature of renewals, and had already been discounted. Blacksmith coal seems to be holding its own both as to tonnage and prices. The producers of this grade state that business is fairly good. A good tonnage of pig iron was sold on the approximate basis of $10.50 f.o.b. Birmingham.

LOUISVILLE

Eastern Kentucky market active. Buyers inclined to cover their requirements and drop out of the prompt market.

Though conditions in the western Kentucky field continue backward, the situation in the eastern Kentucky field has shown greatly increased activity. Domestic coals are in more than brisk demand at a ten- to fifteen-cent advance, while stocks of steam sizes are being rapidly cut down and there is much less on demurrage than for the past three or four months.

In western Kentucky, sales are being made at what the market will bring, no stable basis having been established; the mines are working from one-third to two-thirds full time. The quotations for eastern Kentucky coals vary from 40 to 75c. for nut and slack; 90c. to $1 for six-inch run-of-mine; $1 to $1.05 for steam run-of-mine and from $1.60 to $2 for block coals, all prices f.o.b. mines.

MIDDLE WESTERN

INDIANAPOLIS

Mines on half-time, with a few doing slightly better. Crop movement near and railroads will be larger buyers then. Prices at lowest summer level, with exception of slack.

The mines, as a whole, are on half-time or possibly a shade better, with some companies doing much better, and a very few on practically full time. The industry is waiting for the improvement expected with the beginning of the crop movement. The railroads have been putting thousands of cars in readiness for this, and they will be larger consumers, while it is expected related industries will also show more activity. The money put in circulation by the crop movement should create a demand in many lines that will improve general industrial conditions.

Slack is the only grade for which the demand seems to tax the supply. It is selling at 80c. to 90c., as against not much more than one-half of that at this time last year. This may be due to the Keokuk dam across the Mississippi, which has cut down the demand for slack about 50,000 tons a day. Retailers report a good summer movement of domestic grades to consumers' storage bins.

CHICAGO

Chicago dealers expect to handle an unusually large tonnage next fall. The market is already moving toward a better position. Production being restricted.

It is estimated that the amount of coal moving into Chicago at present is about 30% normal and when the fall rush begins it is expected that operators will be confronted with inadequate transportation facilities. The railroads have purchased only a small number of new cars and engines and in many instances have permitted their rolling stock to deteriorate. This means that a record coal tonnage must be moved during both a low railway efficiency and a small car supply.

There is a stronger tone to the smokeless market. A large amount of this fuel on track has been disposed of and comparatively little is being forwarded. On this account dealers are able to adhere to the circular price which advanced to $2 a ton July 1, on smokeless lump and egg. The demand has been good. Orders from the country for splint coal are arriving in considerable volume. As a number of the mines are still closed down by a strike, the amount of this fuel received in Chicago has been reduced.

Prevailing prices are:

	Springfield	Franklin Co.	Clinton	W.Va.
Domestic lump	$2.07	$2.40@2.55	$2.12	
Steam lump	1.97		1.97	
Egg		2.40@2.55		$4.05
Mine-run	1.87	2.15@2.25	1.87	3 30
Screenings	1.67	1.95	1.67	

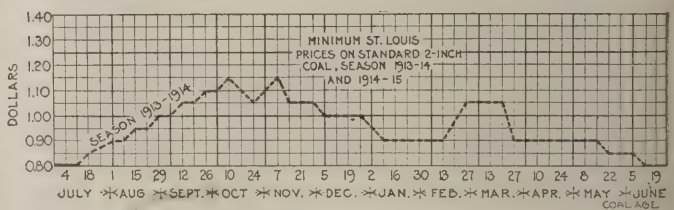
Quotations on Harrisburg coal are: Domestic lump and egg, $2.40; steam lump, $2.25; mine run, $2.15@2.25; screenings, $1.95; No. 1 nut, $2.55; No. 2 nut, $2.40.

Carterville prices are: Lump, $2.40; egg, $2.40; No. 1 washed, $2.55; No. 2 washed, $2.45.

ST. LOUIS

Slightly better movement, particularly on the higher grades. Steam trade stationary and anthracite dull.

A slight picking up in the way of tonnage for the first few days in the month indicates that business will be fairly good for the next week or ten days. The market did not advance on screenings, as it was expected to; as a matter of fact, all steam coals remained stationary, with a tendency to weaken if anything. The higher grade coals show a better movement, with a tendency towards a higher price, especially on the domestic sizes.



Anthracite is still slow, with very little moving, and the same applies to coke. Smokeless is unusually dull, with plenty under demurrage at East St. Louis, and anthracite is the same. Prospects are, however, that the middle of the month will see a better movement of everything.

The prevailing prices are:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump			$1.15	$0.85	$0.95
3-in. lump					
6-in. lump	$1.15@ 1.35		1.25	1.00	1.15
Lump and egg	1.85@ 2.15	$2.00			1.15
No. 1 nut	1.15@ 1.30				
Screenings	0.85@ 0.90		0.80@0.85	0.75	0.75@0.80
Mine-run	1.00@ 1.15			0.75@0.80	
No. 1 washed nut	1.30@ 1.40	2.25	1.50		
No. 2 washed nut	1.20@ 1.30		1.35		
No. 3 washed nut	1.15@ 1.25				
No. 4 washed nut	1.15@ 1.25				
No. 5 washed nut	0.70@ 0.85				

KANSAS CITY

Harvesting demand about satisfied. Shortage in the supply of fuel oil will create an increased consumption of coal.

Future bookings have continued to measure above those for the corresponding period a year ago. Most of the mines in this section are running about four days a week, with some operating even more fully. Much of the demand created by the wheat harvest in Kansas and other states has ceased, though some shipping will be done until August.

A feature of developments of the past week was the announcement by the Standard Oil Co. that it will be unable to supply big consumers of fuel oil after Oct. 1. This means that the industrial concerns which have relied on oil will necessarily install coal burning equipment. Consumption will be heavier during the coming fall than ever before, according to present indications.

PORTLAND, ORE.

Market featureless, with very little business transacted.

This is the time of year when there is little doing here in the fuel trade, and this year is no exception to the rule. The warm weather keeps the consumer's thoughts from the coal bin and little is being bought now for storage, although the summer rates have gone into effect. Most of the mines in the Pacific Northwest are working slow, many of them operating enough only to supply regular customers, such as the railroads and manufacturing industries.

PRODUCTION AND TRANSPORTATION STATISTICS

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during April and the first four months of the last two years, in short tons:

	April		4 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	123,602	129,220	557,994	536,762
Chesapeake & Ohio[1]	2,176	1,903	4,343	4,954
Erie[3]	753,072	726,237	2,711,120	2,854,845
Pennsylvania[1 3]	930,592	1,070,562	3,674,096	3,776,953
Virginia[2 1]	45	.....	356	102
Total 5 roads	1,809,487	1,927,922	6,947,909	7,173,616
Bituminous				
Baltimore & Ohio[1]	2,660,702	2,275,296	11,191,886	11,228,213
Buffalo, Roch. & P.[1 2]	661,519	347,260	2,955,146	2,842,680
Buffalo & Susq.[1 2]	152,537	14,721	602,601	447,647
Chesapeake & Ohio[1]	964,104	1,637,214	4,925,334	6,028,035
Erie[3]	70,970	218	255,822	28,421
Hunt. & Br'd T. Mt[1 2]	93,376	77,219	474,976	407,176
New York Central	675,175	333,222	3,119,160	2,825,987
Norfolk & Western[1 2]	1,543,220	2,117,286	7,237,796	7,861,693
Pennsylvania[1 3]	3,796,432	3,699,928	15,914,179	16,114,420
Pitts. & Lake Erie[1 2]	1,133,744	434,399	4,043,395	3,525,221
Pitts. Shaw. & North[1 2]	227,003	72,747	908,985	864,002
Virginia[1 2]	345,039	342,843	1,578,283	1,346,660
Western Maryland	245,564	237,031	1,006,549	988,076
Total 13 roads	12,569,385	11,589,384	54,214,112	54,508,231
Coke				
Baltimore & Ohio[1]	400,317	343,962	1,616,068	1,240,461
Buffalo, Roch. & P[1 2]	45,436	17,523	209,443	97,222
Buffalo & Susq.[1 2]	26,448	10,007	104,211	120,866
Chesapeake & Ohio[1]	28,471	36,215	121,085	147,323
New York Central	7,723	.....	25,152	.....
Norfolk & Western[1 2]	129,625	86,918	578,453	404,602
Pennsylvania[1 3]	1,230,979	916,369	4,987,304	3,616,606
Pitts. & Lake Erie[1 2]	594,863	529,535	2,454,710	1,870,674
Pitts. Shaw & North[1 2]	91	.....	9,383	.....
Western Maryland	7,865	5,308	26,903	29,446
Total 10 roads	2,471,818	1,945,837	10,132,712	7,527,200

Total Coal and Coke, 13 Roads	1913	1914
January	19,266,202	18,124,936
February	17,546,496	15,419,489
March	17,631,345	20,201,479
April	16,850,690	15,463,143
Total, 4 months	71,294,733	69,209,047

[1] Includes coal from connecting lines.
[2] Includes company's coal.
[3] Does not include company's coal hauled free.
Note:—The Southern Railway hauled 339,126 short tons of bituminous coal during March, and 987,968 short tons during the three months.

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for January of the years 1913 and 1914:

State	1912	1913	Increase	Decrease
Missouri	305,825	277,609		28,216
Kansas	523,605	526,300	2,695	
Arkansas	183,648	162,056		21,592
Oklahoma	366,859	333,125		33,734
Totals	1,379,937	1,299,090	2,695	83,542

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

ANTHRACITE SHIPMENTS

Anthracite shipments for June and the first six months of the current year as compared with last year were as follows:

	June		6 Months	
	1914	1913	1914	1913
Phila. & Reading	944,816	1,155,107	6,031,648	6,858,384
Lehigh Valley	1,325,982	1,183,821	6,155,075	6,592,131
Cent. R.R. N.J.	839,514	851,445	4,389,087	4,575,664
Del. Lack. & West.	941,868	827,714	4,598,506	4,789,360
Del. & Hudson	661,248	568,352	3,415,875	3,504,539
Pennsylvania	470,652	510,341	3,217,088	3,167,106
Erie	738,175	661,892	3,990,027	4,079,792
Ont. & Western	207,931	211,375	1,148,483	1,284,878
Total	6,130,186	5,970,047	32,945,789	34,851,854

SAULT STE. MARIE CANALS

Coal shipments through the Sault Ste. Marie Canals for June of the current year were as follows in short tons:

	U. S. Canal	Cana. Canal	Total
Anthracite	344,989	69,412	414,401
Bituminous	1,512,894	333,795	1,846,689

FOREIGN MARKETS

GREAT BRITAIN

June 26—There is very little doing on account of the British Marine Engineers' strike. Spot supplies are obtainable at comparatively cheap figures, but sellers are holding for high prices for forward deliveries.

Approximate quotations:

Best Welsh steam	$5.04@5.28	Best Monmouthshires	$4.08@4.14
Best seconds	4.68@4.80	Seconds	3.84@3.90
Seconds	4.44@4.56	Best Cardiff smalls	2.58@2.64
Best dry coals	4.32@4.50	Seconds	2.46@2.52

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those of Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

Coke is quoted at: Special foundry, $6.24; good foundry, $4.80@5.52; furnace, $4.08@4.56.

SPAIN

Spanish imports for the three months to Mar. 31 in metric tons were:

	1913	1914
Coal	640,958	695,293
Coke	91,387	91,525

RUSSIA

The following shows the output of coal in the various districts during 1912 and 1913:

	Millions of poods*	
District	1912	1913
Donetz coal	1086.58	1268.34
Donetz anthracite	217.98	292.61
Dombrowa (Poland)	394.53	426.31
Ural	47.50	60.16
Moscow	12.93	17.12
Caucasus	4.27	4.27
Total	1763.79	2068.81

The above corresponds to an increase of 17.3 per cent.
*1 ton = 62.028 poods.

French Coal Imports at Rouen—All records for imports of coal were exceeded in 1913 with a total of 3,174,818 tons against 2,488,687 tons in 1912, the increase being almost exclusively due to shipments from Great Britain which furnishes nearly all of this article. Imports of anthracite were 250,438 tons. Total imports of German coal in 1913 were 149,525 tons. The excellent equipment at Rouen for loading and unloading coal is thought to be partly responsible for the route being so largely used to reach interior France, facilities of the port permitting the discharge of 3300 tons of coal in 9 hr. Four-fifths of the coal imported into Rouen by sea is reshipped to interior France. Less than a third is forwarded by railroad; of the remainder, delivered in barges, Paris and ports on the Seine receive most, but barges from Rouen bearing English coal go far beyond. In western France they deliver cargoes at Alencon, Mans and Tours to compete against the importations of coal from an opposite direction; by the network of waterways in central France they reach Montargis and Dijon, and by the system of canals of the Oise, the Aisne, and the Marne this water-borne coal arrives to compete against France's own coal mines in the markets of Amiens, Soissons and Nancy; anthracite ascends to the industrial centers of the Vosges, the Meuse and the Haute Marne, to be utilized at gas plants.

Financial Department

Pittsburgh Coal Co.

M. H. Taylor, chairman of the board of Pittsburgh Coal Co., says in his report for 1913:

Production—The total tonnage produced and handled for the year, including coke, and exclusive of coal purchased and handled by the dock companies was 24,707,204 net tons, an increase over 1912 of 644,822, or 2.68%.

While 1913 began with large stocks and a lessened demand, due to weather and trade conditions, an early improvement in the latter permitted all of the mines to average fairly full operating time until the last quarter of the year, when, influenced by free shipments made from all fields and by the recession in general business which then set in and continued for the balance of the year, demand fell off, with the result that the tonnage increase shown on the nine months to Oct. 1 of 6.58% was reduced to 2.68% for the whole year. Transportation facilities were good and efficient, and under no unusual shortage on labor or labor troubles, the output for the year would have largely exceeded 1912 through ability to produce and handle, could it have been placed.

Earnings—An increase of 35% in net earnings for the year on 2.68% tonnage increase—indicates the application of efficiency to the different plants in sales, production, handling and distribution; and especially, that all producers have been forced by their necessities to obtain a price which would more nearly represent the expense, risk and value of their product. By reason of the vast general production of the country, always increasing, its accompanying wastes and higher costs with a decreasing labor supply, prices must continue to advance until there is a substantial reduction in the present heavy percentage of labor charge by mechanical development. A better selling value is required to improve living conditions, to reduce personal injury risk, for proper compensation when sustained, and to secure a larger recovery of the coal.

Bonds—No new bond obligations have been assumed since last annual report and there has been retired during the year in principal of bonds and mortgages the sum of $1,965,243, of which $1,720,243 was paid out of working capital, and $245,000 from bond sales proceeds under Pittsburgh Coal, Dock & Wharf Co. mortgage of Apr. 1, 1912, reserved for the purpose. The principal of total bonded and mortgage debt, direct and indirect, at the end of year, was $31,154,255.

Improvements—It is realized that efficiency in selling, mining and distributing the output must always be had to obtain best general results against competition to be met, and to this end the large investments have been made during the past five years at mines, docks and yards. Some of the results for 1913 come from these investments for modern facilities, and each year should increase their service. Dock No. 5, West Superior, Wis., has been completed, and its operating results are fully up to expectations, as also those of Dock No. 7, Duluth, Minn., continue to be. Lime Island dock went into operation Aug. 30, 1913. Further construction should be added to No. 5 dock, and also to Algonquin dock at Sault Ste. Marie, Mich., when the company is in position to do so. Maintenance and operation of each unit have been directed to promote "safety first."

There is no floating debt other than current obligations for operating and maintenance, except for special construction work, the cost of which has been provided for by reserved bond sales' proceeds, and usual notes issued by subsidiary companies for coal in stock.

Minor troubles, general labor shortage amounting in the average to 15% through the busy season, compliance with safety provisions required by law, unusually heavy personal injury payments, and average higher prices for supplies, have increased production cost at the mines.

The past year practically completed the change from air and steam to electric power, either made or purchased, which, with standardizing equipment at the mines, has been a heavy past charge to operation.

To maintain effective production, three new mining plants are now in course of construction on the line of the extension of the Montour R.R., and are expected to come into operation during the present year.

Coal Reserves—At the end of the year there were owned and held 150,516 acres of the Pittsburgh vein. Should there be no greater annual exhaustion than during 1913, and no further acreage be hereafter acquired, that now owned will continue the life of the company for about 54 years, as a whole, with the other veins in reserve.

Preferred Dividends—It has been a regret to your directors that discharging debts and building up the physical structure of the company has so far deferred any adjustment of the dividend arrearage upon the preferred stock, amounting to 40.58⅓%, as of Dec. 31, 1913.

Due to its present physical and financial condition, its trade position, and a belief in its ability to maintain earnings up to an average better than the past under like opportunities, your directors have felt for some time that they would be warranted in taking the matter into considertaion, in the hope that some adjustment plan might be found that the company could undertake and be acceptable to the shareholders; and, therefore, a committee of the board has been named to first consider and advise what plan or course, in its judgment, could be recommended, but action by it has been delayed on account of the continuing unsettled business situation, and will be until improvement in it permits.

Forecast—A conservative expectation of results for the year is warranted, based on tonnage movement so far, consequent increase in production cost and uncertainty of trade requirements, although there has come a more general feeling of encouragement for the future, with some improvement in demand. Production cannot reach the total of 1913 on the present level of general business, nor become active again until its excess now carried in stock has been used. Both cost and selling value are involved in the renewal of the biennial wage agreement which expires Apr. 1, not yet arranged. Full trade requirements of the company will be maintained and can be met, after possible interruption of running time for these causes to some extent, by the reserve capacity of the plants and handling facilities which the company now has, with labor and transportation supply.

Results for Calendar Year

(Including Monongahela River Consol. Coal & Coke Co. in 1913)

*Produc. (tons 2,000 lb.)	1913	1912	1911	1910
Pittsburgh district coal	23,451,623	16,948,775	14,739,158	16,213,912
Hocking district coal	1,072,873	1,414,642	1,281,517	1,267,914
Kentucky district	182,708	.....	.....	.....
Profits, after all expenses	$6,421,703	$4,427,063	$4,044,504	$4,699,863
S. fs., & depl. coal lands	1,555,089	714,306	696,181	777,285
Deprec. plant and equip.	1,284,206	811,251	867,595	901,089
Net profits	$3,582,408	$2,901,506	$2,480,728	$3,021,489
Interest on bonds	$856,140	$876,024	$1,088,791	$1,056,039
Preferred dividend (5%)	1,353,590	1,353,590	1,353,590	1,353,590
Undivided profits	$1,372,678	$671,892	$38,347	$611,860
Surplus brought forward	9,153,434	8,481,541	8,443,194	7,831,333
Total surplus Dec. 31	$10,526,112	$9,153,434	$8,481,541	$8,443,193

*Production includes sundry purchases from other producers and coal used in manufacture of coke.

Earnings in 1913 and 1912

(Including Monongahela River Consol. Coal & Coke Co. in Both Years)

	1913	1912	Deducn's (Con.)—	1913	1912
Gross receipts	$36,266,146	$34,420,720	Res. for bond prem.	$520,128	$483,462
Earnings	6,421,703	5,692,429	Bond interest	856,139	876,024
Deduct—			Pref. divs. (5%)	1,353,590	1,353,590
sink. fd.	1,034,961	921,345	Balance, surplus	1,372,679	671,893
Depr. plants & eq.	1,284,206	1,386,115			

Consolidated Balance Sheet December 31

(Pittsb. Coal Co. and Sub. Cos., incl. Monongahela River Cons. Coal & Coke Co.)

Assets—	1913	1912	Liabilities—	1913	1912
Properties	$81,815,016	$79,826,702	preferred stock.	$32,000,000	$32,000,000
Treasury stock—			Common stock.	32,000,000	32,000,000
Pref. stock	4,928,200	4,928,200	First M. bds.		
Investm'ts in stks. and bo.	2,415,020	2,975,026	(see Ry. & Ind. Sec.)	30,147,500	29,049,000
Cash with trustees	10,880,223	10,149,893	Mtgs. payable.	250,755	315,498
Pension fund investments.	110,206	86,243	Ctfs. of indebt.	600,000	745,000
Merchandise	7,132,057	5,619,625	Car trust notes.	156,000	260,000
Accounts and bills receivable	6,798362	7,905,937	Pension fund	125,533	108,026
Cash	2,217,362	2,349,949	Bills payable	4,053,680	2,875,255
			Accts. payable.	4,061,741	5,307,661
			Stock purch. sur.	1,021,992	1,021,992
			Insurance fund	356,859	412,294
			Sales conting. fund	25,000	25,000
			Bond prem. res've	971,274	568,415
			Undivided earns.	10,526,112	9,153,434
Total	116,296,446	113,841,575	Total	116,296,446	113,841,575

*Properties owned Dec. 31, 1913, consisting of coal lands, mine plants and equipment, railways, railway cars, docks on Great Lakes, etc., were: Coal lands and real estate, less allowance for depletion of coal lands $61,700,387; plants and equipment, less depr., $20,114,629.

COAL AGE

Vol. 6 NEW YORK, JULY 25, 1914 No. 4

In many mining communities the entire political, social, moral and educational welfare of the inhabitants is dependent on the whims of the colliery superintendent.

The sanitary condition of the camp, the hospital facilities, the Sunday school, the common school, the condition of the dwelling houses, the character of the saloon or its successor, the blind tiger, the water supply, the goods carried in the commissary—surely in all the world's history no one class of men have had more complete control of a people's affairs than that possessed by the average coal superintendent.

There are children being born into our large mining camps every passing day, who will grow to manhood and then follow on down to old age, without ever changing their place of residence.

If they have no opportunity for education, are reared amid unhealthful surroundings, are offered no encouragement to acquire culture and independence, the blame, in all probability, will be traced back to some superintendent who failed to realize his responsibility.

And yet, in spite of all these facts, you will find plenty of superintendents who never have seemed to realize that their responsibility extends beyond their monthly cost sheet, and if questioned, they would have to admit that they have never given any time to an examination of their tenements except when some miner threatened to move on account of a leaky roof; and as for the moral atmosphere of the camp, they have never so much as given it a thought. Such superintendents generally have families that consider themselves above mingling with the people who live in their town and, as a consequence, even the wives of these superintendents know little about the requirements of the camp's inhabitants.

There is another type of superintendent whose intentions are good in the beginning, but often, after being opposed once or twice by his men, while attempting to inaugurate reforms, he gives up in disgust and attends strictly to the orders issued by the Big Boss from the general office. It was of such men that Pascal was probably thinking when he said: "Man is neither angel nor brute and the unfortunate thing is that he who would act the angel acts the brute."

Of course, if a superintendent has risen from the ranks, has never seen a modern camp and is unacquainted with modern conditions, very little can be expected from him if left to follow his own ideas, but in the present status of the coal industry, such a man would be hard to find.

No; every one knows what a modern mining camp looks like (there is always one in the neighborhood), but there are plenty of camps still in existence whose destinies are presided over by superintendents who have never taken time to inquire as to what might be accomplished and what ought to be accomplished.

If every mining camp was an incorporated village, how long do you think it would take the politicians to convince the populace that the man in charge of their affairs needed waking up; and how long do you think it would take the superintendent, after once being aroused, to convince the same populace that he and he alone could carry out the dreams advocated by the politicians?

All of which leads us to suggest that whenever you happen across a superintendent who is bored to death and complaining of his narrow sphere of usefulness, take a few minutes off to carefully and earnestly explain to him some of the possibilities that some of his neighbors have uncovered, and, as a final argument, give him this thought from Schiller: "When man is raised from his slumber in the senses, he feels that he is a man, he surveys his surroundings and finds that he is in a state.

Reformed

By Berton Braley

Written Expressly for Coal Age



I usta be da greata man
For spenda money free,
I usta rush da growler-can
One beeg sport—datsa me;
But seence I meet one leetla girl,
I was'e no more, no sir,
I no have spent a seengle cent
Onless I spen' on Her!

I usta—when I leave da mine
Go straight to beer-saloon,
But now I go an' dressa fine
An' then you see me soon
Go walking weeth a leetla girl
Weeth softa eyes an' brown,
An' hair that's creenkle up an 'curl
Da preetiest in town!



Now every time I load a car
I say myself, I say,
"Dere, Tony, datsa go so far
To help for earn your pay,
You worka jus' so hard like dat
An' sava all da time,
Like wise ol' guy an' bye an' bye
Dose wedding bells is chime."



You be da merry bachelore?
Believe me, datsa fake—
You got no theeng for livin' for
W'at use da cash you make?
You listen to da wisa man
An' queet dat dizzy whirl,
You wanta be so smart like me
An' get a leetla girl!

Coal Pulverizing and Mixing Plant

By H. H. Kress*

SYNOPSIS—In order to increase both capacity and quality of product, large additions were made to the crushing and mixing apparatus at this coke plant. Both of the results sought were secured.

About a year ago the Hamilton Otto Coke Co., of Hamilton, Ohio, enlarged its works at Cokeotto, located near Hamilton, by installing a modern type of coal-pulverizing and mixing equipment. The output of this company is marketed extensively for domestic and foundry uses, and the increased demand necessitated an enlargement of facilities. The general view of the plant with the additional equipment is shown in the accompanying photograph.



General View of Crushing and Conveying Plant, Hamilton Otto Coke Co., Hamilton, Ohio

E. M. Peters, president of the company, stated shortly after the work was completed that "the new machinery and auxiliary equipment consisting of a track hopper, elevating, pulverizing and complete coal-mixing plant was installed primarily to improve the structure of our coke. From the pulverizing alone a decided improvement in the quality of the product was noticeable. After considerable experimenting with different kinds of coal as a mixture, a further improvement was achieved, so that at present the quality of coke we are producing, both chemically and structurally, is superior to most beehive and equal to any byproduct coke on the market."

The enlarging of the plant was accomplished by the installation of additional new equipment, consisting of a complete plant, built parallel to the old one, which can be seen on the right side of the illustration.

The equipment operated prior to the installing of the new was inadequate. The plant was not large enough to produce the output demanded. The old installation consisted of a railroad track hopper, a crusher underneath it and an inclined scraper conveyor, a large central storage bin, about 100 ft. from the track hopper, received the crushed coal from the conveyor. Modern facilities were lacking on the former equipment and the quality of coke desired was not obtained.

The coal carried to the storage bin by the old inclined conveyor could not be distributed evenly. The new equipment is more modern in every way, having a capacity for handling 100 tons of coal per hour. The equipment consists of a track hopper, a Jeffrey single-roll crusher, a vertical bucket elevator, an inclined bucket elevator, two compartment bins, a mixing plant, a common hopper, a Jeffrey swing-hammer pulverizer, and an inclined bucket conveyor, all of which may be seen in the photograph.

The run-of-mine coal, after being dumped into the new track hopper, is carried by means of a 36-in. beaded flight conveyor to the Jeffrey 30x30-in. single-roll crusher

*Jeffrey Mfg. Co., Columbus, Ohio.

and reduced to 1½-in. cubes and smaller for convenience in elevating, mixing and pulverizing.

The continuous vertical bucket elevator delivers the crushed coal into the two compartment bins, having a capacity of 100 tons each. These are shown in the accompanying photograph. Two different kinds of coal are stored in the bins. The vertical bucket elevator is equipped with a chute, having a lateral, with a valve connection for the distributing of the different grades of coal into the bins. This operation is handled by a single employee, who keeps the bins filled at all times.

The quality of coke depends upon the mixing of the coal proportionally before entering the pulverizer. The mixing is accomplished by two 60-in. dia. horizontal circular-disk feeders, arranged to gage the feeding from 1:10 to 1:3, as desired by the operator. The coal is then delivered into the common hopper.

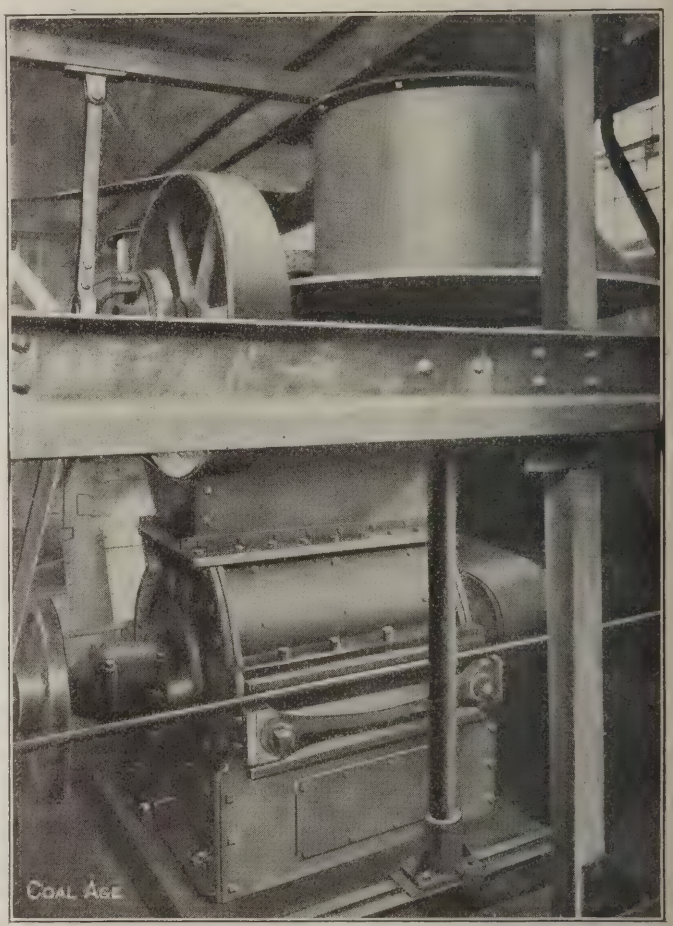
The 36x42-in. Jeffrey swing-hammer pulverizer is driven by a 100-hp. motor at about 1000 r.p.m. The coal by this operation is reduced to the proper fineness and is ready for the large central-storage bin.

The inclined continuous bucket elevator picks the coal up at the base of the pulverizer and conveys it either to the inclined bucket conveyor or to the inclined scraper conveyor. In the accompanying photograph can be seen the lower construction of the conveyor, also a portion of the chute that feeds the buckets. Another chute is provided to deposit coal into the old scraper conveyor should it become necessary to operate in this way.

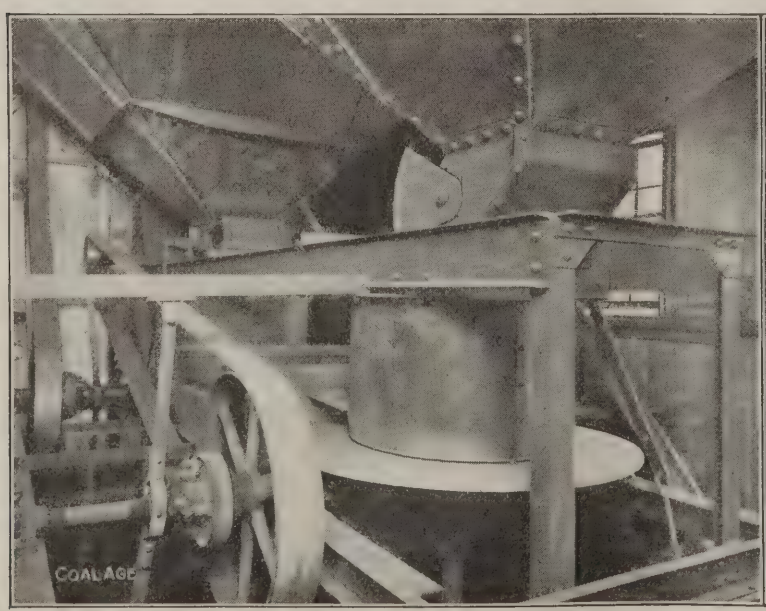
The inclined bucket conveyer operates in a shaft 140 ft. in length and is constructed entirely of steel. A flight of steps is supplied at the side for convenience, and the structure is covered with a wood siding and roofing of a standard prepared composition.

The distribution of the pulverized coal to the central storage bin was improved with the installation of the new equipment. The coal when carried to the bin by the inclined bucket conveyer is taken by a reversible scraper conveyor and dumped uniformly to all parts of the bin. The conveyer is 59 ft. long and traverses the entire length of the storage bin.

The storage bin is directly above the ovens and was built before the new equipment was installed. The latter are of the Otto Hoffman type, composed of two batteries which parallel both tracks, extending on either side of the storage bin, as shown in the photograph. The crushed coal is taken from the central storage by electric larries operating along a steel framework and dumped directly into the ovens.



TYPE B PULVERIZER



GENERAL VIEW OF DISK FEEDERS



SECTION OF BUCKET OUTFIT

The working parts and machinery of the plant are easily accessible. The entire space where the machines operate is covered with diamond-tread iron floor plates, allowing ready access to the working parts without disturbing the rest of the machinery. It requires four electric-driven motors to operate this plant.

The new equipment above described was designed and erected complete by the Jeffrey Mfg. Co., Columbus, Ohio.

Extracts from a Superintendent's Diary

The word adventurer has always held a great fascination for me, but I'm afraid it lost most of its glamour today. I've been employed superintending the checking in and arrangement of quarters for the carload of strike-breakers who arrived from New York last night.

Surely they are adventurers. Of every nationality and occupation imaginable, and displaying by their talk and manner the abandon and fearlessness used as stock in trade by our popular story writers, they are easily classified. But—

Fiction writers overlook the animals that travel with these people—lice.

Fiction writers don't tell us about the filthy habits and the loathsome diseases that these men discuss continually.

Fiction writers don't even hint at the moral depravity that seems to have taken possession of these human beings.

In fact, I realize now that fiction writers are concerned mostly with what these men do, and they leave to our imagination the consideration of what they really are.

For example, I noted particularly one bright-looking young fellow who, according to his story, had twice circled the globe. He has worked at different times as sailor, "news butcher," hotel porter and circus roustabout, and, without effort, he amused a crowd of our mine guards and company men for hours at a time. Just his "brogue" alone was so amusing that he could have held attention by simply talking, but in addition to his brogue his adventures were most surprising and quite in keeping with the expectations of his audience. But every now and then he would unconsciously let out a little of sure-enough personal history, and then some of our older and more thoughtful men would look serious. It didn't take them long to realize that if this young fellow were accepted into some of their homes and allowed to roam at will he would, ere long, leave behind him a trail of misery quite as difficult to wipe out as a siege of bubonic plague.

It soon became evident that this young fellow was no better and no worse than the others; only he, being somewhat younger than his companions, had less control of his tongue.

Gradually during the day we picked up the life stories of many of them, and, while they varied greatly as to beginnings, they agreed closely as to present tendencies. The same apparent desire to stage all of their adventures in slum surroundings was characteristic of all of them, irrespective of the favorable early training which some of them claimed and, strange to say, I caught myself wondering what effect they would have on the slums, rather than what effect the slums would have on them.

Of course, we have been outrageously imposed upon by our labor agents in the North. We requested experienced miners, and instead we have been furnished with a carload of men, most of whom never saw a coal mine and have no intention of laboring in one even now. They have their eyes pointed toward a large city just south of us, and they figured, no doubt, that this was a good opportunity to secure free transportation at least part way. But even though they all disappear by morning, their advent in our midst will not soon be forgotten. We've had an opportunity to contrast our men with other men of the world, and we're bound to have a higher opinion of them because of it. It's unfortunate that more of our miners were not brought in intimate contact with these men, but of course, during times of strife, we can't afford to let down the bars just for sociological effect.

And it's quite possible that some of our young women will be able to realize that perhaps our young men, as a whole, are worth catching after all.

An Increase in Coke Production in Indiana and Illinois

The production of coke in Indiana in 1913 was, according to E. W. Parker, of the U. S. Geological Survey, 2,727,025 short tons, valued at $13,182,136, this being an increase over 1912 of 110,686 tons in quantity and $643,451 in value.

All the coke made in Indiana is the product of retort ovens, most of the coal coming from West Virginia. With the completion of the byproduct plant of the United States Steel Corporation, at Gary, in 1912, Indiana rose from a relatively low rank among the coke-making states to third place, outranking West Virginia, from whose mines the Indiana ovens receive the greater portion of their fuel.

The plant at Gary consists of 560 Koppers ovens which, in 1913, produced 90 per cent. of the entire output of the state. The total number of ovens in Indiana at the close of 1913 was 749, while 41 were under construction. Ten beehive ovens at Black Creek were abandoned. The 749 ovens had an average production of 3670 tons of coke, the yield from the coal used being 77.1 per cent.

All the coke produced in Illinois, as well as that in Indiana, is the product of retort ovens, which are fired mostly with West Virginia coal. The common practice is to mix the West Virginia coal with Illinois coal in the proportion of 4 to 1. This mixture is powdered before charging and has been found to make an entirely satisfactory coke with a yield of approximately 75 per cent. There are four establishments with a total of 568 ovens, all of which were in operation during the year; 58 ovens were in process of construction—40 at South Chicago and 18 at Joliet, both installations being additions to plants already established.

The production of coke in Illinois increased from 1,764,944 short tons, valued at $8,069,903 in 1912, to 1,859,553 tons, valued at $8,593,581 in 1913, or a gain of 94,609 tons and $523,678 in value.

It is remarkable that in neither of these states, Indiana or Illinois, are there any of the old-fashioned beehive coke ovens in operation.

Organization and Preparation for Mine Rescue Work

By George E. Sylvester*

SYNOPSIS—Although the Bureau of Mines has done much to put mine rescue work upon a solid basis, the political subdivision of government exercising control over the mining industry should logically organize and maintain a force to cope with emergencies. Training in first aid should approximate actual conditions.

Wherever bituminous coal is mined there seems to be no way to entirely eliminate the possibility of mine explosions.

The extensive investigations which have been made, the numerous remedies recommended, and now in use, have undoubtedly done much to minimize the number of such disasters. It is, however, probably a fact that the modern practice of mining, with its increased use of machinery, more rapid development, with more extensive and deeper mines, does, increase to some extent the danger of explosions.

While it would seem that with the increased use of preventive measures mine explosions should diminish, statistics show that there is but little, if any, gain. While doing everything possible for its prevention, we must admit that the explosion or mine fire remains a possibility, and although it may be a rare occurrence, we should be prepared to handle the emergency when it comes in the best possible manner.

A general mine explosion is usually too great a disaster to be handled by the individual company, which must rely on public aid. And to give aid in such cases is clearly a province of the state. The question to be considered is, therefore, how can such aid be given with the maximum efficiency and economy.

The oxygen breathing apparatus is recognized as one of the most effective instruments in rescue and recovery work after an explosion. The Bureau of Mines has thus far taken the lead in the introduction and practical use of this apparatus. It has tested out and given its approval to such types as were found practical for actual use; has given instructions and issued certificates of competency in the use of the equipment to a considerable number of the miners from practically all of the coal fields, many of whom have rendered valuable aid in emergencies; and the trained men in its service have given active assistance in many of our worst disasters.

While much of this work can only be done to advantage through such a department, its efforts must in the nature of things be largely investigative and educational, and the question of direct organization should be taken up by the power in direct authority.

The State Should Organize a Rescue Force

The state is the political division assuming the direct supervision over the mines within its boundaries. But with one or two exceptions the various states have thus far been content with the matter of regulation only, leaving the caring for emergencies to the volunteer services of the individual or to the Bureau of Mines. I think I am safe in making the assertion that the greatest need in rescue and recovery work after an explosion is organization.

Organization in such a case necessitates one direct head, who must assume entire responsibility, and definite units of men under their respective leaders who understand their particular work, and who will recognize and obey the proper authority.

The chief, or in his absence, the district mine inspector, is generally expected to assume supreme responsibility, and is logically the person best fitted to direct such organization, since the general mining law of the state gives him certain authority which the individual or the federal official cannot have.

At such times the organization of the mine itself is highly demoralized. Sometimes those in direct authority are among the victims or are not in condition to assume command. The mine officials, however, should, and usually do, act in conjunction with the inspector at such times.

If an inspector is to be expected to assume such responsibilities he should be given the necessary authority and the means to carry out this work to the best advantage. This means that there should be at his disposal, a trained organization and a fund upon which he may draw for any necessary expense.

There are two ways whereby a state organization for such emergencies, may be perfected. A permanent organization of picked men may be established under regular salary, who shall hold themselves in readiness for emergencies; or a volunteer corps, might be organized, distributed throughout the field; who while carrying on their ordinary work as miners, shall maintain themselves in condition, and hold themselves in readiness to respond to a call for their services.

If mine explosions were of frequent occurrence, which fortunately they are not, the former might be the more desirable method, although a force large enough to be effective would doubtless be expensive. With disasters as infrequent as they are at present, and with reason to hope that their frequency will decrease, the latter system seems to be preferable.

There is nothing new in such a system of organization. In the smaller towns and cities where fires are not of frequent occurrence, the volunteer fire department, when kept efficient by frequent drills, has proved to be the most effective way to economically handle this form of disaster.

A Rescue Organization Is Comparable to the Militia

The state has need of a military force to cope with emergencies yet maintains no standing army, relying on a volunteer organization, the militia. Sufficient compensation is given for drill and training, which latter does not interfere with the ordinary occupation of the member.

There seems to be no reason why an organization for mine rescue work, based on the same plan, should not

*Chief inspector, Mining Department of Tennessee.

Note—Abstracted from a paper read before the West Virginia Mining Institute, Cumberland, Md., June 3, 1914.

prove what is needed. The fact that many miners in the various states, without compensation, and often with a certain amount of expense to themselves, have taken advantage of the instruction offered by the Bureau of Mines, shows that we could count on them to do their part. The operator should also coöperate, for an available, well trained rescue corps, besides its value in case of explosion, might at times prevent disastrous mine fires.

It is true a number of our large operators maintain rescue apparatus with efficient corps of trained men. It cannot be expected, however, that the smaller mines will be thus provided. Even should an operation maintain such a corps, in the event of a serious explosion it would still need assistance from other sources.

In order to form and maintain such an organization, and to properly distribute the corps, the state should furnish the apparatus and provide the supplies for same; there also should be sufficient compensation to the members to maintain regular drills. New men could be trained at these drills who would be eligible to act as substitutes, thus keeping the corps always up to full strength.

The operator should necessarily coöperate by furnishing the station and place for drill, which need not be elaborate. He should also assume the responsibility for keeping the equipment in condition.

The pay which each member should receive for drill should be sufficient to attract the best men from the mine or mines where the corps was located.

The workings of the corps should be under the direct supervision of the chief inspector, who should lay out the general system of the work and receive reports of same from the several corps captains. He should also be empowered to call on any or all corps for any serious disaster within the state. In this way the inspector could have at hand in an emergency a sufficient number of thoroughly organized corps which could serve as units in rescue work.

Team Work Is Important

The question of team work is of great importance. It is recognized that the corps, and not the individual, must be the unit in rescue work, as no man should go alone, or even with one companion. Five members seem to make the most effective working force, since if one is overcome, or meets with accident, there are four left to bring him back.

No matter how many men may volunteer in emergency, organization is lacking; the men are strangers to each other, and naturally doubt the courage or judgment of others. The weakness of the individual then becomes the weakness of the whole corps. Also the particular apparatus worn is new to the volunteer. It is not the one he has tried and tested out in many drills in the smoke room, and he feels that it may show a defect at the critical time.



A Mine Rescue Team Organized under Tennessee Legislation

With proper organization on the other hand, there could be brought together in emergency, not a sufficient number of individuals, but a number of organized corps, each member having confidence in his apparatus and his associates.

We have considered thus far the subject only with reference to work with the oxygen apparatus. As a matter of fact this may be, and often is, a small part of the question. The restoring of ventilation, building temporary brattices, and opening up a passage where falls have occurred must necessarily be done, and can probably be best accomplished by a volunteer force from our mines. Here, too, the question of organization is all-important, for there must be no haphazard work to add special danger to that which already exists.

While every disaster forms its own problem, the official rescue corps could, besides their drill in the appa-

ratus, be instructed in the general principles involved, and the dangers to be avoided. Men with this training might often do extremely valuable service in emergency.

Such a plan as I have attempted to outline would, if carefully carried out, result in an efficient organization, economical in administration, and well distributed through the mining districts. It should contain picked men from all sections, whose everyday work in the mines would tend to keep them in the best of physical condition.

Rescue Legislation in Tennessee

Last year the State of Tennessee enacted legislation with the object of bringing about as far as possible such an organization. This bill provided for the maintenance of a limited number of such volunteer corps, where an operator, or combination of operators, would furnish the apparatus, place for drill, and the necessary number of qualified men could be found to constitute a unit.

The bill set forth in detail the minimum amount of apparatus and the requirements of the operator, the qualification of men forming the corps, the requirements of a monthly drill, and the amount paid by the state to the operator for the materials used and to the members for drilling. No restrictions were placed on the private use of apparatus or corps, the only obligation imposed being the standard to which the apparatus should be maintained, and the monthly drill, together with the agreement to respond to a call from the chief inspector in case of a mine disaster, and to report with apparatus at any point in the state.

The obligation called for reporting for duty only, the actual entrance into danger being voluntary. Provisions were also made, giving the inspector authority at such occasions, with power to draw on the general rescue fund for necessary expenses, also for the compensation and expense of regular corps or specially qualified volunteers in case of a disaster. Provisions were likewise made for the employment of men for organizing and training in both rescue and first-aid work.

A station formed under this law directly after its passage, has shown that in detail it will give very satisfactory results. The unusual depression in the coal business in Tennessee since this bill was passed, together with the fact that much of the state's coal is produced in small independent mines, has been responsible for less being done in this work, thus far, than could be desired.

Suggestion for First-Aid Work

Rescue work and first aid are usually considered to have a more or less intimate connection. Rescue training should include the principles of first aid, although the latter as such does not necessitate any knowledge of rescue work.

In practice in rescue work the corps or team is the unit, while with first aid, although the training and drill are by team, the actual practice is usually by the individual.

While some legislation seems advisable in order to perfect organization in rescue work, little necessity exists for same in first aid, although each mine should be required by law to keep on hand suitable first-aid supplies.

The object of first aid is to teach the miner to be able to care for an injured man in the best manner possible until the arrival of medical assistance. While a miner will always do what he can for an injured comrade, it takes a greater incentive than the mere desire to be qualified for such an occasion, to induce him to learn this work.

While present methods have been successful in creating an interest in first aid, it does not seem to have entirely reached the desired end. To be the winning team on a field day seems to be a most powerful incentive, and tends to develop a group of a limited few, trained to a high degree of efficiency. While at a field day there are one- and two-man events, these are participated in only by picked men, and the members of a well organized corps are trained to work together.

When an accident actually occurs in the mines it is only by chance that a single member of the team is present, while the possibility is extremely remote that the whole team would be on hand to work as a unit. What usually happens is that those present do the best they can until the arrival of a first-aid man, who with such help as he can get cares for the injured miner. Often, as in the case of arterial bleeding, or electric shock, quick attention is required and there is no time to hunt up a first-aid man.

Contests Should Approximate Actual Circumstances

While it is hardly possible to have every man efficient in first aid, a more general acquaintance with the fundamental principles of this work would be lighly desirable

To hold the interest in this work the highly organized and efficiently trained team appears to be necessary, but it seems that our field days could be so arranged as to increase the general interest among the rank and file of our miners, and to represent more nearly the actual conditions under which accidents occur.

In local contests, where a considerable number of men from each mine could be present, in addition to the usual events, a simple one- or two-man event could be arranged, to be participated in by men chosen from among the general body of miners of each mine, outside of the first-aid teams; or, as in a real accident, one first-aid man could choose his necessary assistants from the miners at hand. A team event might be arranged for a single member of a corps, the remainder of the team to be picked at the time by a disinterested party, or in any other manner, from the miners present who are not members of a regular team.

While I do not know of any field days where such innovations have been tried, it may be possible that something along this line, while in no way detracting from the general interest in such occasions, might tend to stimulate a more thorough diffusion of the knowledge of first-aid principles.

Historical Mine Fires—A coal bed in Colorado has been burning for nearly a hundred years. In some of the Welsh coal mines there are fires that have been alive quite as long. Near Summit Hill, Penn., a fire has been burning in a body of anthracite for fifty-three years. It is still unquenched. Already it has detroyed coal to the value of $26,000,000. Almost as many millions have vanished in the same way in a fire in an Ohio coal bed that has lasted twenty-eight years. Near New Castle, Colo., the first white settlers observed smoke rising from a mountain plateau. At first they thought it came from an Indian encampment. But it continued week after week. Investigation proved that a seam of coal was burning. From the Indian traditions it appeared that this fire had been burning more than a century. At Carbondale, Penn., subterranean fires that have been burning for ten years have caused the earth's surface to subside.—"The Analyst."

Plant of the Borderland Coal Co.

SYNOPSIS—At this plant coal is mined in Kentucky and loaded on cars for market in West Virginia. At one operation a double bucket cableway is employed, while at a second plant, an apron conveyor transports the output of the mine across a river.

Mining coal in one state and loading it for shipment in another has its advantages and its disadvantages. The disadvantages are less when the state boundary is an imaginary line than when it is a physical barrier, like the river which the Borderland Coal Co. has to cross in getting its product from the mines to the railroad cars.

Tug Fork of Big Sandy River forms the boundary between Mingo County, West Virginia and Pike County, Kentucky, and the Norfolk & Western Ry. here runs along the West Virginia side. The Borderland coal property is on the Kentucky side and the product must be taken across the river for shipment.

The property includes 3300 acres, extending about two miles along the river and yielding coal from three workable seams. High in the hills, about 500 ft. above the river, is the Winifrede seam, available over about 25 per cent. of the acreage and averaging 6 ft. in thickness. About 130 ft. beneath this is the Miller's Creek seam, varying in thickness from 3½ to 4 ft. About 250 ft. lower still is the Thacker seam, 4 to 4½ ft. thick and available over about 75 per cent. of the property.

To get out this coal the company has installed two plants, No. 1 at Borderland station, 5 miles northward from Williamson, and No. 2 the newer operation a half mile farther north.

The main offices of the company are in Roanoke, Va. Edward L. Stone is president of the corporation, James P. Wood is vice-president and Ernest B. Fishburn is secretary-treasurer.

Operation is in charge of L. E. Armentrout, manager, who resides at Borderland and has been the "man behind the gun"—as distinguished from the "men behind the check book" at Roanoke—in the big job of developing the plants to their present efficiency. His burden of the past has been lightened by the recent advent of C. A. Jones as general superintendent, under whom are the two mine superintendents, J. O. Sinnott, at No. 1, and H. Martin at No. 2. For the upper and middle seam workings at No. 2 Supt. Martin has J. R. Roach and Joseph Edwards, respectively, as mine foremen. The lower seam workings are new, and neither the middle nor lower seams are yet being mined extensively at No. 1 operation.

The Borderland Coal Co. was formed in 1903 to open No. 1 mine in the Winifrede seam. The original plant was a modest affair, with a continuous bucket carrier across the river from the head house on the Kentucky side to a simple loading outfit at the railroad.



General View of No. 1 Plant of Borderland Coal Co.

The high quality of the product gained it an unexpectedly good market and the demands for greater tonnage could not be satisfied by the original carrier, so in 1908 the present two-bucket cableway was installed. Continued growth of the outlet possibilities led to the installation of the No. 2 plant in 1910, equipped to work all three seams, and delivering the coal across the river by a long apron conveyor.

A Fine Domestic Coal Is Produced

Borderland Block is the coal by which the company is best known, as under this trade name the 5-in. lump goes to a high-grade domestic market through the central and northwestern states.

At No. 1 the railroad takes nearly all the coal smaller than 5-in. lump, using about 10,000 tons per month, so that little other than Borderland Block is shipped from this plant.

All coal passing through the 5-in. screens at No. 2, and all over railroad requirements at No. 1, are washed and separated into egg, nut and slack. The egg is shipped as a domestic and steam fuel, while the nut and slack go as steam coal for the stoker-fired boiler plants of several electric railways and paper mills. These are ideal consumers, requiring a fairly constant tonnage at all times.

The product is sold through the Borderland Coal Sales Co., Union Trust Building, Cincinnati, this separate corporation having been organized in 1911 for more effective marketing of the output than had been possible through general sales companies. The Edwards & Bradford Lumber Co., Sioux City, Ia., is agent for the Northwest.

It should be here noted that the Borderland Coal Co. is a Virginia corporation, mining coal in Kentucky, loading it in West Virginia, and shipping it to Ohio and beyond.

The cableway, at No. 1, with its two 4-ton buckets, gives a capacity of 1000 tons per day, and the other equipment is arranged accordingly.

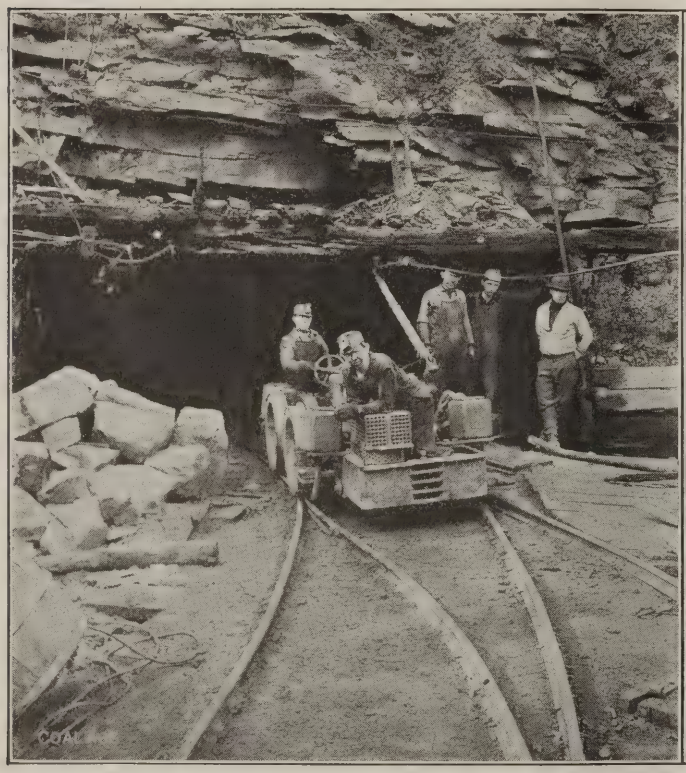
The coal as brought across the river is dropped into a receiving hopper, from which it is passed over 5-in. screens. All going over the screens is loaded as Borderland Block; what passes through goes either direct to the locomotive coaling bins or to the washer plant for cleaning and preparation for shipment in any desired grades.

The locomotive fuel passes a continuous weighing apparatus at the receiving end of the long inclined apron conveyor to the bins over the railroad tracks. The latter has a capacity of 750 tons, with chutes for coaling locomotives on four tracks. All Norfolk & Western freight and coal trains stop here for fuel, as do also some of the through passenger trains. The railroad operates the coaling plant with its own men and pays the Borderland company a tonnage rate for all coal weighed onto the conveyor.

The complete locomotive fueling plant, as also the washer and screen equipment, was furnished by the Jeffrey Manufacturing Co.

Electric Power and Mining

In the early days the plant was practically without power. The original cableway operated by gravity (as does also the present one), the mining was by hand and the haulage by mules and gravity plane. When the capacity was increased in 1908 the mine was electrified; solid shooting was abolished and the mules banished.



Mouth of No. 1 Mine, with Goodman 6-Ton Single-Motor Haulage Locomotive



Looking Back Toward the No. 1 Plant from Mine Side of River

The power-plant equipment includes two Atlas horizontal tubular boilers, furnishing steam for two 100-kw. direct-connected right- and left-hand units. Each unit consists of a Skinner engine and a Goodman generator. Between them is a double switchboard. The entire power-plant equipment being furnished by the Goodman Manufacturing Co.

Only One Seam Is Now Worked

Only the top, or Winifrede seam, is as yet being worked at No. 1. The coal is undercut by five Jeffrey breast machines.

Gathering, the distribution of empties and making up trips of loads, is done by Goodman 3-ton single-motor locomotives of the "1600" type. There are five of these machines at this mine, four regularly at work and a fifth on spare. Two 6-ton single-motor locomotives of the

same make do the main haulage work between partings inside and the head of the gravity plane outside.

The head house where mine cars are dumped and the cableway buckets loaded is at the level of the middle seam, so that this coal can be handled through it when that seam is opened. The top seam opening is located some distance around the mountain. A short haul from the drift mouth at the level of the top seam brings the mine cars to the head of a 30-degree gravity plane, 350 ft. long, down which they are lowered to the main roadway at the middle seam level, where an 8-ton Porter steam locomotive hauls them around to the cableway head house, a distance of 3400 ft.



Goodwin Gathering Locomotives and Short-Wall Mining Machine on Entry

No. 2 Plant Works All Three Coal Beds

Started in 1910, the plant at No. 2 has only within the present year been completed for working all three seams. Still further growth is in prospect when the contemplated building of a railroad along the Kentucky shore of the river makes it feasible to install independent plants, at both operations, for separate preparation and shipment of coal from the lower seam, which differs materially in character from the quite similar coals of the top and middle beds. At present the lower-seam workings at No. 2 are just started and their small production is mixed with the larger tonnages from above.

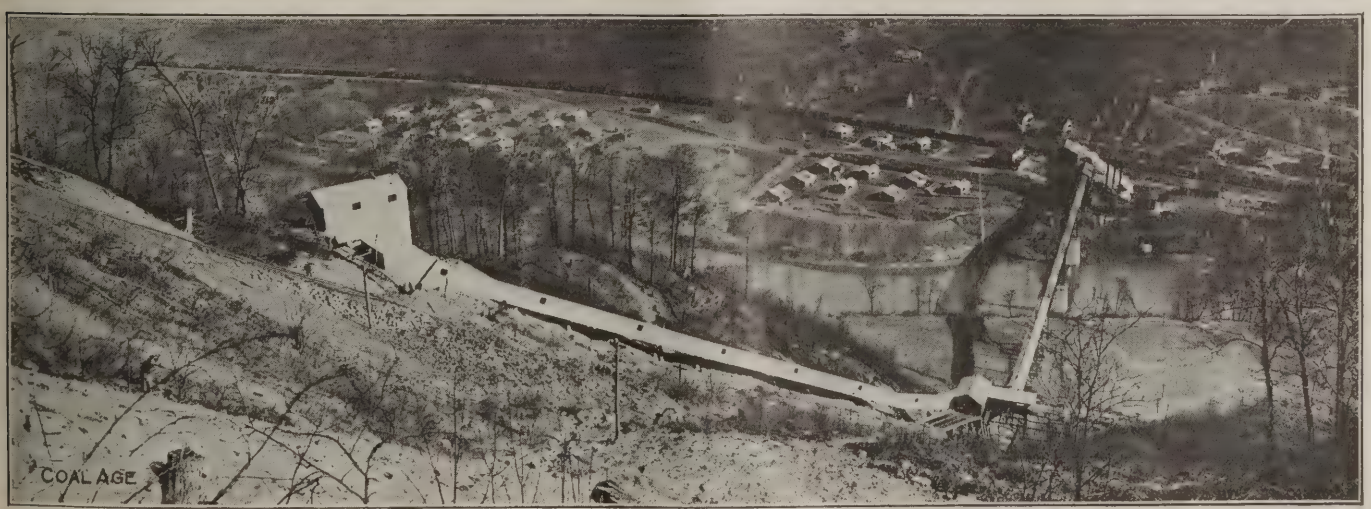
There being no locomotive fueling equipment at No. 2, the preparation plant for small coal is of greater size and importance than at No. 1, and furthermore it is continuously operated. The washer and screening equipment is all steam driven, as is also the long apron conveyor by means of which the coal is brought across the river.

This conveyor is 950 ft. in length and was, when new, the longest of its kind ever installed. Its inclined portion—222 ft. long and on a slope of 19 degrees—has a gravity effect such that only 5 hp. is required for operating the entire apron, with full load, in cold weather. In warm weather, and with good lubrication, on the other hand this conveyor will run without power consumption.

Whereas at No. 1 plant there is a suspension bridge across the river, at No. 2 the conveyor framing includes a travelingway beneath the conveyor proper, which together with the coal-preparation machinery was furnished by the Jeffrey Manufacturing Co.

On the mine side of the river everything is electrically operated, driven from the power house on the railroad side. This power house is a duplicate of that at No. 1, except that there are three boilers, one extra being necessary to drive the steam engines operating the washing and screening machinery.

The two generator units are identical with those at No. 1, having 100-kw. Goodman generators directly



Showing Lengthy Conveyor System at No. 2 Mine

coupled right and left to Skinner engines and delivering current for distribution at 250 volts from a switchboard placed near the wall between the two generators.

The output of this plant is practically all used on the mine side of the river, mainly in coal mining and haulage.

The head of the apron conveyor crossing the river is at the level of the lower seam. The hopper from which it is fed receives the coal from all three measures—only temporarily, however, from the lower one. The lower-seam cars dump directly to the hopper. The middle-seam coal is received from a retarding flight conveyor, recently installed by the Webster Manufacturing Co. while the upper-seam coal is brought down in 6-ton monitors on a gravity plane 650 ft. long.

Mining the Upper Seam

The upper, or Winifrede seam, was here first opened in 1910. The coal runs about 6 ft. high and of the same fine quality as at No. 1. The mining conditions are exceptionally good, with firm sandstone top and clean bottom. The coal is all cut by shortwall mining machines, there being three in use at present, two Goodman and one Sullivan.

Three Goodman 3-ton "1600" locomotives, with mechanically driven electric cable reels, do the gathering; while for haulage there are two Goodman 6-ton, "2600" locomotives, one doing all the work of present production, with the other on spare. Cars of 2 tons capacity are used, on 48-in. track gage.

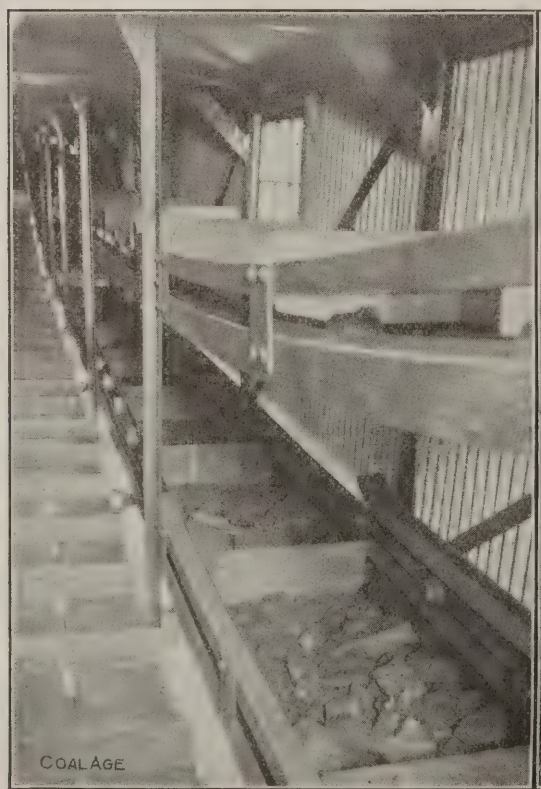
Both the other mines are in the early development stage. The lower seam was entered in 1912 but has not been carried beyond a few cars of production daily. Middle-seam work was begun in 1913 and has been pushed for rapid development, so it is already far in advance of the lower mine.

At first, until the retarding conveyor was installed, the middle-seam cars were hauled up the hillside to the higher level, where they were dumped like those from the upper seam. The conveyor now lets the coal down to the lower mine level, where it goes to the same hopper into which the monitors discharge, and which feeds the apron conveyor extending across the river.



Power House and Preparation Plant at No. 2 Mine

The retarding conveyor is of the flight type, and is fed by an apron conveyor beneath the hopper to which the middle-seam mine cars dump. It is 440 ft. long and



Looking Upward through the Conveyor House



Showing the Conveyor System as it Spans the River

is controlled by an electric motor, through worm gearing. Conveyor and feeder are geared together and operate as one, while the gravity action is such that the worm drive is in reality a locking device to prevent the conveyor from running away. The motor has only to rotate the worm and allow the conveyor to drive itself and its feeder.

The middle seam being thinner, smaller mine cars are used. At the lower seam, however, the cars are the same as for the top seam. Track gages and operative equipment are maintained the same for all three seams, giving advantageous interchangeability of both equipment and spare parts.

The shortwall type of mining machine is of even greater value in these thinner coals than in the thicker top seam. There is only one Goodman machine in the lower mine, while three are employed in the more rapidly developing middle measure. Thus there is a total of seven shortwall machines at No. 2 mine.

Gathering and haulage in both mines are accomplished by 3-ton locomotives. There are two of these machines at the middle mine and one at the lower.

There are, therefore, at No. 2 mine two 6-ton "2600" type and six of the 3-ton "1600" type, all of Goodman manufacture.

The Labor Situation

SYNOPSIS—The Industrial Workers of the World are rioting in Belmont and Jefferson Counties of the State of Ohio, while the United Mine Workers of America actively oppose their propaganda of violence. In Oklahoma, it seems as if the union is itself responsible for the destruction of tipples by dynamite and fire. The Kanawha settlement being finally completed, the union purposes to extend the organization into the competitive Guyandotte Valley, where low wages rule. A meeting has been held by Socialists in New York City, urging the operation of the Colorado mines by the Government.

No progress has been made toward a settlement of the strike in eastern Ohio and meanwhile rioting is becoming general. The violence seems not to be chargeable to the Union, at least as a body, but to the Industrial Workers of the World, because the local mine workers' officials at Bellaire, in Belmont County, have announced that after the present trouble is settled the miners who have participated in the disturbances of the Industrial Workers of the World will not be permitted to return to work as members of the Union and will be put out of the organization. The efforts of an Italian organizer of the U. M. W. of A. from the Colorado field have failed to pacify his fellow countrymen who are members of the Industrial Workers of the World. It is said that owing to their staunch adherence to law and order the miners' officials' lives have been threatened.

On July 15, 200 miners picketed the mine of the Fort Pitt Coal Co., near Bellaire, and prevented the company from carrying out its intention of starting the pumps and fans to clear the mine of water and foul air. Sheriff J. H. Anderson stated that he was unable to give the mine protection because the citizens refused to serve as deputies.

SHERIFF TAKES TARDY ACTION

The operators, prominently among them being the Lorain Coal & Dock Co., are still demanding of Governor Cox that he give them the protection of the militia, but he still insists that the sheriffs should prevent disorder. Major Harold Bush of the Ohio National Guard has spent several days investigating conditions in Belmont County as a confidential agent of the Governor. He reports that the sheriffs' powers are fully able to meet the situation. Governor Cox reprimanded the sheriff of Belmont County for not making more vigorous efforts to suppress rioting, pointing out that despite the fact that there had been a week's disorder not one arrest had been made. Finally the sheriff drafted 50 men and arrested 5 I. W. W. rioters who were attacking caretakers and engineers at a mine near Stewartsville. They were lodged in jail at St. Clairsville.

DISORDER SPREADS TO JEFFERSON COUNTY

But the worst disorder occurred in the neighboring county of Jefferson, which lies to the north of Belmont County. Here at Bradley, there was a spirited encounter between about 100 deputies and double that number of I. W. Ws. following an attempt to arrest ringleaders of the organization charged with riotous conduct.

Two or three hundred strikers kept their promise to Sheriff Huscroft and marched down from the hills intending to drive out the pumpmen from the Dillondale and Rush Run mines of the United States Coal Co., near Bradley, O. Huscroft and his party met them and drove them back, arresting several. Bricks and stones were used by the rioters and Deputy Edward Lucas was severely injured. It is further stated that the sheriff and three deputies were struck with clubs. The miners retreated to their houses and a number of shots were exchanged. The women were used as shields by the I. W. Ws. They used both clubs and stones and threw pepper and salt into the eyes of the deputies.

A number of operators with headquarters at Cleveland, O., signed a communication to the governor on behalf of practically all the eastern Ohio operators to the effect that they have complied with their agreement with the miners' union and have not laid off any Union pumpers and engineers at the mines. He had asked for information as to this fact, John Moore, the state president, having declared that nonunion men were replacing members of the organization in pump and repair work.

IMPURITY AND SLACK MAXIMA DELAY SETTLEMENT

Arrangements have been made for holding conferences of operators in the Hocking Valley and Jackson subdistricts, July 20; in Crooksville and Lawrence County, July 23, and in Pomeroy and Massillon, July 27. These conferences are for the purpose of agreeing on working conditions and the rate for day work and also to try to arrive at an adjustment of the percentage of impurities and fine coal to be allowable under the new mine-run law.

It was believed for a time that work could be resumed July 20, but when that time approached it was found to be out of the question. Much new ground is to be covered in the negotiations and consequently more time was required than at previous agreements. Work is expected to be resumed in all the districts which have signed the scale by Aug. 1, if not earlier.

UNION VIOLENCE IN ARKANSAS

The situation has become more severe and the Union may be as blameable in Arkansas as it is commendable in Ohio. On July 17, fire and dynamite were used to destroy 4 tipples, 2 fanhouses, a store and boarding house of the Mammoth Vein Coal Mining Co. at Prairie Creek, Ark. Some mine guards were killed and some are missing. How many men have been killed was at the time of writing uncertain, but the bodies of John Baskin and Clarence Stylesberry have been found and the coroner was holding an inquest over their bodies. According to the affidavit of L. C. Thomas, also a mine guard, and a participant in the fight, he and six other guards left the mine when the fighting was at its height and tried to break through the attacking party.

They were captured and removed to a log house in the woods and held for hours till the state officers arrived. Then it was that one of the Union men shot Baskin and as he fell fired at Stylesberry, sending another bullet in the body as the latter tumbled over.

Eight warrants have been issued by Federal Judge Youmans charging violation of the court injunction. The sheriff of Sebastian County, Lon Norris, and Paul Little, the attorney for the state, are investigating the battle.

Twice recently the mining camp of Frogtown, near Prairie Creek, was shot up and it is reported that another attack was made on the 16th. The wires being down, news is difficult to obtain. The property loss is estimated at $200,000.

As a result ten men have been arrested for inciting a riot and warrants have been issued for twenty more. Seven men in addition who were employed at No. 4 and are said to have engaged in the fight have been arrested charged with a breach of the peace.

The Coronado mine, also belonging to the Bache-Denman Coal Co. and located a mile west of Huntingdon was dynamited and completely destroyed on July 20. Thus in less than a week this corporation has lost the Mammoth Vein mines, mines Nos. 3 and 4 and the Coronado plant.

KANAWHA STRIKE ENDED

It seems permissible at last to record that the Kanawha strike in West Virginia is at an end. On July 15, by a vote of 4 to 1, the delegate convention of the United Mine Workers of America, No. 17, voted to accept the proposition tentatively agreed upon by the miners' representatives and the Kanawha Coal Operators' Association. Every clause was submitted to vote separately.

The contract provides for the check-off, which was first granted in 1903 and surrendered in 1906; for a wage scale for outside workers; for the extension of the 1912-1914 Kanawha wage scale and for the elimination of the discrimination clause. Every clause was carried by a substantial majority and no amendments were made. If the union men are opposed to the check-off, as was alleged by the operators, that fact did not show in the voting, as 43 voted for it and 3 against it.

The hand pillar-drawing rate in the gas seam has been left to local adjustment. It must not, however, be less than 40c. per ton. In the splint seam, the same rate has been left to local determination and must not be less than 46c. It has hitherto been 56½c. per ton. In some places this coal is much easier to mine than it is in others and this fact is expected to operate in the adjustment of the scale. The docking rate for dirty coal is reduced from $1 to 50c. for the the second offense.

OTHER DISPUTES IN KANAWHA FIELD

The miners claim a victory in securing the check-off and the operators are successful in getting a 3-year settlement. About 200 miners are on strike at the Montgomery and Eureka mines on Morris Creek; and the Winifrede and Belmont mines of the Winifrede Coal Co. are idle owing, it is said, to a lockout, but the lack of orders may be the cause of the idleness.

No contract has yet been signed with the Four States Coal Co. at Dorothy, or with the Milburn Coal Co. on Paint Creek, but the miners are working at both operations pending an agreement.

THE GUYANDOTTE VALLEY TO BE UNIONIZED

A scale being arranged on the Kanawha, the union officials will turn their attention to the unionizing of the Guyandotte valley plants in Logan County. The Guyandotte, it will be remembered, enters the Ohio a few miles above Huntington and runs on a course roughly parallel to the Kanawha except at its headwaters in Wyoming and Raleigh counties. At present only about 3000 to 5000 men are employed, but it is expected that before long 10,000 men will be engaged. The companies operating are still small except the United States Coal and Oil Co. at Holden, W. Va., and the Monitor Coal & Coke Co. Island Creek No. 1 of the former company produced the second largest tonnage of any mine in West Virginia in 1912.

So far the success of the union in West Virginia has been with the smaller companies. It is now purposing to pit itself against a company of financial strength. The mines of the United States Coal & Oil Co. are in the No. 2 Gas seam, as are most of those in the Kanawha valley, and the company has been a strong competitor of the Kanawha operators, as its rates are lower than those paid by them, its mines being run on a nonunion basis.

FEDERALIZING COLORADO MINES

Probably some will be disposed to lay much emphasis on the meeting held in Webster Hall, July 17, to protest against the coal companies in Colorado and to demand the acquirement of all the mines by the federal government and their operation by the United States or by lease under severe restrictions. As a matter of fact, there is in the meeting no new menace to capital. The parties who advocated the action were all recognized Socialists except a few who kept well in the background and did not speak at the meeting. In fact, there was a general note of apology for so mild a resolution and almost everyone who spoke wished to explain that for years he had believed in state ownership undiluted for all public utiliies, and some were evidently uninclined to stop at the acquiring of the establishments of public service corporations and desired to enjoy the parlous pleasures of unmitigated state socialism.

Dudley Field Malone, collector of the port of New York, who was said to be on the committee, did not attend, so the federal administration was in no way represented. Benjamin C. Marsh presided and he read Amos Pinchot's attack on the Colorado Fuel & Iron Co., a somewhat conservative statement in which he declared that according to the admissions of the company officials that corporation had been slow in complying with the Colorado State laws which evidently they regarded as class legislation. He did not declare that they were now violating the laws of Colorado.

Hugh Frayne, New York representative of the American Federation of Labor, then spoke, stating that John D. Rockefeller by a word could have prevented the bloodshed in Colorado. We much doubt if he could have done so permanently, but whether property owners are to listen to the cry to prevent bloodshed by surrendering when the malcontents break the peace is a question to be determined when all the facts are known.

There is something childish in Frayne's statement. There were other ways of avoiding bloodshed. Certain Greeks and Bulgarians, for instance, could have given up their guns and permitted those men who would, to go to work without improper interference. Had the Colorado union officials behaved as well as the mine leaders in Ohio, there might have been no Ludlow.

JOHN W. BROWN AND MOTHER JONES

Then followed the interesting Meyer London, who has a congressional position in mind. John W. Brown, one of the leaders of the miners in Colorado, made a mild address on the economic condition in the mines of the state. He got not a little applause, but only because he made a few purely socialistic statements. Mother Jones' witticisms' and sallies were loudly applauded, as also her stories about her dogged obstinacy and her determination to go back to Colorado "next week" and make trouble.

She said she came to talk about the "babies" who were roasted by the operators and whom she knew and had learned to love on her previous visit. All this "sob talk" utterly failed to create an impression, because it did not concern socialism; beside it was all untrue and the people knew it. The story of the father going back to the militia camp for his boy who had been missing and having the boy's headless, half-burned body thrown over to him with the words, "Here, take the damned thing," was not even told, and had it been told would not have been believed. Mother Jones stormed at those present because they had not started a revolution to avenge the wrongs of the "babies," but reiterating the word "babies" did no good. Let no one think that any body of citizens believes the babies were deliberately burned. Only those will credit the militia or operators with it who are capable of doing it themselves and there were probably none in the audience who could be conceived as ever being engaged in such villainy.

Senator Martine was fairly well received, though those of our readers who have heard him and his moss-grown oratory will hardly credit the statement. He talked mainly on himself, his beliefs and services, and on the West Virginia situation. He declared he had believed in public ownership of utilities for forty years. Like everyone else, he showed that he did not believe that the action called for was one arising out of the pecular conditions in Colorado.

WHY ARE COLORADO MINES CHOSEN FOR SOCIAL EXPERIMENTS?

The motion was finally put, but Marsh had to explain that it had been hard to agree on the nature of the resolution. It was clear that some objected to it because, as they would express it, it would "only replace a soulless corporation by a soulless government." Besides, others objected because there was an inference that the government would pay for what it took. Do not the Socialists rather desire to tax the value out of all property before annexing those properties for the public? Also, was Socialism not asking for a small part only of what all the Socialists desired in far greater measure? Hence Marsh thought it necessary to apologize for the half-hearted resolution. The voting was strongly in favor of the motion, though it was not enthusiastic for the reasons given.

The audience was a respectable working-class assemblage. The men and women were of a self-respecting kind, mostly English-speaking foreigners, all orderly and above the average of citizenship. It is a pity that to such an audience a reasonable argument could not be presented such as would convince them of the essential soundness of a less radical program and would assure them that at present real social self-immolation is so rare among workers and capitalists that it is not safe to base our civilization on its existence.

Electricity in Coal Mining

By David R. Shearer*

SYNOPSIS—This is the last article of the series on this subject and treats of the application of electricity to purposes of mine ventilation and drainage. The centrifugal pump, on account of its high operating speed, is admirably adapted to direct connection to a motor shaft.

It has been necessary since almost the earliest developments in coal mining to use some type of device for securing a circulation of air throughout the different parts of the mine. Since both men and animals are working underground in comparatively restricted quarters, the oxygen would soon be consumed from the air and replaced by gases dangerous to health and life, even if gas were not constantly escaping from the coal in many mines.

The earliest systems of mine ventilation were based on the principle of chimney suction. Tall stacks were built from which an air duct led into the mine so that when fires were kept burning in the chimney a continual draft of air was being sucked out of the workings and carried up the chimney.

This method was necessarily both cumbersome and expensive and was soon replaced by large fans and blowers driven by steam engines or some other form of power. If steam engines were used and the fan located at a distance from the boiler, large losses from condensation occurred in the steam pipes. The normally low speed of the steam engine made necessary the use of very large fan wheels, which called for expensive housings and heavy foundations.

Upon the advent of electrical power for mine operation the electric fan rapidly came to the front, and at the present time it is used almost exclusively where current is available. Electrically driven fans are of many different forms and operated by various types of motors connected in some cases by belts, chains or gearing or more usually mounted on the motor shafts.

When a ventilating fan is of such design that it may be mounted in this manner a high efficiency is secured with practically no noise and very smooth operation. Since a fan must be operated continuously a small gain in economy means a considerable saving in power consumption, and since even a short stoppage of the fan would result in danger to those working in the mine, it is necessary to have the very best driving equipment possible.

The direct-connected motor meets these conditions admirably, for not only is it economical, but subject to little danger from accident or wear. The motor-driven fan being usually run at high speed is compact and easily moved when necessary. When a change of location is found to be desirable, the feed wires may be quickly taken down and erected at a different point.

If electric power is available and a fan be subjected to some accident, it is possible to install temporary equipment quickly, fed from the distributing lines to take the place of the disabled machine.

Where alternating current is available, perhaps no better method of driving a fan may be found than the use of a squirrel-cage induction motor, since these machines have no open contacts, no sliding brushes or commutator and consist of only two parts, the rotor or rotating member and the stator or machine frame, upon which the windings are placed. Such a motor will operate continuously and economically with practically no attention except an occasional oiling. Direct-current motors, however, are quite satisfactory in several types when alternating current is not available.

*Schaum & Uhlinger, Philadelphia, Penn.

Pumps Also Have Hard, Rough Usage

Another class of mining machinery upon which devolves hard service is the mine pump. Pumps are placed in service for two purposes, to supply water to the boilers or for domestic use and to pump out the water accumulating in the lower levels of the mine.

Many different types of pumps are found in common use, the geared single-action, duplex, triplex and multiplex, centrifugal and positive rotary. Each of these types has certain advantageous points for working under certain conditions, and it may be necessary to use several types in one mine to meet the varying requirements. Probably the most satisfactory pump for domestic and boiler service is the plunger type, either simplex or duplex, operated through spur gearing by an electric motor.

Here again the induction motor makes an excellent driving power, since it operates smoothly and with practically no attention. This machine is less affected by dampness than any other type and cases have been known where a squirrel-cage motor continued to operate after being submerged by several feet of water for five days, or until it had pumped all the water out of the shaft in which it was located, and this without injury either to the motor or to the pump.

It is possible to use a motor on a small pump that may be thrown directly across the line without injury, but those of a larger size require some form of starting device. This may be either hand operated or entirely automatic. Thus, a pump may be located at a long distance from the power house and yet be readily controlled from this point.

In the case of domestic water supply the operation of the pump may be made entirely automatic by a float-switch mechanism, so that when the water drops to a certain level in the tank, the motor is automatically started and pumps until the tank is filled to a predetermined point where the float throws out the switch and stops the pump. Frequently an arrangement of this kind is used in the lowest level of the underground workings, so that when water rises in the sump to a given point, the motor begins work and pumps the water out without any attention whatever.

Piston Pumps Are Subject to Rapid Wear

Although the piston pumps are quite efficient in handling water, they are subject to rapid wear from mud or grit and frequently a few months' operation either wears out the valves or cuts the cylinder so badly that a new pump is made necessary. To obviate these troubles, many types of centrifugal pumps have been brought out in which there are no valves and no sliding surfaces exposed to the gritty water.

The principle of operation in these pumps is as follows:

The pump casing being full of water, the impeller in rapid motion tends to throw the water outward by centrifugal force and as the only outlet is the delivery pipe at some point in the circumference of the casing, the water is forced out through this opening with considerable velocity and is replaced by suction with more water admitted to the center of the impeller.

One marked advantage in this type of pump is that owing to a high speed being necessary, they may be connected directly to an electric-motor shaft without intermediate belting or gearing. Many of these pumps are mounted direct on the motor base so that the whole forms a self-contained unit and may be moved from place to place readily.

Peculiar Feature of Centrifugal Pump

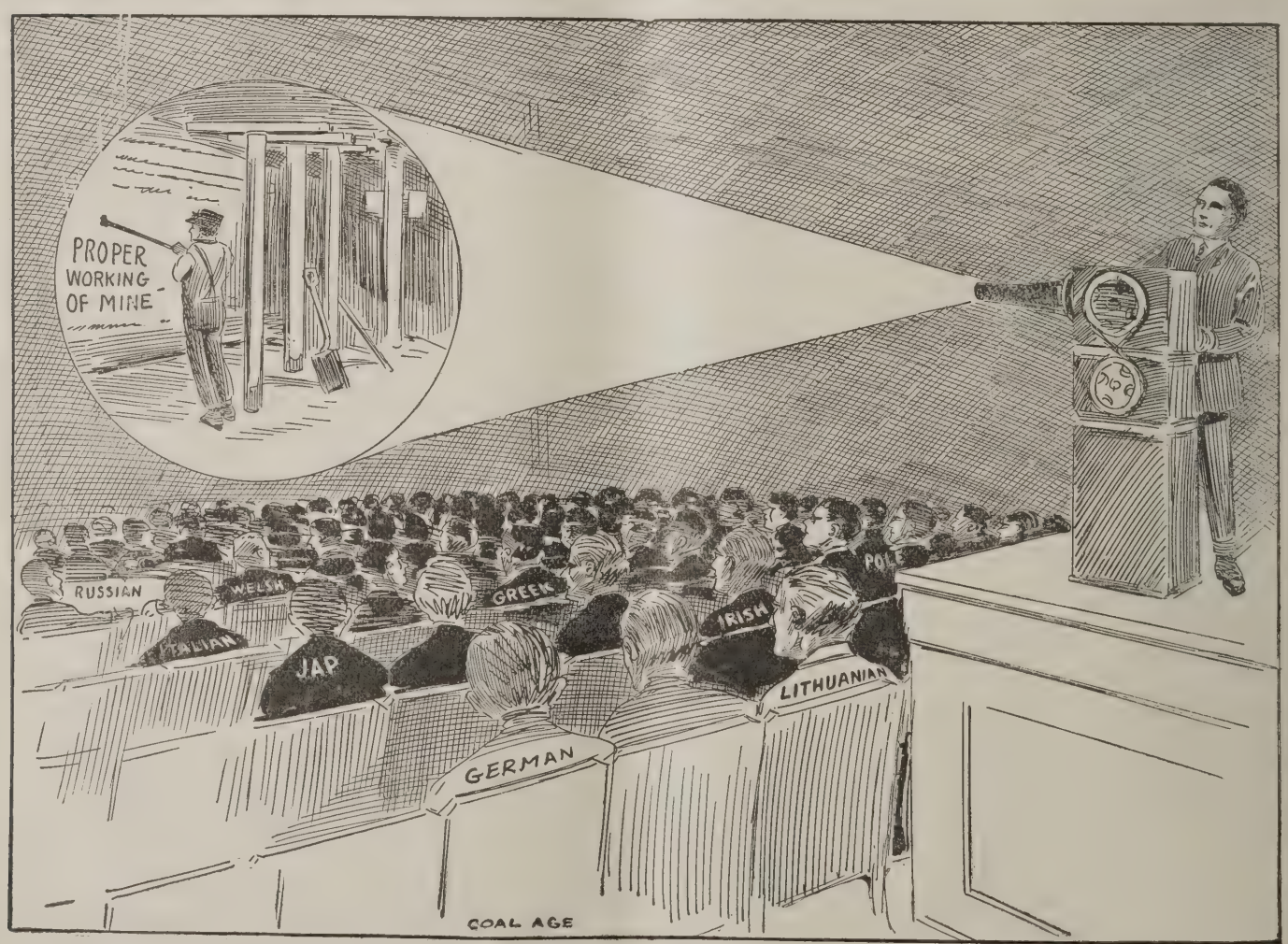
A peculiar feature of the centrifugal pump and one that is directly opposite to that which exists in the piston or plunger type, is that when the discharge pipe gate-valve is closed, the pump impeller runs light and without taking excessive power, but as soon as this valve is opened, the pump assumes a load. If the gate valve were closed on a plunger pump when it was running, either the pipe or pump would be broken or the driving power would be stalled, since such a pump is positive in action.

Another type of pump used to some extent where pure water is to be forced from one level to another is the positive rotary pump, which usually consists of some form of gearing or wheels which mesh together in such a manner as to create a suction in one side of the casing and a pressure in the other. This type of pump runs at a higher speed than the piston pump, but lower than the centrifugal and is not employed to any great extent in mine work.

As a usual thing, it is advisable to use a motor about twice the size theoretically necessary to drive a given pump, since considerable losses occur both in the pump proper and the pipe lines. If the pump is of the piston type driven by intermediate gearing, considerable power is lost in the transmission, so it is best to dispense with all gearing except that absolutely required.

The theoretical power necessary for pumping purposes may be found as follows: Multiply the height of head in feet by the number of gallons to be moved per minute and this product by $8\frac{1}{3}$, dividing by 33,000. This gives the theoretical horsepower, which should be multiplied by 2, in order to find the size of motor necessary.

The Summer Meeting of the Pennsylvania Anthracite Section of the A. I. M. E. will be held this evening (Saturday, July 25, 1914), at 7.30 p.m., following an informal dinner at the Pottsville Club, Pottsville, Penn. William G. Whildin, mining superintendent of the Lehigh Coal & Navigation Co., will present a paper on "Steep Pitch Mining of Thick Veins," and informal discussion of the paper is invited. Charles Enzian is secretary.



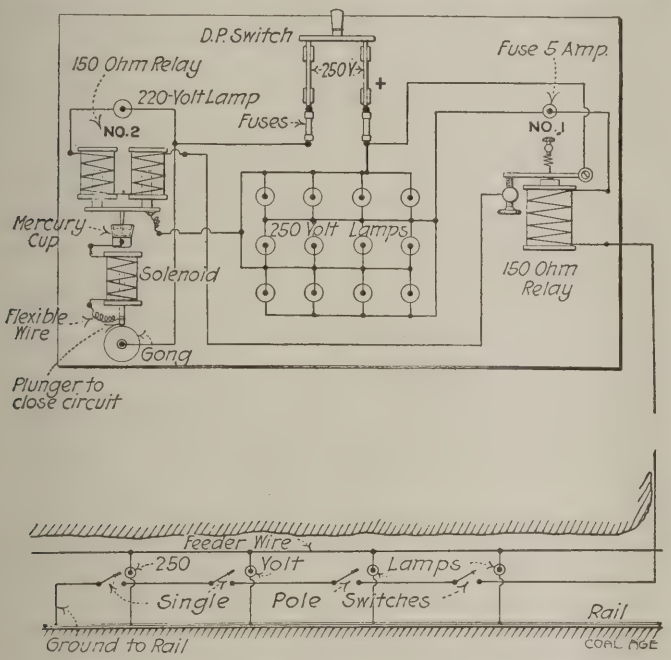
The Universal Language That Gives Impetus to the "Safety-First" Movement in Coal Mining

A Good Signal System

By James McCune*

For the benefit it may be to others operating under similar conditions, I submit the accompanying diagram of a wiring system that I installed, several years ago, in a mine in the Birmingham district, in this state. Although the mine is not working at the present time, the signal system to which I refer worked satisfactorily for two years previous to shutting down the mine. To my knowledge, the system never gave the least trouble in its operation, during that time.

I will attempt to describe the system as clearly as possible. The switchboard, which was located on the surface, was designed so that the signal gong could be rung by opening any one of the single-pole switches, which were located about 100 or 150 ft. apart along the haulage road



An Automatic Danger Signaling Device for Mines

in the mine, as shown in the diagram. I used a single wire, No. 14, B. & S. In order to use the 250-volt power circuit, for this purpose, twelve 250-volt, 16-cp. lamps, in series parallel, were cut into the circuit to reduce the line pressure to about 20 volts with a current of 3 amperes. This current was conducted through the 150-ohm relay No. 1, as shown in the diagram, from whence it passed into the mine.

As long as the mine circuit remained unbroken, No. 1 relay being in the circuit was active and permitted the current to pass likewise through the branch circuit that energized No. 2 relay, shown on the left of the diagram. This relay (No. 2) being thus active held the needle suspended above the cup of mercury, thus keeping open the circuit for operating the signal gongs.

If, now, the mine circuit was broken by the opening of any one of the single-pole switches in the mine, or by an accidental fall of roof, or other cause, No. 1 relay was at once rendered inactive and the branch circuit was thereby instantly broken which, in turn, rendered No. 2 relay inactive and permitted the needle to drop into the mercury cup. This closed the circuit passing through the gong, which was thus thrown into action and continued to ring until the main circuit was again closed, when it would cease.

The operation of the secondary circuit to ring the gong continuously is well understood. The gong is rung by the plunger striking against it whenever the solenoid is inactive; but the instant the plunger touches the gong, the circuit is again complete and the plunger is drawn back into the solenoid, which again breaks the circuit and again the plunger strikes the gong. The action is thus an alternate making and breaking of the secondary circuit, which produces a continuous ringing of the gong as long as this circuit is closed.

When this system was first installed, I expected that some trouble would arise from the excessive heating of the relay coils, but this fear was not realized. As an extra precaution, an incandescent lamp was introduced into the circuit above relay No. 2 and served to show, by its burning, that the main circuit was unbroken. Lamps were also introduced into the main circuit at each switch in the mine, and these served both to light the roads and to locate the switches.

*Yolande, Ala.

Kansas Mines More Coal

The coal miners of Kansas, according to E. W. Parker, of the U. S. Geological Survey, working in coöperation with the Geological Survey of Kansas, produced 7,202,210 short tons in 1913, valued at $12,036,292. This was a substantial increase over 1912, especially in the value of the output, which advanced more than 6 per cent. The production of the former year was 6,986,182 short tons, valued at $11,324,130.

The coal-mine operators of Kansas had little of which to complain during the year. There was no serious trouble with labor, railroad consumption increased somewhat on account of the strike in Colorado mines, transportation facilities were satisfactory, and the demand for steam coal, for manufacturing and domestic fuel generally was well up to the supply. The only unfortunate incidents were occasional shut-downs, at the stripping operations, because of high water in the spring, and some inconvenience during the summer and early fall when boiler water had to be hauled. Shooting from the solid continues to be practiced in the coal mines of Kansas.

It Is Important

That you should read the "Extracts from a Superintendent's Diary," published in Coal Age each week. This brief article contains a lot of good common sense. One subscriber says: "It seems like a page from my own experiences." We also suggest that you carefully examine the next issue of Coal Age and read the following articles: Engineering Practice of the Consolidation Coal Co.; An Endless Rope System for an Inclined Plane; Sanitation and Simple Ways of Making It Effective at Coal Mines; Flameless Surface Combustion for Boiler Heating; Substitutes for Wood Timbering in Mines; Costs and Application of Piping at Coal Mines and a Description of a Particularly Well Executed Shaft-Plumbing Operation. There will also be several feature articles that will hold your closest attention, and one of the best poems Mr. Braley ever turned out. In short, the Aug. 1 number will be the most interesting issue of Coal Age ever printed.

Who's Who in Coal Mining

John Dunlop

One of the many ambitious men who have figured in the coal-mining industry, and who have given generously of their time and talents to the building up of that industry in Illinois is John Dunlop, former state mine inspector and, at present, inspector for the Safety-First Mine-Inspection Bureau of the Peoria district.

Mr. Dunlop was born at Annick Lodge, Parish of Irvine, Ayrshire, Scotland, 1864. Educated, at first, in the common schools of Scotland, he entered at an early age, Kilmarnock Academy. Mr. Dunlop early showed a deep interest in all that pertains to coal mining. He joined the classes which were at that time conducted as the Science and Art Department and under the administration of the Government. By his devotion to study and



JOHN DUNLOP

constant application, he received from those schools four diplomas. The instruction included a thorough course in mining engineering.

At the early age of 23 years, Mr. Dunlop came to the United States and located first at Clay City, Ind., where he remained for a few years before making Illinois his adopted state. In 1892 Mr. Dunlop took the examination for mine manager, before the State Mining Board and passed with high credit. The following year he secured the appointment of mine manager for the Pittenger & Davis Coal Co., Centralia, Ill., which position he held for five years.

Again, in 1897, Mr. Dunlop went before the State Examining Board and passed successfully the examination for state mine inspector, to which position he was appointed by Governor John R. Tanner, being assigned to the Sixth Inspection District of the state. He was reappointed, successively, by Governor Yates and Governor Chas. S. Deneen. In the year, 1908, Mr. Dunlop was employed by the Marion County Coal Co., to sink several shafts near Centralia. But, in 1909, he again entered the state inspection service and was assigned to the Third Inspection District, at which time he located in Peoria.

Effect of Change in Administration

Owing to a change in administration and the divorcement of the mine-inspection service in the state from civil-service control, all the state mine inspectors of Illinois, with one exception, failed of reappointment, Mr. Dunlop being among the number. This universal change in the inspectorate of the state was the result of a purely political upheaval. Mr. Dunlop's ambition would not permit him to remain idle, however, and his ability as a mine inspector and instructor in coal mining brought him the appointment of inspector for the Peoria District Safety-First Mine-Inspection Bureau. This is an organization made up of the following operators of that district: Crescent Coal Co., Clark Coal & Coke Co., Logan Coal Co., Groveland Coal Co., Tazewell Coal Co., Warsaw Coal Co., Newsam Bros. Coal Co., Brewster & Evans Coal Co., all in the Peoria district.

Since taking up this work, Mr. Dunlop has manifested his usual energy and made a thorough inspection of the mines of these companies. He has given much personal instruction to the men in the mine, whereby we may hope he has greatly reduced the liability to accident. Not satisfied with performing his duties as inspector of mines, Mr. Dunlop has organized and successfully conducted large classes in coal mining, in connection with and in addition to his other duties. That this work of instruction has been eminently successful goes without saying. Mr. Dunlop is a close student of mining and thoroughly acquainted with the theory as well as the practice of mining coal.

At the last meeting of the Mine Inspectors' Institute of the United States of America, Mr. Dunlop was chosen president of the Institute, of which he has been a member since its organization. This meeting was held June 9-12, at Pittsburgh, Penn. The next meeting (1915) will be held in St. Louis, Mo.

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Marketing Waste Gas at Birmingham—A controversy developed between the city of Birmingham and the Birmingham Railway, Light & Power Co. over the proposal of the company to furnish byproduct gas to the city from the coke ovens of the Tennessee Coal, Iron & Railroad Co. Under the proposed contract the gas company would have furnished the gas at an average reduction of about 18c. a thousand to the city consumers, but the city officials stood out for a lower price on the ground that the gas was a waste product, and their stand has resulted in Birmingham failing to secure the cheaper gas. George Gordon Crawford, president of the Tennessee company says that between the coke ovens at Fairfield and the steel mills of the company at Ensley there is a 24-in. pipe line 2½ miles long connected to two compressor stations, one of 25,000,000 cu.ft. daily capacity and the other of 30,000,000 cu.ft. daily capacity. The gas is compressed and forced through the mains to Ensley, where it is used under boilers and in the open-hearth furnaces and soaking pits, displacing coal. The company has spent over $140,000 in piping this gas to its steel plant and could use to advantage several times the present quantity of gas in its plants.—"Wall Street Journal."

Editorials

The General Labor Strike

The British Columbia Labor Convention decided on July 15 to call a general strike of all the labor forces in British Columbia, because of conditions which have arisen out of the miners' strike on Vancouver Island. A referendum will be necesesary to make the decision effective, and this will prevent a strike for at least six weeks.

We shall overlook the fact in these remarks that such a strike would be against the laws of British Columbia, where both strikes and lockouts are regulated, but as this foolish European method of settling a dispute may eventually be imported into the United States, where it is not illegal, it may be well for us to show that general strikes are against the welfare of the workingman.

The British Columbian store clerks and lumberjacks are seeking to strike to raise the wages of the miners and therefore the price of the coal they use. After a while they will ask the miners to strike with them to raise the wages of clerking and lumbering, thus increasing the price of the goods the miner buys and of the lumber he uses. All this would be a diverting pursuit of increased wages and decreased purchasing power, and would work no one any harm if it were not for two considerations; one, that no one will pay store clerks, lumberjacks and miners when they are idle, so that they all alike will all lose; and, two, that if the wages get too high in that "tight little island," no one will be willing to pay for the goods it produces.

The general labor strike is a folly. It is as if the hands of all mankind banded together and entered into conflict with their heads. Surely no good could come of such a quarrel, for the happiness of man is bound up in the union between the man's head and his hands in which both help each other. No good could come to the hands if all the heads were beaten to a jelly, while on the other hand the feeling of a single head and a pair of hands might be transcendently jubilant if all the other heads and all the other hands needed triangle bandages and splints.

The important solidarities of mankind are industry bonds rather than class bonds, though in a regrettable way employers unite against workers and workers against employers. Moreover, when solidarity is rightly attained, there will be no private interest either of class or of industry. The happiest individual would be the man who could live where all are prosperous and all have the adroitness of mind and cheerfulness of spirit which comes from well remunerated toil.

Strikes are generally believed by the advocates of trades unionism to encroach on the profits of capital, and indeed they did so when they did not involve the whole industry at one time, for then they merely brought the wage scale of one factory or mine up to that of its competitor, but now that they are almost national in any one trade their effect is almost always to raise prices to the consumer and to upset the balance of living of other workingmen. The labor conflicts of the twentieth century are apt, like the national wars of the seventeenth and earlier centuries, to plunge the world into a needless penury.

We must never forget that though these later conflicts destroy but little and though the efficiency of the workman is continually on the increase, his comfort and wealth must be immensely depleted if he is to produce only a short part of the year. And moreover, it is likely that because the populousness of the world is continually on the increase there will be an increasing need to build up the capital of the race in order to make possible the utilization of lands and mineral deposits of inferior value. This cannot be done if the people are to reduce their productivity by idleness of a character which does not add to their efficiency.

But This Is about Oil

We wish that we could take some hope from the facts we are about to relate, but the story is about other fuel than coal; it is about oil. It has been rumored that the small oil man needs help though his smallness is only relative. His profits have always been large and the extravagances of men made rich by oil have passed into a fable. No one has discussed the tips, the libations and the follies of the coalman. He has rather been represented as miserly and grasping. The reason is clear; he has not been empowered by his wealth to be liberal and to scatter his coins like a princeling to the people on the street.

But we do not pretend to understand the difference between oil and coal. When crude oil rises 100 per cent. in a few months, everyone says "Good for the oil man; that will help the producers." At the same time, coal is raised 10 or 12 per cent., and the remarks on the street are too contemptible for repetition. We will be frank; we cannot tell where the difference arises. Even when wages are increased, the people grit their teeth and say coal should not increase in price, yet on the other hand, crude oil always rises on the principle enunciated in the motto "Make the traffic pay all the traffic will stand."

In the progressive state of Oklahoma, there is a Corporation Commission which has been regulating matters of all kinds in a high-handed manner. Some time ago, someone complained that gasoline was too high in his little village and he desired the commissioners to order a reduction in price. From that time on the Commission has been busy with oil questions. The producers declared the Trust was discriminating against their oil, that it was not supplying pipe-line capacity to take care of their product, was endeavoring to "freeze them out" and was, moreover, producing as well as selling oil.

At first the Commission attacked the pipe-line companies and then suddenly finding that too much oil was being produced and that the price would certainly fall and more oil would be for sale than would be needed at the terminal points, deliberately threatened to cut off the production from such wells as were drilled contrary to their orders, and ceased to berate the Trusts for not doubling their line capacity.

So they made these rules which we do not quote verbatim, as they are most ineptly worded:

It is therefore ordered that the Texas Co., the Gulf Line Co., of Oklahoma and the Prairie Oil & Gas Co. shall be relieved as common purchasers from taking the production of any wells brought in, on or after July 1914, except:

(1) Wells where the lease conditions require drillings within a definite date. Such wells shall be drilled on the lease at a point where it will not be necessary for adjoining properties to offset the same. [That is, they must be drilled so far from the property line that they will not draw the oil away from under a second property.—Ed.]

(2) Wells on properties which have no production and adjoining properties which may have a tendency to drain same, even though they would not come strictly under the offset rules.

(3) Wells which are now being drilled.

(4) Wells necessary for opposing the draft of oil by producing offsets.

(5) Wells drilled on short-term leases to comply with Federal court orders where receivers have been appointed.

Furthermore, they also exempt the pipe-line companies from taking oil from any well "squibbed or shot" to the Bartlesville sand in the Cushing field during the period of exemption and order that the companies transporting oil, shall not be required to accept oil from any new well drilled under the five exemptions listed above if, being drilled in the Cushing district, it goes more than 60 ft. into the Bartlesville sand, unless the Commission orders otherwise.

The whole of this restrictive action is alleged to be with the idea of conserving oil, but is really provided to keep up the price and the commissioners are at no pains to deny that the order is made to help the producers, and in answer to their clamor. They have declared that if the producers will not help enforce the regulation, the Commission will let the whole matter severely alone, that is, let the oil be wasted; so little are they conservationists. They are afraid oil might fall to 3c. per bbl., as it did at one time in Texas.

But let us not suppose the Oklahoma producers are losing money, not at all. The papers are full of records of the fortunes being made, and those producers who are not able to take advantage of the prices liable to be artificially created, are not pleased that they cannot sink enough wells to get a plethoric fortune.

If the opening of new coal mines were forbidden, the miners would not realize any noticeable restriction of the opportunities to labor because the work of opening is a small item compared with that of operating. But the oil industry is self operating in much of the Cushing field and will not need even dynamiting if in the Bartlesville sand. In fact, only one well reaching down to that sand has needed to be so treated. Consequently all the work in the field consists in drilling and preparing to drill, and the restrictive order has laid a number of men idle.

But what does it matter, the oil interests must be appeased. The poor oil millionaires must make money; the market must not be demoralized. Oklahoma, the great baiter of the trusts, has now taken thought and has created a trust more discreditable than any which has ever preceded it, and has chosen for its ill advised action, that business which has led to fortunes which have been the wonder of the world and in a field where the production has been more prolific than in any other state.

And the moral is clear. The Oklahoma oil producer has continually urged his rights on the legislature, has published his hopes and fears broadcast, has in short, advertised his woe. He has always had a grievance and at last, he has found in Commissioner Henshaw, a sympathetic listener. We believe he has been too successful and that his profits have been excessive, and it is probable that in a few months, the action of the commissioners, producers and pipe-line men will be rightly condemned. The better plan would have been to have required that every producer be ordered to provide storage for his oil or leave it underground.

A Contrast

Julian Street, writing in *Collier's,* quoted Henry Ford, the builder of the popular automobile, as follows:

We've done two hundred and fifty millions of business to date. Our profits have amounted to about fifty-nine millions. About twenty-five per cent. has been put back into the business—into the plant and branches. All the actual cash that was ever put in was twenty-eight thousand dollars. The rest has been built up out of profits. Yes; it has happened in a short time; the big growth has come in the last six years.

This may well be called making money. We are constantly reminded that coal men seem prosperous, have fine houses, and must make money somewhere if not in coal mining. Howbeit, we have never noticed anything striking in the residences they erect. But did one ever hear of a coal corporation starting with $28,000 and after only a few years, acquiring from profits a plant worth roughly $15,000,000, having paid meanwhile about $44,000,000 in dividends? In fact, the talk about coal barons is extremely misleading. In no business have profits been so small and uncertain, and surely all the coal companies have not been badly managed.

The time has certainly come when other corporations than coal and public-service companies receive a ray of the fierce light of investigation. Surely there is no reason why those who render an essential service to humanity should receive all the abuse, should be forbidden to protect themselves by reasonable combination, and should be considered fit subjects for restrictive laws.

The logic of the situation urges everyone to seek his profits and his living in providing for the luxuries and in meeting the extravagances of the multitude, and not in supplying them with staple articles on which their real happiness depends. Moreover, as a corollary we may ask whether manufacturers whose profits are so unreasonable, have any right to demand of coal men that they either operate their mines continuously, conceding all the demands of their employees, or else turn their holdings over to the state.

With such magnificent profits as the manufacturers often secure we cannot wonder that they feel they are the chosen of the nation, nor can we marvel that like spoiled children, they sometimes make imperious demands. When they themselves make such fair profits it is easy to explain how it is they always imagine the coal man has a princely surplus to divide with his employees.

Dr. George Halberstadt, who is at the head of the Philadelphia & Reading Coal & Iron Co.'s first-aid corps, in a recent speech before Reading Coal Company employees, said:

"Not one of you would dream of sitting down to dinner under a loose ceiling that looked as if it were about to fall, and yet some of you deliberately work for five hours a day under a loose roof in the mine."

How very true and pertinent is this homely simile of Dr. Halberstadt.

Legal Department

Legislative Regulation of Weights

By A. L. H. Street*

Congress having failed to fully exercise its right to fix the standard of weights and measures, it has been decided by the courts that the states are left free to make reasonable regulations on the subject, for the protection of the public. Accordingly, a Louisiana law prohibiting sale of coal contained in boats or barges until the same has been officially gaged, was upheld by the United States Supreme Court in the case of Pittsburgh & Scranton Coal Co. vs. State, 15 Supreme Court Reporter 459. The validity of the statute was unsuccessfully attacked on the ground that it interferes with interstate commerce, and discriminates against coal carried by vessels in favor of coal carried by rail. And a statute in force in Missouri requiring every sale of coal to be made on the basis of the actual weight thereof, and making it unlawful for a buyer to deduct any amount from the actual weight under claim of right to do so by reason of any custom, rule or pretense, was upheld by the same court in the case of House vs. Mayes, 31 Supreme Court Reporter 234.

Where a law requires coal sold in certain quantities to be weighed by an official weigher and a certificate of the weight to be delivered to the buyer, there can be no recovery of the price unless there is an official weighing and such certificate is issued. (Massachusetts Supreme Judicial Court, Libby vs. Donnely, 5 Allen's Reports 299.) There is no valid compliance with such a requirement where the weigher is the owner of the coal or is selling it on commission. (Smith vs. Campbell, 68 Massachusetts Supreme Judicial Court Reports 268.) And, under a Maine statute requiring coal to be weighed by a sworn weigher, "unless the parties otherwise agree," it was held that there was no showing of an agreement waiving such weighing, although it appeared that the buyer accepted the coal without objection, and offered to give his note for the price, and had paid for similar lots of coal weighed by the seller's bookkeeper. (James vs. Josselyn, 65 Maine Supreme Judicial Court Reports 138.)

Mistakes in Quoting Prices

When a coal company, in quoting a price on a shipment, inadvertently quotes a lower price than was actually intended, through stenographic or other clerical mistake, and the offer is accepted, is the company bound by the contract? This situation arises, doubtlessly, in the coal trade frequently the same as it does in other lines of business. Based on the decisions of the courts, the answer to this question must be that, notwithstanding the mistake, the contract is binding on the coal company, unless it can show that the person to whom the offer was made knew or ought to have known of the mistake. If this latter condition can be established, however, then there is a very recent court decision to sustain the proposition that the coal company is not bound. This decision did not arise in the coal trade, but the principles involved are equally applicable to sales of all kinds of commodities which have a market value.

A Texas seed house offered to sell a quantity of millet seed at $1.35 the hundredweight at a time when the market price was $2.35, which the house intended to quote; the quoted price being the result of a clerical error. The Kansas seed house to which the offer was made immediately wired an acceptance of the offer, without stating the price, and sued for breach of contract, when the Texas concern, on discovering the mistake, refused to deliver at $1.35.

In relieving the Texas company from liability, the Texas Court of Civil Appeals said in this case, Barteldes Seed Company vs. Bennett-Sims Mill & Elevator Company, 161 Southwestern Reporter 399: "Ordinarily, when the mistake is not mutual, courts will not relieve the party making it against his own negligence or inattention; but we think a different rule should apply when the evidence shows that the party accepting the mistaken offer knows of the mistake when he accepted it and that he should not reap the benefit of the mistake to the evident injury of the other. We think that fair dealing and good conscience should require an opportunity to correct the error, before trying to found a binding contract on it. . . . The evidence in this case is that both parties knew the market value of the millet seed on Apr. 17, 1912. Upon receiving a letter from a dealer in that commodity, appellant must have known that $1 per hundredweight less than the market value was a mistake. That they did is evidenced by the telegram to 'Ship quick.' It did not wire back that 'Your $1.35 per cwt. offer is accepted.' . . . We think that it is manifest from the evidence that appellant knew a mistake had been made, and sought to take advantage of the mistake by an immediate acceptance.

*Counsellor-at-Law, St. Paul, Minn.

Recent Judicial Decisions

Duty to Warn Inexperienced Miner.—A coal company must warn an inexperienced miner against special dangers incident to his employment. (Iowa Supreme Court, Looney vs. Garfield Coal Co., 147 "Northwestern Reporter," 129.)

When a Mining Company Becomes a Public Service Corporation—A mining company engaged in furnishing surplus electricity to private consumers is subject to regulation as a public-service corporation, so far as such service is concerned. (West Virginia Supreme Court of Appeals, Wingrove vs. Public Service Commission, 81 Southeastern Reporter 734.)

Validity of Coal Weighing Ordinance—An ordinance requiring all coal sold and delivered in the city, excepting in carload lots, to be weighed on the city's scales, and requiring payment of a ten-cent fee for the service and issuance of a weight ticket is a valid regulation. "The dealers can readily add the increase in expense to the price which they formerly charged for coal and protect themselves from any loss on account of the regulation." (Wisconsin Supreme Court, Brittingham & Hixon Lumber Co. vs. Sparta, 147 Northwestern Reporter 635.)

Discussion By Readers

Working Coal Seam with Heavy Parting

Letter No. 6—The proposition submitted by Mr. Morck, COAL AGE, June 13, p. 981, I regard as being practicable, so far as the successful extraction of the coal is concerned. The degree of profit attending the operation would depend upon the method adopted and the relative cost of labor and market value of the coal produced. Mr. Morck has omitted a very important factor, namely, the condition of the seam with respect to gas.

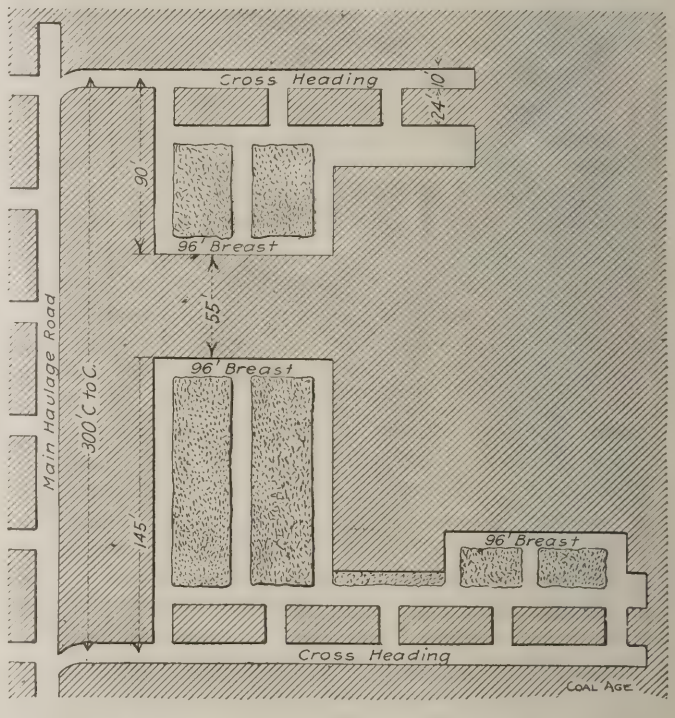
However, leaving this factor out of consideration, and regarding only the question of the adaptation of the two general systems of mining or some modification of the same, to the conditions given, permit me to say that I do not regard the longwall advancing method as adapted to this case for the following reasons: 1. The average thickness of the rock parting being 1 ft. and the two coal benches taken together being 5 ft. in thickness, gives an average thickness of 6 ft. for the entire seam, and the construction of packwalls, in an opening of this height, would involve a large expense. 2. The quantity of refuse available in the seam would not be sufficient to build packs of this size, and it would be necessary to bring material from the surface into the mine to complete the work, which would greatly increase the expense. 3. The seam being composed of material of different hardness, the resistance to the pressure of the overburden would vary in the several strata of the seam. While the effect arising from this condition might not manifest itself for some time, it is apt to prove a dangerous factor in the later development of the mine.

I have had experience in the working of a seam of coal having the same general composition as that given by Mr. Morck. The coal, however, was inferior in quality, and the roof conditions were bad. Notwithstanding these facts, the seam was mined with profit on the room-and-pillar system. The workmen, in both rooms and entries, were paid a cent per inch per lineal yard, for all rock over 4 in. in thickness. The price per yard was based on an average thickness of the rock parting, for each two weeks. The men on pillar work received no extra compensation. In this case, the coal was mined by pneumatic machines, in the bottom of the seam, and the rock was blasted with the coal. This method presented at least two important disadvantages. 1. The increased labor expense for removing the rock in the rooms. 2. The inferior quality of the coal produced by blasting the rock with the coal.

I recall seeing a modification of longwall advancing in operation in the northern bituminous field of Pennsylvania, in a 2-ft. seam of coal. I believe, with slight modification, the same method could be employed in the working of the present seam. The mine was opened on the double-entry system, the haulage roads being driven with a headroom of 5 ft. 2 in. above the rail, while the back heading was driven 4 ft. in height. Both of these entries were driven with a "skip" for gobs.

A coal face 96 ft. in length was opened off the back entry in sections of 24 ft. each, these being worked in steps. Between the consecutive 96-ft. breasts, a 4-yd. pillar was left. The breasts were driven a distance of 75 yd. and no cut-throughs were made in the pillars between them. From the haulage road of the next pair of cross-entries, a heading was driven to meet the breasts just mentioned; and from these headings other breasts were driven up parallel to the cross-entries. These last, however, were driven as a single breast, there being no pillars separating them. The roof conditions being good, no effort was made to construct packs.

It can readily be imagined that this method would afford little opportunity for good ventilation, and would probably entail a loss of considerable coal. The modification I would suggest, is shown in the accompanying diagram, which shows the main-haulage road on the left



A MODIFIED LONGWALL-BREAST WORKING

and two cross-headings driven 10 ft. wide to the right and, say 300 ft. apart, center to center. A barrier pillar 50 or 60 ft. in width is left to protect the main-haulage road. Inside of each cross-heading, and parallel thereto, is driven a 24-ft. place or room parallel to the cross-heading with which it is connected by crosscuts every 20 yd.

As the cross-headings and 24-ft. places advance, 96-ft. breasts are opened out on the ribs of the latter, and driven to intersect a similar breast that is opened in the same manner, from the 24-ft. place paralleling the next cross-heading. These breasts can be worked in steps or as a single face, depending on the conditions of roof and

floor. Modifications can be made in this general method, in respect to width of pillar and opening and method of extraction of the coal, whether on the advancing or retreating plan, so as to adapt it to the conditions existing in the mine.

The system affords a good opportunity for ventilation, avoids the expense of much yardage, and, with proper care, practically no coal need be lost. A sufficient width of pillar should be left between consecutive 96-ft. breasts, to enable these to be drawn back when the breasts reach the limit, without loss of coal.

The coal can be mined by pick or machine, as conditions render advisable. I would do the mining in the bottom-coal stratum and blast down the rock and upper coal separately, for the following reasons: 1. While more holes will have to be drilled, the amount of charge for each hole will be proportionately small, which will decrease the possibility of blownout shots occurring. 2. By blasting the rock and coal separately, cleaner coal is obtained and the expense of picking the coal outside is reduced. Also, the rock is handled more readily before the coal is taken down. 3. More lump coal will be obtained from the upper seam. 4. The daily output per man is increased. I believe this method, if adopted, would greatly reduce the cost of production, per ton of coal mined, and insure greater safety to the workmen than is possible in the common longwall system; and will prove less expensive than the room-and-pillar system of mining.

I. C. PARFITT.

Jerome, Penn.

Effect of the Mine-Run Law

I was pleased to note, in a recent editorial, COAL AGE, June 13, p. 974, that the mine-run law recently passed in Ohio, is not meeting the favorable reception that was hoped by its advocates, in its practical working. Experience in Kansas has led me to predict that the passage of this law in Ohio could only bring disastrous results to the mining industry throughout the state. The following brief references to the practical working of such a law cannot fail to convince the most skeptical that the results following in the wake of such legislation can only be disastrous to the industry at large:

Under the operation of the mine-run law as a basis of payment for miner's coal, the miner is only interested in increasing his daily output of coal, regardless of its condition. To accomplish this, he uses an excessive amount of powder and shoots his coal off the solid, without undermining or cutting the shot. This class of work does not require any skill or knowledge on the part of the miner; and, as a result, the mines are fast being overcrowded with unskilled and ignorant workmen. There is greater danger of the occurrence of blownout shots when the coal is thus shot off the solid. Not only is the coal shattered and broken, producing a large amount of a lower-grade and, in some cases, unmarketable coal, but the heavy shots loosen the roof and are thus the direct cause of many accidents from falls of roof. The heavy shooting also blows out the timbers and makes the working places unsafe.

This reckless style of mining is also responsible for the production of large quantities of fine dust, at the working face and on the roadways, thereby increasing the danger of dust explosions. In shallow mines, particularly, the damage to the roof by hard shooting and the resulting heavy roof falls cause the loss of large areas of coal that could have been worked out profitably by a more careful drifting and mining of the coal. The result is, in such districts, it is common to see "stripping" methods employed, the shallow surface being removed with steam shovels, by which many acres of surface land are destroyed and rendered worthless forever. There is still another consideration; these surface strippings produce a better grade of coal than is taken from the shaft mines, with the result that the former secure the bulk of the trade, while work at shaft mines is often slack.

The legitimate results of the mine-run law may, therefore, be summed up briefly, as decreasing the revenue from the sale of coal, by producing larger quantities of a lower-priced quality; causing the loss and abandonment of much coal that could be otherwise profitably worked; increasing mine accidents due to falls of roof, explosions of coal dust and gas; overcrowding the mines with unskilled and ignorant workmen; and, finally, destroying large areas of surface lands that would, by cultivation, prove a greater source of revenue than the coal taken from underneath them.

SUBSCRIBER.

Scammon, Kan.

Co-operation in the Mines

An item on the editorial page of COAL AGE, Apr. 18, p. 654, states: "Much good would result if coal companies would make compulsory a weekly meeting of superintendents, mine foremen, fire bosses, master mechanics, hoisting engineers, etc." I am in thorough accord with this idea, but would omit the word "compulsory."

Some months ago I instituted a series of weekly meetings of my mine foremen, by sending each one a request that he would so arrange his affairs as to meet the superintendent at the company's office on the next Wednesday evening. The time was specified as from 7:30 to 8:30, and all were present. At this meeting, the object of the gathering was stated, a general discussion held, the views of the different foremen secured, and a subject for discussion at the next meeting selected. The men were informed that while their attendance was earnestly desired, there was no intention to compel them to come; that the object was to obtain coöperation between the men and the management, with a view to increasing the efficiency; and for the further reason that an interchange of views and experience between themselves could not but prove beneficial to all concerned.

There was a cordial assent to the idea, on the part of the foremen, and a full attendance at the next meeting resulted. The subject assigned for that meeting was "Safety First," and a request had been made that each foreman should report what he had done or was doing in the way of safeguarding the men under his charge, against accident. They were also requested to report on unsafe conditions that they had observed and, for any reason, had been unable to remedy, and further to make any suggestions that occurred to them along the same line.

This meeting was very productive of results. Many valuable suggestions were made and much interest was aroused in regard to the best means of preventing acci-

dents. Many things were brought to the management's attention that might otherwise have escaped notice; and a vigorous and healthy movement was started for the removal, so far as possible, of all dangerous conditions.

These meetings have since been held regularly every week. They are wholly informal, each man expressing his views freely, and the chairman merely acting to guide the discussion and keep it somewhere within the limits of the assigned topic. At first, I acted as chairman, myself; but later each foreman, in turn, was asked to preside at a meeting; and the idea has now developed, so that each chairman suggests, at his meeting, the subject for discussion the following week. Meetings are strictly limited to one hour in length; but there have been occasions when the foremen refused to adjourn at the end of sixty minutes, and kept up an interesting discussion and debate for an hour and a half.

Each foreman is at liberty to bring anyone with him whom he thinks would be interested in the subject under discussion; as, for instance, his assistant foreman, machine boss or boss driver; and these visitors are always asked to take part in the discussion. The master mechanic, outside foreman and the engineers usually attend, also; and many of the meetings are marked by interesting and valuable discussions. Among the subjects so far discussed, besides Safety First, may be mentioned, The Recovery of Pillar Coal; Machine vs. Pick Mining; Cost of Haulage; Recovery of Material; Treatment and Handling of Stock in the Mine; etc.

The results obtained by these meetings, I do not hesitate to say, have been good. Much interest has been shown by the foremen and a spirit of coöperation and friendly rivalry aroused, both of which tend toward increased efficiency. The attendance of the meetings has been all that could be desired. Unfriendly criticism is not allowed; but different methods are discussed and debated with the greatest freedom. It has frequently happened that suggested changes in methods have been put in force, and given a thorough trial. If the change proved more economical or efficient than the old method, it was adopted as standard practice, in the camp.

The foremen are also encouraged to visit one another's mines, with a view of studying the different conditions, which "the other fellow" is up against, and observing how he has solved his difficulties. This, also, we hope will be productive of much good. I have written this brief account in the hope that the method adopted here may be approved and undertaken by others similarly situated, and our crude ideas enlarged and developed by others.

FRANK S. DAVIS, Mine Supt.,
Superior Coal Co.
Superior, Wyo.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

Dry and Wet Air Compared—Strange as it may at first appear, wet air is lighter than dry air, volume for volume. This is because the water vapor in the air is much lighter than the same volume of air which it displaces. The specific gravity of water vapor referred to air as a standard or unity is 0.6235.

The weights, per cubic foot, of water vapor, dry, partly-saturated and fully-saturated air, respectively, are calculated by the following formulas:

Water vapor, $$w = 0.6235 \frac{c\, p_v}{0.37\, T} \quad (1)$$

Dry air, $$w = \frac{p_a}{0.37\, T} \quad (2)$$

Air partly saturated, $$w = \frac{p_a - 0.3765\, c\, p_v}{0.37\, T} \quad (3)$$

Air fully saturated, $$w = \frac{p_a - 0.3765\, p_v}{0.37\, T} \quad (4)$$

w = weight (*lb. per cu.ft.*)
c = degree of saturation, expressed as a *decimal*
p_a = atmospheric pressure (*lb. per sq.in.*)
p_v = saturated-vapor pressure (*lb. per sq.in.*)
T = absolute temperature (*deg. Fahr.*)

It is readily seen, from formulas 2, 3 and 4, that perfectly dry air is always heavier than air containing water vapor, and that the weight of air decreases as its degree of saturation increases. The weight of moisture in air is usually estimated in grains instead of pounds, per cubic foot, and it is necessary to multiply the results obtained from the above formulas by 7000 (1 lb. = 7000 grs.).

The same formulas expressing the atmospheric pressure and the vapor pressure in inches of barometer, instead of pounds per square inch, are as follows:

Water vapor, $$w = \frac{0.82757\, c\, p_v}{T}$$

Dry air, $$w = \frac{1.3273\, B}{T}$$

Air partly saturated, $$w = \frac{1.3273}{T}(B - 0.3765\, c\, p_v)$$

Air fully saturated, $$w = \frac{1.3273}{T}(B - 0.3765\, p_v)$$

It is evident that when air is fully saturated, $\mathbf{c} = 1$, and disappears from the formula. The values of $\mathbf{p_v}$ are given in a preceding table, in pounds per square inch and inches of mercury.

Important—Properly speaking, a vapor does not saturate the air, but the space it occupies; since, for any given temperature, the same weight of vapor serves to fill a given space whether that space is full or void of air. Commonly speaking, vapor is said to be saturated or unsaturated according as the space it occupies is saturated or otherwise.

The Coal Age Pocket Book

Laws of Vapors—The following laws express the chief characteristics of vapors:

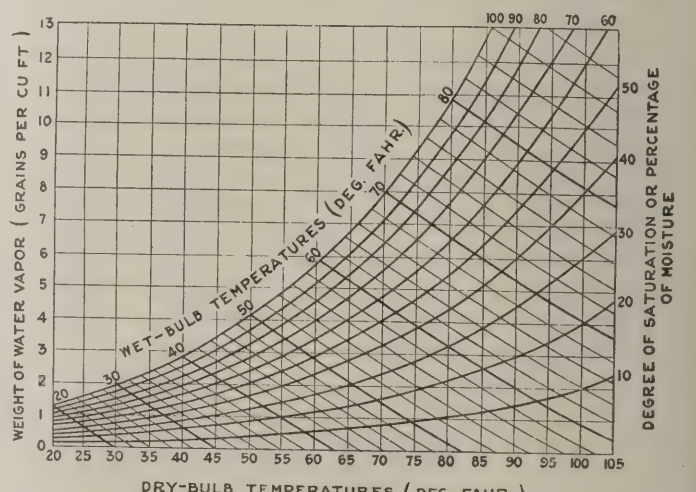
1. Vaporization takes place at the surface of all volatile liquids, at all temperatures, till the space surrounding the liquid is saturated or the critical temperature is reached.

2. Vapor pressure (different for different vapors) depends on the temperature and the degree of saturation.

3. For any given temperature, the weight and pressure of a vapor saturating a given space is the same whether that space is full or void of air or other gas.

4. Saturated-vapor pressures increase with the temperature, and when equal to the pressure above the liquid vaporizing, the ebullition of the liquid begins, which marks the **boiling point** of the liquid for that pressure.

5. In a confined space, a further addition of heat to the liquid causes a rise of both temperature and vapor pressure till an equilibrium of densities of liquid and vapor stops further vaporization and marks the so called **"critical temperature"** for that liquid.



A Humidity Chart

The above diagram is useful in showing at a glance the weight of water vapor that will saturate a cubic foot of space at any temperature from 20 to 105 deg. F. and the degree of humidity for different dry- and wet-bulb readings of the psychrometer.

Inquiries of General Interest

Study Question--Ventilation

In the later development of a coal mine opened some time since in a seam of clean coal 3 ft. 8 in. thick, the ventilation became insufficient, the requirement of the mine being greater than the capacity of the present fan. After a thorough examination of the mine, the mine inspector decided that, in order to comply with the mine law, a circulation of 180,000 cu.ft. of air per minute was necessary. He requested that this air current should be circulated in three natural splits, as follows:

Split A, 8 × 10 ft., 3600 ft. long
Split B, 6 × 12 ft., 5000 ft. long
Split C, 7 × 14 ft., 4500 ft. long

I would like to ask where the regulators should be placed in these airways; and what will be the size of the opening in the regulator, in each split. Also, what will be the least expenditure of power, in order to produce the required circulation in these splits. Assuming a single intake fan, what must be the required diameter of the fan that will produce the required volume of air in this mine?

The mine is a drift opening, and the main air current of 180,000 cu.ft. per min. must pass through the main airway, which is 6x14 ft. and 800 ft. long, including its return, to the point where the air is divided between the three splits mentioned.

HARRY M. DANIELS, Mine Foreman,
Cabin Creek Consolidated Coal Co.
Wake Forest, W. Va.

In answering this question, it should first be stated that no regulators are required in the *natural* division of an air current. It is only when a proportionate division is required that regulators must be introduced in every split but one, which remains open. The purpose of the regulators is to increase the pressure in each of those splits where the regulators are placed, to make it equal to the natural pressure of the free or open split. The "free split" is one having the highest natural pressure; and this pressure becomes the ventilating pressure for all the splits.

The areas, perimeters and lengths of the main airway and splits, respectively, are as follows:

Main airway $a = 84$ sq.ft.; $o = 40$ ft.; $l = 800$ ft.
Split A, $a = 80$ sq.ft.; $o = 36$ ft.; $l = 3600$ ft.
Split B, $a = 72$ sq.ft.; $o = 36$ ft.; $l = 5000$ ft.
Split C, $a = 98$ sq.ft.; $o = 42$ ft.; $l = 4500$ ft.

In the present case, the division being natural, the quantity of air passing in each split is proportional to its pressure potential. The respective potentials for the main airway and the three splits are as follows:

Main airway, $X_1 = a\sqrt{\frac{a}{lo}} = 84\sqrt{\frac{84}{800 \times 40}} = 4.304$

Split A, $X_a = 80\sqrt{\frac{80}{3600 \times 36}} = 1.988$

Split B, $X_b = 72\sqrt{\frac{72}{5000 \times 36}} = 1.440$

Split C, $X_c = 98\sqrt{\frac{98}{4500 \times 42}} = 2.232$

Sum of split potentials, ΣX_p 5.660

The quantity of air passing in the main airway and each respective split is, then, as follows:

Main airway, (*total circulation*) 180,000 *cu.ft. per min.*

Split A, $q_a = \frac{1.988}{5.66} \times 180{,}000 =$ 63,220 *cu.ft. per min.*

Split B, $q_b = \frac{1.44}{5.66} \times 180{,}000 =$ 45,800 *cu.ft. per min.*

Split C, $q_c = \frac{2.232}{5.66} \times 180{,}000 =$ 70,980 *cu.ft. per min.*

Since the pressure for all the splits is the same, the split pressure may be calculated from any one of these splits, as, for example, Split A. This split pressure when found must be added to the pressure required to pass the total quantity of air through the main airway, to obtain the total mine pressure; thus:

Splits, $p_a = \frac{klOq^2}{a^3} = \frac{0.00000002 \times 3600 \times 36 \times 63{,}220^2}{80 \times 80 \times 80}$

$= 20.23$ *lb. per sq.ft.*

Main airway, $p_1 = \frac{0.00000002 \times 800 \times 40 \times 180{,}000^2}{84 \times 84 \times 84}$

$= 34.98$ *lb. per sq.ft.*

Total mine pressure . . . . . 55.21 *lb. per sq.ft.*

Or these unit pressures may be found by dividing the quantity of air passing in any airway, by the corresponding pressure potential, and multiplying the square of the quotient by k; thus,

Splits, $p_b = k\left(\frac{q_b}{X_{pb}}\right)^2 = 0.00000002\left(\frac{45{,}800}{1.44}\right)^2$

$= 20.23$ *lb. per sq.ft.*

Main airway, $p_1 = k\left(\frac{Q}{X_{p_1}}\right)^2 = 0.00000002\left(\frac{180{,}000}{4.304}\right)^2$

$= 34.98$ *lb. per sq.ft.*

Total mine pressure . . . . 55.21 *lb. per sq.ft.*

The horsepower on the air, in this case, is

Horsepower, $H = \frac{Qp}{33{,}000} = \frac{180{,}000 \times 55.21}{33{,}000} =$ *say* 300 *hp.*

Allowing 60 per cent. for the efficiency of the fan and engine, which is customary practice, the indicated horsepower of the engine driving the ventilating fan would be 300 ÷ 0.60 = 500 hp. We would not recommend building a fan that would be designed for this circulation, inasmuch as the ventilating pressure required is far too high for the economical ventilation of the mine. The air current should be further split to reduce this pressure to, say from 10 to 15 lb. per sq.ft. of section.

Examination Questions

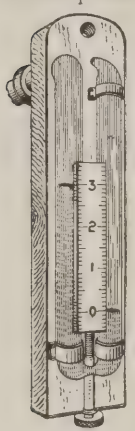
Montana Mine-Foremen's and Firebosses' Examination

(Continued from last issue)

Ques.—What is meant by the terms, "ventilating pressure," "water gage" and "resistance of air?"

Ans.—Ventilating pressure is the pressure producing the ventilation. The term properly describes the total pressure exerted on the entire sectional area of the airway. The *unit* of ventilating pressure is then the pressure per square foot of sectional area. The expression "ventilating pressure," however, is often used when the unit pressure is meant.

A water gage is a bent glass tube attached to a standard or base, as shown in the accompanying figure. The water placed in the bend of the tube is acted on by the air pressure, which is exerted through each of the open ends. One of these ends is bent at right angles so that it can be extended through a hole in a brattice on which the instrument is placed. The brattice divides the intake airway from the return. The water in the gage is thus acted upon by two different pressures, the intake and the return pressures. The intake pressure being always the greater, depresses the water in that arm of the gage, the liquid rising an equal amount in the other arm. The difference between the water levels, which in the figure is 3 in., indicates the difference of pressure between the intake and the return airway. This is the unit of ventilating pressure, and is equal to 5.2 lb. per sq.ft. of area, for each inch of water-gage reading; or $3 \times 5.2 = 15.6$ lb. per sq.ft.



A Water Gage

The resistance of the air, in mine ventilation, is due to the friction of the air current rubbing against the sides, top and bottom of the airways and striking against other obstructions in the passage. It is this resistance to the passage of the air current that produces the ventilating pressure, to which it is equal.

Ques.—If an open light is placed in a large body of marsh gas unmixed with air, what would be the result? Give your reasons.

Ans.—Assuming that it were possible to place a lighted safety lamp within a large body of marsh gas unmixed with air, the flame of the lamp would thereby be deprived of the oxygen necessary to support its combustion and, as a result, would be promptly extinguished by the gas. Flame cannot burn in the absence of oxygen, and there is no available oxygen in marsh gas (CH_4), unless the gas is diluted with air.

Ques.—How many cubic feet of air is passing per minute along an airway 6 ft. high and 10 ft. wide, the velocity of the air current being 450 ft. per min.?

Ans.—The sectional area of this airway is $6 \times 10 = 60$ sq.ft. Assuming the given velocity is an average reading for the entire area of the airway, the volume of air passing is $60 \times 450 = 27{,}000$ cu.ft. per min.

Ques.—According to the Montana State mining law, what quantity of air should be circulated in a mine with 200 men and 20 mules?

Ans.—The mining law of the state requires a circulation of not less than 100 cu.ft. of air per min. for each person and 600 cu.ft. per min., for each animal employed in the mine; but in a mine generating firedamp, the volume of air required is 150 cu.ft. per min. for each person employed. Therefore, assuming no firedamp is present, the volume of air required, in this case, is $200 \times 100 + 20 \times 600 = 32{,}000$ cu.ft. per min. If firedamp is present, the volume of air required will be 42,000 cu. ft. per min.

Ques.—If a fan should double its speed, what increase would there be in the ventilating pressure, and in what proportion would the quantity of air be increased?

Ans.—Roughly speaking, other conditions remaining unchanged, the quantity of air in circulation varies as the speed of the fan and the ventilating pressure as the square of the speed. On this basis, the quantity of air in circulation would be doubled and the pressure increased four times, by doubling the speed of the fan. In actual practice, however, the quantity of air will be increased only one and three quarters times and the water gage three times the original amount, by doubling the speed of the fan.

Ques.—Explain the constant 5.2 used in connection with water-gage calculations.

Ans.—This constant expresses the pressure in pounds per square foot corresponding to a water-gage reading of 1 in. A cubic foot of water weighs approximately 62.5 lb. The weight of water distributed over 1 sq.ft., in a layer 1 in. in depth, is, therefore, $62.5 \div 12 = 5.2$ lb. Since water in equilibrium rises to the same height, regardless of the sectional area of the vessel, a water-gage reading of 1 in. represents a layer of water 1 sq.ft. in section and 1 in. deep, and corresponds to a pressure of 5.2 lb. per sq.ft.

Ques.—If 55,000 cu.ft. of air is passing through a circular shaft 10 ft. in diameter, what is the velocity per second?

Ans.—The sectional area of a shaft 10 ft. in diameter is $0.7854 \times 10^2 = 78.54$ sq.ft. The velocity of the air current, in this case, is $55{,}000 \div 78.54 =$ say 700 ft. per min.; or $11\frac{2}{3}$ ft. per sec.

Ques.—What are the features that render some safety lamps more sensitive to gas than others?

Ans.—The principal feature that renders a safety lamp sensitive to gas is a free upward circulation of air through the lamp, as is the case in the unbonneted Davy lamp. In other lamps, an important feature, in this regard, is the entry of the air below the flame of the lamp; it is also important to have a free unobstructed discharge of the burned gases in the upper part of the chimney. Volatile oils and hydrogen gas afford flames sensitive to gas.

Coal and Coke News

WASHINGTON, D. C.

The Interstate Commerce Commission has handed down a decision in the case of the Hughes Creek Coal Co. vs. the Kanawha & Michigan Ry. Co. as well as in the case of the Kelly's Creek Colliery Co. vs. the same. In this case it is held that there may properly be a slight difference between the rate on coal applicable to the through routes ordered and those applicable to the single movement on the Chesapeake & Ohio, this difference not to exceed 5 cents per ton.

The decision arrived at in this case is based upon the original decision of the Commission in the same cases regarding rates on coal from mines on the Kanawha & Michigan Ry. to various Eastern and Southeastern destinations. The substance of the Commission's original decision was this: It appeared that the Kanawha & Michigan and the Chesapeake & Ohio, operating in the Kanawha district, parallel each other for a distance of about 50 miles on opposite sides of the Kanawha River, with a junction at Gauley, W. Va.

Complainants are coal companies situated on the Kanawha & Michigan who were petitioning for an outlet to markets east and southeast of them. At the time of the petition, to reach these destinations they were compelled to pay the sum of the Kanawha & Michigan's local of 40 cents to Gauley and the Chesapeake & Ohio's local from Gauley beyond, which, in the case of Richmond, Va., for example, is $1.50, resulting in a total combination rate to Richmond of $1.90. The rate from Chesapeake & Ohio mines to Richmond is $1.60.

Complainants contended that this 30-cent differential against them practically closed these markets, and they accordingly requested the Commission to establish through routes and joint rates from the Kanawha & Michigan stations to the Eastern and Southeastern destinations in question, asking that as reasonable rates for such through routes the Commission prescribe the rates applied to these destinations by the Chesapeake & Ohio for the movement from its own mines over its own line. The Commission decreed the establishing of the through routes and held that the Chesapeake & Ohio rates would be reasonable rates to apply to the through routes composed of the two roads, the Kanawha & Michigan to Gauley and the Chesapeake & Ohio beyond.

In reargument counsel for the Chesapeake & Ohio repeats a contention which was urged from the outset of the proceeding to the effect that the complainants' case was one solely of discrimination. This attempted limitation of the issues clearly was not sustainable upon the record, and the Commission in effect so held in its original report.

Further discussion of the point would seem to be unnecessary were it not for the insistence and emphasis with which it has been continuously advanced. It seems abundantly clear that on grounds quite apart from their charges of discrimination predicated in the main upon the alleged association in interest between the Kanawha & Michigan and Chesapeake & Ohio, the complainants were petitioning the Commission to establish through routes and joint rates.

While they were avowedly seeking the Chesapeake & Ohio's existing rates for competitive reasons, complainants also distinctly proposed these rates as the measure of what would be reasonable joint rates to apply to the through routes they were seeking. Counsel objects to the Commission's decision on the ground that while it found that the charges of discrimination were not proven, it gave relief as though for discrimination.

In passing upon the contentions thus offered, the Commission after a review of the whole situation, says:

Renewed examination of this matter has not made it entirely clear that the through routes would in all cases necessitate an extra switching movement which would not be required in the case of the single movement over the Chesapeake & Ohio from its own mines. On the ground, however, that as a general rule there would be this additional expense, taken in connection with the consideration of the two as against the one line haul, we are of opinion upon reconsideration of the case that there may properly be a slight difference between the rates applicable to the through routes and to the single movement on the Chesapeake & Ohio. This difference should not exceed 5 cents per ton.

Congress to Investigate Southern Coal Trust

Congress has at last reached the point of investigating the charges relative to the alleged establishment of a Southern coal trust and has just begun the work of inquiry through a special committee of the Senate of which Mr. Bryan, of Florida is chairman. The inquiry is based upon charges made by B. L. Dulaney, of Bristol, Tenn., that the Pennsylvania system and its allied lines have undertaken to control shipments from southern coal fields in the interest of the so called "coal trust."

The first witness summoned before the Committee was Mr. Dulaney himself. He will be accompanied by F. C. Wright, a railroad rate expert who is to make an analysis of the coal rates that are now complained of by coast cities south of Norfolk. The claim has been that north Atlantic ports between Norfolk and New York get coal shipments which would normally be sent to tidewater at Charleston, Jacksonville and other ports.

It is believed that the investigation will broaden into an inquiry as to the relationships between the coal fields in Tennessee, West Virginia, Virginia, Kentucky and Pennsylvania on the one hand and the various railways running through those states. Officials of the roads have been asked to appear and among those who are expected are the presidents or general managers of the Atlantic Coast Line, the Chesapeake & Ohio, the Seaboard Air Line, and the Southern Railway.

It is possible that legislation may be urged as a result of the investigation or if not that the Interstate Commerce Commission may be directed to take up the matter and correct the alleged discriminating rates, if it should be concluded that nothing further in the way of legislation is desirable or necessary.

HARRISBURG, PENN.

It is reported here that indictments were filed on July 13, in the United States Court at Rochester, N. Y., against the Pennsylvania R.R., the Northern Central Ry., the Delaware, Lackawanna & Western R.R. Co. and the Delaware, Lackawanna & Western Coal Co.

All the indictments relate to transactions in connection with the mining of anthracite coal in Pennsylvania and transportation to Buffalo and vicinity, and allege unfair advantages by the railroads over other shippers.

The four companies are liable to fines of more than $1,000,000 if convictions are obtained.

The indictment against the Pennsylvania charges violation of the commodities clause of the interstate commerce act. Under this clause railroads are forbidden to transport commodities which they own, not required by them in their own business. It is the second criminal case under this act.

The indictment charges that half a dozen coal mining corporations ostensibly separately incorporated and which ship all their coal over the Pennsylvania system, are really owned, operated and financed directly by the Pennsylvania R.R. Co. The indictment contains 25 counts, the maximum penalty under the law for each violation being a fine of $5000.

The indictment against the Northern Central Ry. charges that it leased coal lands near Shamokin, Penn., to the Mineral Railroad and Mining Co., at a rental in the form of a royalty of 28 cents a ton, and that while the mining company has been mining and shipping a million and a half tons a year, the railroad company never has collected a cent in royalties.

The government alleged that by reason of this situation there was a discrimination in favor of this particular shipper. The indictment contains 50 counts, the maximum penalty for each violation being a fine of $20,000.

The Delaware, Lackawanna & Western R.R. Co. was indicted for granting concessions to the coal company of the same name on shipments of anthracite, while the coal company was indicted for accepting such concessions. While the word "concession" was used, it was explained that this was one and the same as granting rebates.

It is also alleged that the Delaware, Lackawanna & Western R.R. Co. owns five coal trestles in Buffalo which are worth $185,000. It is charged that the road expends annually for repairs and taxes $6000 on the property. It rents the trestles to the Lackawanna Coal Co. for $48 per annum. Because of this low rate the charge of making an illegal concession is made.

Improvements to Philadelphia Harbor

Within the next 30 days the largest vessels in the coal trade will be able to load safely full cargoes at the Greenwich Coal Piers at Philadelphia. It is said by the Department of Wharves, Docks and Ferries that the bar at the entrance to these piers, which in the past has been a menace to shipping, would be removed by Aug. 15.

For a number of years the shipping interests of this port made repeated efforts to have the bar removed, but without avail. The trouble arose over its location. As it is situated west of the 30-ft. channel, it did not come under the jurisdiction of the army engineers, and, as it is beyond the pierhead line, the city of Philadelphia was not responsible for its removal.

The determination to remove this bar was caused indirectly by a large shipping concern outside of the state. Last April the New England Coal & Coke Co., of Baltimore, wrote to the Maritime Exchange and asked if vessels 500 ft. long, 56 ft. wide and drawing 27 ft. could load safely at Greenwich and Port Richmond coal piers at any stage of the tide. The exchange replied that they could not on account of the bar just opposite the Greenwich pier.

After this the matter was dropped for some time. It was taken up later by the Joint Executive Committee on the improvement of the Harbor of Philadelphia and the Delaware and Schuylkill rivers. It eventually was referred to the Department of Wharves, Docks and Ferries. This department took the matter up with Colonel George Zinn, in charge of the United States Engineers' Office, in Philadelphia. Colonel Zinn promised to remove this bar, and about a month ago started two dredges working. Assistant Director John Meigs of the Department of Wharves, Docks and Ferries, on July 13, notified the Maryland concern that by Aug. 15 large vessels could load safely at the Greenwich piers at any time.

Shippingmen state that they look for a big increase in the coal trade of Philadelphia when it becomes generally known that this bar has been removed.

PENNSYLVANIA

Anthracite

Beaver Brook—The abandoned washery at the Beaver Brook colliery, which has been out of service for the past few years has been torn down. The best of the material will be utilized for other purposes, while the poorer class will be disposed of for fire wood to the residents of the town.

Luzerne—According to the report of the national auditors of the United Mine Workers of America recently made public, District No. 1 of the Anthracite region has a balance on hand in its treasury of $75,643.67. Two years ago the balance was only $12,618 and last year $52,640.68. Never has the union been so well financed and so strongly organized.

Freeland—The arrest of several coal pickers by officers of the Lehigh Valley Coal Co. has had a telling effect on the people who pick coal on company property, and the banks and strippings hereabouts present a deserted appearance. The recent crusade waged by the police officers of the company was marked by the consfication of a number of vehicles used to haul coal by the coal pickers.

Scranton—All the lower veins of the Pine Brook mine of the Scranton Coal Co. are filled with water as a result of the storm on July 10, and between 600 and 700 men are out of work as a consequence. Officials of the company stated that operations will not be resumed for about two weeks.

Yorktown—A cave occurred on July 14, near the road leading from Beaver Brook to Yorktown, caused by an internal disturbance in the old Yorktown mines. A force of men were put to work filling the cavity for several days. The surface surrounding the cave is all cracked and may yet disappear.

Audenried—As a precaution against possible accidents, the Lehigh & Wilkes-Barre Coal Co. officials have given orders against the backing of cars or trains, making it imperative that the engine be in advance. This will lessen the possibility of accidents and make it safer to all concerned. The safety-first idea is being applied to all branches of industry, and the Lehigh & Wilkes-Barre Coal Co. is doing its share to put it into execution.

Bituminous

Connellsville—More than $6000 worth of garden truck will be raised at the Leisenring No. 1 plant of the H. C. Frick Coke Co. this year, according to the judges who on July 13 inspected the lawns and gardens of the employees and awarded three prizes in each class. The judges expressed regret that the prize list was so limited, and specifically mentioned 17 persons as entitled to credit for what they have accomplished.

Lilly—Independent miners of this place on July 15 announced that they would oppose the formation of a branch of the United Mine Workers of American in that town. President Patrick Gilday, of District No. 2 of the United Mine Workers, has completed plans for the starting of a branch at Lilly, and a charter has been applied for. The arrival of the charter is expected to be the signal for the opening of a battle that may have serious consequences.

WEST VIRGINIA

Charleston—The recent explosion of a keg of powder in the mine of the Olcott Coal Co. at Dungriff resulted in serious injuries to 13 miners, three of whom may not recover.

Ansted—The mines of the Gauley Mountain Coal Co. have been compelled to shut down on account of inability to secure enough water for the use of the boilers. Every available supply of water has been exhausted during the prolonged drouth, and even the electric-light plant is stopped leaving the town in darkness.

Fayetteville—Two strikes at New River mines were called recently on account of local grievances. At Elverton about 80 miners quit because of the company's refusal to employ a certain man as check weighman. The company did not consider him competent, and declined his employment after he was duly elected by the miners. At Kaymoor No. 2 mine the men quit because of the company's employment of Howard Wilson. He is objectionable to the miners because he has been employed as a guard at Loop Creek mines and is charged as being a member of the Baldwin force of detectives. About 50 miners went out.

KENTUCKY

Whitesburg—The Elkhorn Coal Co. is getting in readiness to begin shipping coal from its new operation at the Mater-Kona station, on the main line of the Lexington & Eastern R.R. A mining town of some size is rapidly nearing completion.

The next grand jury, it is said, will be charged to inquire into the matter of cocaine selling, which, it is declared, has grown to large proportions, especially among the colored population. This traffic is charged with being responsible for a large part of the disorder which occurs in this section.

TENNESSEE

Chattanooga—The Baker mines, at Baker's station, on the Cincinnati, New Orleans & Texas Pacific R.R., have been taken over by the Conger Coal Co., organized in Chattanooga with a capital of $50,000. John E. Patton, Charles C. Moore, James M. Adams, George M. Price and J. H. McCallum are the incorporators. The mines have been in operation for several years and are considered of great value.

OHIO

Bellaire—The Cambria Mining Co., with its principal offices in Pittsburgh, has announced that it will start the Poultney and Webb mines shortly. Twenty armed guards will be placed on duty at the mines. It is believed to be practically certain that demonstrations will be made at both plants, and probably some violence will be offered by the Industrial Workers of the World. Fearing violence, several of the Union officials in this district have removed their families.

Massillon—The Goshen Valley Coal Co. of Massillon has taken leases on a large tract of coal land in Warwick and Goshen townships, Tuscarawas County. The leases were conveyed to the company by Frank Taggart, also of Massillon.

INDIANA

Kokomo—The Howard Circuit Court has ordered the mines of the Domestic Coal Co., near Brazil, sold. The company has been in the hands of a receiver, Harry Smith, Indianapolis, for more than a year. Appraisers have been appointed. The company was organized several years ago, J. E. Frederick, manager of the Kokomo Steel & Wire Co., having the controlling interest.

Terre Haute—A settlement has been reached between the operators and 250 miners of the five strip mines of the state, and the men are at work again. The scale of wages is to be left to a board of arbitration.

Sullivan—The Citizens mine, formerly owned by the Mönon Coal Co. and shut down for four years, has been reopened by the new owners and the No. 6 vein is being mined.

ILLINOIS

Herrin—Mine No. 7 of the Big Muddy Coal & Iron Co., which has been shut down for practically 18 months, is expected to resume operations in about 30 days. A new crusher is being put in and the plant overhauled. It will give employment to 500 men.

The properties of the Chicago & Carterville Coal Co. are both idle. A recent storm put mine A out of commission by blowing away the smokestacks and damaging the property otherwise, and it will be Sept. 1 before mine B, the top works of which were recently destroyed by fire, can be put in shape for operation.

MISSOURI

Creighton—Repairs are being made in the mine at Creighton, in Cass County, and actual producing probably will begin in the immediate future.

ARKANSAS

Prairie Creek—The tipples of three mines of the Mammoth Vein Coal Co., at Prairie Creek, near Hartford, were destroyed on July 17, following a six-hour battle between union and nonunion miners and guards. The damage is estimated at $200,000. The guards were routed by the union men, who, it is alleged, fired the surface plants.

KANSAS

Pittsburg—The Chamber of Commerce has decided to take a prominent part in exploiting coal and other products at the International Dry Farming Congress and Soil Products Exposition, to be held at Wichita, Kan., in October. Comprehensive exhibits showing the importance of the coal-mining industry, are planned.

Mineral—The strike of the Joplin & Pittsburg Ry. has continued without developments. Miners living at Mineral are walking from one to three miles to their work, others in the district being equally handicapped by the interurban tie-up.

TRADE CATALOGS

The Central Foundry Co., New York. "Valve, Service and Roadway Boxes." Twenty-three pages 3½x6¼ in.

The Electric Weighing Co., New York, N. Y. "Electric Conveyer Scales," Pamphlet of six pages illustrating and describing automatic weighing devices.

The T. L. Smith Co., Milwaukee, Wis., catalog No. 300 "Smith Mixer." Sixty-three pages 6x9 in. profusely illustrated, describing the construction and application of Smith mixers.

The Wagner Electric Mfg. Co., St. Louis, Mo. Bulletin 104 "Portable Instruments." Forty-seven pages 8½x11 in. illustrating and describing electrical testing instruments and their application.

PERSONALS

J. F. Smith has accepted the position of superintendent for the Montevallo Mining Co., at Aldrich, Ala.

Daniel Young, of West Scranton, Penn., has been appointed general superintendent of the Scranton Coal Co., to fill the vacancy caused by the promotion of W. L. Allen to the general managership of the firm.

William J. Murray, general manager of the Victor American Fuel Co., and Benjamin W. Snodgrass, mine superintendent at Delagua, Colo., have been nominated for membership in the North of England Institute of Mining and Mechanical Engineers.

A. J. Meek, of the Meek Coal Mining Co., aged 75 years, on July 14 suffered a stroke of paralysis, which rendered him speechless and helpless. Mr. Meek is also president of the Egyptian Coal & Mining Co., Merchants Exchange, St. Louis, Mo.

Dr. T. D. Scales, of Boonville, Ind., has given up his practice and is now an extensive coal operator in southern Indiana. He owns several mines about Evansville and Boonville and disposes of a considerable amount of their output in the Louisville market.

O. J. Patzold has been appointed sales manager for the La Follette Coal, Iron and Ry. Co., by George M. Shoemaker, manager of operations under Neil Robinson, receiver for the above named company. Mr. Patzold will have his office at the La Follette mines in Tennessee.

Daniel B. Torpy of Marietta, Ohio, has been appointed receiver for the Marietta, Columbus and Cleveland R.R., which runs from Marietta to Palos, on the T. & O. C. The suit for a receiver was filed by the Knickerbocker Trust Co., of New York, which held a mortgage on the property.

James W. Paul, former chief of the West Virginia Department of Mines, was recently granted letters patent for a portable signal apparatus to be used in coal mines. The device, should its use be adopted, would be a material factor in avoiding accidents inside the workings.

Arthur I. Young, for the last year, first-aid miner with the rescue car at Pittsburg, Kan., has been promoted to foreman in charge of the rescue station, with full charge of the local operations of the United States Bureau of Mines. Mr. Young succeeds H. D. Mason, Jr., who recently was transferred to Pittsburgh, Penn.

"Aunt Polly" Davis has come into the limelight of late by reason of articles in the Louisville papers containing her picture and that of her cabin in the midst of a 1000-acre farm which is exceedingly rich in coal and timber. She works the farm, with the assistance of a little help occasionally, although she is 82 years of age. She has $33,000 in the bank, but has elected to live a secluded life.

H. S. Gay, general manager of the Gay Coal and Coke Co., of Logan, W. Va., sailed this week from Boston for Scotland, where he will attend the Napier Tercentenary Celebration, an event to be held under the auspices of the Royal Societies of Edinburgh and London, and will read a mathematical paper entitled "The Approximate Determination of the Function of the Angle and the Converse." Mr. Gay is one of the two Americans who will read papers on this occasion. He has devoted much of his spare time during the past 20 years to the theories covered in the article, mathematics being one of his hobbies.

OBITUARY

Daniel H. Davis, banker, capitalist and one of the wealthiest men in Clay County, died at his home, Brazil, Ind., July 14. He was born near Cardhill, Wales, and came to America at the age of 17. He was a coal miner for several years at Scranton, Penn., and Knightsville, Ind., but went into the mercantile business and laid the foundation of a fortune now estimated at over $1,000,000. He organized two of the largest coal companies in the Indiana block coal field, and at one time was probably the largest producer in the state. He was an officer or director of several Indiana banks and trust companies and held appointive offices of importance from postmaster to trustee of public institutions.

Archibald F. Law, vice-president and treasurer of the old Temple Iron Co., which was dissolved recently by decree of the United States Supreme Court, died at his home, 1515 Adams Ave., Scranton, Penn., on the morning of July 18. He had been failing for some time and hope for his recovery had been abandoned. He was 59 years old.

Mr. Law was born in Scranton and began his career with the Lehigh Valley Coal Co., starting as weighmaster. In 1885 he became connected with the firm of Simpson & Watkins, colliery operators, and when that firm disposed of its properties to the Temple Iron Co. he became president of the Temple's subsidiary companies and vice-president and treasurer of the holding company.

Besides his connection with the coal mining business, Mr. Law was president of the Wyoming Electric Co., director and treasurer of the Mears Mining Co., of Joplin, Mo.; a director of the Title Guaranty & Surety Co., the Peckville National Bank, the Forty Fort Silk Co., the Scranton Trust Co. and the Lytle Store Co., of Minersville.

He was active in all the principal local social organizations, was a member of the Green Ridge Presbyterian Church and a 32d degree Mason. He leaves his widow and one son, Frank E. Law, a mining engineer, in Mexico. His only daughter, Mrs. Frank M. Rutter, and her husband were killed in a New Haven wreck about a year ago. In 1905 Mr. Law presented the town of Jessup with a 5000-volume library, which will now be known as the A. F. Law Memorial Library.

CONSTRUCTION NEWS

Ironton, Ala.—The Alabama Co. one of the largest coal and iron producers in the Birmingham district announces that it will re-line immediately its furnace at Ironton at a cost of approximately $20,000.

Dante, Va. — The Clinchfield Coal Corporation recently awarded the Roberts & Schaeffer Co., of Chicago, a contract for building a large Marcus coal tipple for installation at the Dante mine. The contract price was approximately $50,000.

Birmingham, Ala.—The Alabama & New Orleans Transportation Co. states that by Jan. 1, it will have on regular schedule at least 10, steel, self-propelling barges for transporting coal down the Warrior River to New Orleans. Seven are now in operation, and three more are building.

St. Clair, Penn.—Contractors have turned over to the Reading Ry. Co. a $300,000 auxiliary to the million-dollar, 75-track coal-shipping yard recently opened between this place and Mill Creek, in the shape of thoroughly equipped car shops. These have been building nearly two years

Sandusky, Ohio—The new loading machinery just installed at the new Pennsylvania docks in this city will be tried out in the course of a few days. This is part of the $1,000,000 dock improvements now under way in this city, which it is believed will make Sandusky one of the first coal ports on the Lakes.

Birmingham, Ala.—The American Tar Products Co. has located a site just north of the by-product plant of the Woodward Iron Co., and has engaged the entire tar output of the coke-oven plant out of which it will distill creosote and soft pitch. The present investment is $100,000, but this will soon be increased to $250,000.

Yolande, Ala.—The Yolande Coal & Coke Co., with mines at Yolande and Abernant, Alabama, anticipates making improvements costing between $25,000 and $30,000 on its plants, including the installation of motors at both places, the opening of a new slope at Yolande and the erection of a modern school house. Work has already been started on all of these improvements.

La Follette, Tenn.—The Vasper Coal Co. is contemplating an 800-ft. rock stope on a 33½-degree pitch to the Rex seam of coal on a tract leased from the Lindsay Coal & Land Co., of Knoxville, Tenn. When the coal is reached which will be within a few days it is expected that a modern plant will be installed. The Lindsay Coal & Land Co. has also just completed a slope to the same seam of coal at Careyville, for development purposes.

Birmingham, Ala.—The Pratt Consolidated Coal Co., the largest independent operating company in Alabama announces that it will build a fleet of steel barges for the purpose of conveying coal down the Warrior River to Mobile. Each barge will have a capacity of 500 tons, and three will be transported at a time by a tow boat, it being decided not to employ the self propelling barges at this time. The company already has a number of the latter type of coal boats, both at New Orleans and Mobile.

Floodwood, Ohio—Satisfactory progress on the construction of the huge power plant being erected by the Central Power Co. is being made. The large concrete foundations have been completed and the brick work will be rushed. It is the intention to push the transmission lines also so that when the plant is completed, about Nov. 1, the mines in the vicinity can be furnished with electric current. The company has 1000 acres of coal adjoining the plant. Fuel will be fed into the furnaces by gravity and the ashes will be removed in the same manner. The capacity will be 7000 hp.

NEW INCORPORATIONS

Leechburg, Penn.—The Valley Coal Co. has been organized with a capital of $20,000. The incorporators are Joseph G. Beale, E. H. Beale, Alfred Hicks, L. W. Hicks, and A. N. Hicks.

Ebensburg, Penn.—The Springfield Coal Co. has been organized with a capital stock of $25,000. The incorporators are, A. W. Evans, Harry Bell, and Leonard S. Jones, of Ebensburg.

Nashville, Tenn.—The Conger Coal Co. has been organized with a capital of $50,000. The incorporators are John E. Tatum, Charles C. Moore, J. M. Adams, George M. Price, and J. H. McCallum.

Pittsburgh, Penn.—The Clifton Coal Co. has been incorporated in West Virginia, with a capital stock of $100,000, by L. A. Bennett, Thomas Watson, J. J. Harter, George Shepard and R. M. Atkinson. The company will operate in West Virginia.

Pittsburg, Kan.—The Domestic Coal & Fuel Co., which will develop about 500 acres of strip and shaft coal lands in the Pittsburg field, has beeen formed. The capitalization is $100,000. A. H. Schlanger is president, other officers being George H. Mackie, vice-president, and C. M. Sweeney, secretary-treasurer. Sales and executive offices will be in the Globe building at Pittsburg.

INDUSTRIAL NEWS

Venice, Ill.—The coal chutes of the Chicago & Alton R.R., with several loaded coal cars and empties, were recently destroyed by fire, with a loss of approximately $20,000.

Coalfield, Tenn.—The Baker Coal Co. mine near Petros has been purchased from Ray M. Baker, of Rockwood, Tenn., by John E. Patton, president of the Sewanee Fuel & Iron Co., of Chattanooga.

Baton Rouge, La.—Thirty-one coal barges belonging to the Monongahela River Coal Co. sank here July 14, during a heavy rain storm. The coal was valued at $75,000 and a large force is now trying to raise the barges.

Birmingham, Ala.—Within the past few weeks, the Sloss-Sheffield Steel & Iron Co. has sold upwards of 50,000 tons of pig iron for delivery during the balance of the year. It has also closed contract with the Central of Georgia Railroad for 40,000 tons of coal for delivery during the next 12 months.

Charleston, W. Va.—The records in the office of Earl Henry, chief of the Department of Mines show that for the six months ending June 30, 1914, there were 370 fatalities. One hundred and eighty of these, however, occurred in the disaster at Eccles, this leaves 190 fatalities, with the mines running under normal conditions.

Lilly, Ky.—On July 27, E. G. Stooksbury, trustee for the creditors of the Ideal Block Coal Co., will sell at public auction the machinery and fixtures of the above named company, consisting of a steam shovel, steam boilers, pumps, electric hoists, Sullivan undercutting machines, coal cars, etc. This sale will take place at the mines about 2½ miles from Lilly.

Chicago, Ill.—The Illinois Pipe & Mfg. Co., of Chicago, has bought the entire surface plant of the Cardiff Coal Co., of Cardiff, Ill. This includes one steel tipple with its equipment, all boilers, hoisting engines, three sets of railroad scales, shaker engines, 400 coal cars, the rails in the mine and all equipment and supplies. These will now be offered for sale as second-hand equipment.

Columbus, Ohio—One of the effects of the settlement of the mining suspension in the Hocking Valley, Jackson, Crooksville and Pomeroy districts in Ohio is the resumption of work at the various railroad shops in order to get the coal cars in shape for traffic. Orders have been issued for resuming work at the shops of the Hocking Valley in Columbus and Logan and the Kanawha and Michigan at Hobson.

Columbus, Ohio.—The dissatisfaction which has been expressed by Ohio physicians with the manner in which their charges for medical attendance on injured workmen have been adjusted by the Ohio Industrial Commission is in a fair way to be settled, as the Ohio State Medical Association has appointed a committee, at the suggestion of the state authorities, to take the matter up and assist in arriving at an adjustment of the question.

Pittsburg, Kan.—The report of Eugene McAuliff, general fuel agent for the Frisco, for the fiscal year ending June 30, indicated that the coal tonnage on that road constituted one-sixth of the revenue tonnage. Several interesting points were discussed in the report. Mr. McAuliff asserted that a mistaken sentiment among operators that a car was loaded with coal when it is level full is evident. He stated that even when a car is crowned up, the load is still less than the capacity of the trucks.

Wheeling, W. Va.—After breaking all records for the amount of coal hauled in West Virginia and Kentucky for the fiscal year which ended June 30, the Chesapeake & Ohio Railway continues to keep up the high daily loading maintained last year. During the first ten days of July 579,920 tons were loaded in the fields mentioned, 41,200 tons of this being on the Big Sandy & Elkhorn road. This is an increase of 169,220 tons over the corresponding period of last yer, and indicates that 1914 will show a heavy increase over 1913.

New York City—The American Boiler Manufacturers Association will hold its 26th annual convention in New York on Sept. 1-4 inclusive, 1914. The headquarters will be established at the Waldorf-Astoria Hotel, and all boiler, tank, and stack manufacturers and fabricators of steel plates, also manufacturers and representatives of materials and supplies used by boiler makers are invited to attend the convention. A number of interesting papers will be presented and the subject of uniform boiler specifications will be thoroughly discussed.

Coal Trade Reviews

General Review

Heavy cuts in the anthracite circular and operations much curtailed. Down East bituminous market bordering on complete demoralization. Pronounced apathy in the Atlantic seaboard trade. Lake business is failing to show the expected form. Slow improvement in the Middle Western situation.

Further discouraging recessions have characterized the anthracite trade of the past week. The middle of the customary summer's dullness is at hand, with retailers placing only a few orders, and the situation further aggravated by delayed purchasing in all quarters. Heavy cuts in the circular are the rule, while both the individuals and large companies are reducing operations to nearly half capacity. A fair demand in the line trade, together with a large movement to the Northwest via the Lakes, are the only features preventing large accumulations at tidewater.

An almost complete demoralization prevails in the down East bituminous market. The situation has reached such a stage that a conference of the leading agencies was held at Boston to formulate a plan for rehabilitating the trade, and it was decided that the only corrective lay in a drastic curtailment program. Other Eastern distributing centers have failed to develop any features of a constructive nature, but the situation appears less acute and more along the line of the routine summer lethargy. There is no spot market, and the oldest operators report the dullest situation in years.

The long expected improvement in the bituminous movement from the Pittsburgh district, up the Lakes has failed to materialize, nor does there seem to be any immediate prospects for such. As a rule, tonnage figures are running close to those of last year, and consumers have little surplusses. Both spot and contract prices are subject to cuts. With the realization that the Ohio mines could not get under operation before Aug. 1, and even then only under a heavily curtailed capacity, a somewhat better tone has developed, particularly in the domestic grades. The Lake trade has proved decidedly disappointing so far, although preparations are being made to rush a heavy tonnage into the Northwest during the balance of the season. A distinctly better tone prevails as to the future.

The improving tendency in the Middle-Western market is being offset to a certain extent by the rapidly increasing production, and the delay in getting the crop movement under way. The demand is slow opening up and the disappointment is general throughout the trade. The labor scarcity, due to the heavy call for men in the farming districts, is interfering with handling the coal at the large distributing centers. The high-grade fuels are holding steady as a rule, and advances in the circular are scheduled for Aug. 1.

ATLANTIC SEABOARD

BOSTON

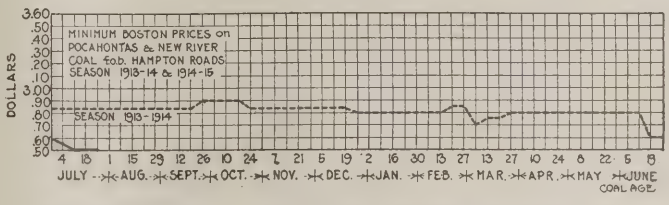
Efforts made to improve the price situation on Hampton Roads coals, but no result as yet. Pennsylvania grades in slightly better demand. Georges Creek still dull. Anthracite quiet.

Bituminous—Conferences have been held the past week to see if the ruinously low prices could be corrected at the various distributing points. So far, however, these efforts have shown no result. The local opinion is that the missionary work should be put in at the operating end and that conditions on Pocahontas and New River will get even worse unless a really drastic curtailment is enforced and further shipments of market coal are checked.

There are Hampton Roads cargoes at practically all the ports awaiting distribution orders and in varying degrees of distress. The trade here can hardly be said to feel optimistic. The only hope now is that sometime soon the West Virginia mines will close down for longer than a day or two, following the example of many of the Pennsylvania operations, and give the market a chance to tone up before the fall season starts in.

A large order for Cambria coal is understood to have been placed lately by the New Haven interests. This contract has usually been awarded to Pennsylvania shippers but Somerset County has heretofore furnished the bulk of the tonnage. A slightly better movement of the Pennsylvania grades is observed in several directions and orders are not quite so scarce as a fortnight ago. There is the same caution about sending coal to the loading piers without orders and doubtless that has been the means of keeping the standard coals from running down into low figures.

The Georges Creek situation is still dull but the prospect is opening up a little and better business is expected in August. Prices f.o.b. on this grade continue to be held very firmly.



Anthracite—Only a scattering business is offering on domestic sizes. The July 4 shut-down has been followed by another and there is no great surplus at any of the ports. Retailers here are only taking odd lots to patch out their storage.

Several anthracite barges are being tied up temporarily and it is getting to be difficult to secure orders. The consuming trade is not taking coal as early as in ordinary years.

Current prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahonta New Rive.
Mines*.....	$0.85@1.45	$1.20@1.60	$1.67@1.77	
Philadelphia*.....	2.10@2.70	2.45@2.85	2.92@3.02	
New York*.....	2.40@3.00	2.75@3.15	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.50@2.80
Boston†.....	.....	.....	.....	3.10@3.58
Providence†.....	.....	.....	.....	3.15@3.63

* F.o.b. †On cars.

NEW YORK

Soft coal business down to an irreducable minimum. Operations heavily restricted. Heavy price cutting in the anthracite market. Some individuals are closed down for a full month.

Bituminous—The most searching review of the local soft-coal situation fails to disclose any important new features. The situation is no worse than it has been for the past several weeks, probably because there is little room for any further changes in that direction, but the long-expected developments of a constructive nature, which the market optimists have so consistently predicted, have still failed to develop.

The leading feature of the week has been the final closing of several more or less important contracts, including the American Locomotive, International Paper, General Electric and the majority, if not all, of the navy business. Contradictory reports are current regarding the contract of the New Haven subsidiary, but indications are that it has also been closed. Considerable railroad business is yet to be negotiated.

In the bunkering trade, business continues as slow as ever, vessels seeming to find it impossible to procure business due partially to the increased freight rates. This is also affecting export business. Some demurrage coal is appearing where operators resort to full time operations for certain compelling reasons unnecessary to mention. Although there is still scarcely any prompt business being negotiated, the market cannot be quotably changed for the past few weeks, which we continue as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The hard-coal trade has experienced a week of further recessions and disappointments. Evidences of

heavy cutting on the part of individuals is seen in the report that a number of the independent collieries of the Erie R.R. have definitely suspended operations from now until the middle of August. While similar suspensions are the rule on the Philadelphia & Reading, the Pennsylvania and the Lehigh Valley, these are due to the strong demand for Lehigh coal for line shipments, and the light call for Wyoming and the free burning varieties. The abnormally heavy demand for the Lehigh grade all-rail has prevented accumulations at tidewater, but on the other hand the decreased demand for the Wyoming and free-burning varieties in the line trade have thrown heavy tonnages of these into the tidewater market and resulted in substantial cuts in the circulars.

Chestnut, the circular price of which is 25c. above stove, is now being quoted at less than the latter at tidewater; because of the light local demand chestnut is being diverted to the Cape and other down East points. Dealers report that the individuals are offering the best grades of Wyoming, egg and stove coal down to the April circular, while nut is quoted at $4.75@4.90. The steam grades are still relatively inactive, the better qualities moving at a slight reduction, but large concessions required to dispose of the off grades. A fairly good demand for pea coal in the line trade has prevented an abnormal accumulation at tidewater.

Mining operations are being conducted on about half-time basis. The market is now quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$4.90	$4.60@4.90	$4.85	$4.55@4.85
Egg	5.15	4.95@5.15	5.10	4.85@5.10
Stove	5.15	5.05@5.15	5.10	5.00@5.10
Chestnut	5.40	4.95@5.40	5.35	4.75@5.35
Pea	3.55	3.40@3.55	3.50	3.25@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.05@2.75
Rice	2.30	2.15@2.30	2.00@2.25	1.50@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

BALTIMORE

Business generally flat and discouraging. Prices largely a matter of immediate necessity. Exports still hold up the average.

While hoping and believing that a few more weeks at most will see an end of the depression, the agencies here characterize the present situation as one of the worst they have experienced for some years. Consumers are simply not taking the fuel. The day of pushing coal up on contracts is at an end, and there are numerous reports of surplus fuel at various points. There is little or no spot maket.

Under the circumstances the fixing of prices is rather difficult. There has undoubtedly been some sacrificing of coal where producers have been caught with too much on hand. But it is now not so much a question of price as it is to find the buyer. West Virginia coals Westward, are commanding a little better price than for Eastern consumption. Three-quarter gas has sold variously at from 80 to 90c. Lower grade Pennsylvania line coals still hold at from 85c. to $1, with better qualities ranging at from $1.15 to $1.35.

Coal exporting continues heavy, and this will undoubtedly help the tonnage handled over the local piers for export, coastwise and harbor use, to a point close to normal, if not in excess of that for last year up to the present time. The increasing demand from Europe for American coal is the telling factor. Coastwise business, South is expected to pick up from now until the middle of August.

The anthracite trade is quite flat.After the middle of August, however, there should be a period of more activity leading up to the real awakening in September.

The reopening of the Maryland Steel Co. works the past week proved an encouraging feature to the trade.

COAL CARTERS

Coal carters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tonnage	Rate
Mount Hope [1]		Baltimore	Calais	989	
Frankrig [2]	Danish	Norfolk	Barbados	876	
Flora A. Kimball [1]		Port Liberty	San Juan P. R.	321	$2.00
L. C. Anderson [1]		Philadelphia	Jacksonville	766	1.00
Whitgift [2]	British	Norfolk	Mediterranean	2842	
Sangstad [2]	Norwegian	Baltimore	Nipe Bay	1459	
Robt. P. Murphy [1]		Philadelphia	Galveston	572	
Tabor [2]	British	Norfok	Barbados	2392	

[1] Schooner [2] Steamer

HAMPTON ROADS

Dumpings for the week show some improvement. Demand still light on all grades. One collier loaded for U. S. Government. Bunker trade continues the leader.

Dumpings at tidewater for the week will show some improvement. Foreign shipments have increased and there also seems to have been some improvement in the coastwise movement. The number of steamers calling for bunker supplies has shown up fair but as has been the case for some time the demand for cargo coal is still light and a greater part of that moving has been on contract. Circular prices are being quoted but indications point to some cuts having been made by shippers who have more than a normal supply of coal on hand. The general accumulation of cars on the railroad yards is just about normal and while some of the suppliers have an excess quality on hand others hardly have sufficient to take care of contract business.

Practically all coal moving has been New River and Pocahontas mine-run with some small shipments of high volatile and nut and slack, the two latter grades moving to the New England market. Foreign shipments have gone to Santo Domingo, Canal Zone, Havana, Georgetown, Curacao, Naples, Brindisi, Venice, La Plata, Vera Cruz, Barbadoes, Trapani, Kingston, Para and Manaos.

LAKE MARKETS

PITTSBURGH

Lake shipments have not improved and are therefore disappointing. Line demand moderate. Production between 60 and 65% of full capacity. Prices still being cut on both prompt and contract.

Coal mining operations show no improvement in the past week and on the whole there has been little if any change for four or five weeks. It was fully expected that by this time there would be a decided increase in production. The first-half of the Lake shipping season was expected to be slow, but the second-half was expected to be good, making on the whole a fair showing for the season. At present there is no prospect of any measurable improvement.

The line demand has not increased and there is no immediate prospect that it will improve. The iron and steel industry is working at about 65% capacity and seems to be well satisfied that July has not brought an actual decrease in operations. Production of coal to the Pittsburgh district is at from 60 to 65% of full capacity. Some operators place the percentage higher, but evidently rest on the basis that operations at the full capacity are not really normal. Prices continue to be cut on both prompt and contract, particularly the former. Relatively little has been done in contracts the past week or two. Circular prices remain as follows: Slack, 80@90c.; nut and slack, $1.05; nut, $1.15; mine-run, $1.30; ¾ in., $1.50; 1¼-in., $1.50 per ton at mine, Pittsburgh district.

BUFFALO

Market continues slow but with a hopeful undertone. Sales are about equal to last year and operators are holding down outputs. Anthracite at the low point of the year. Lake shipments heavy.

Bituminous—There is about the same slow situation that has prevailed for some months, with reports from outlaying points indicating that the surplus stock in consumers' hands is still large. The consumers will not buy more than they need and some of them are not able to store any more than they have. Still the trade as a rule is very hopeful. When the car supply runs down next fall there will be improvement in the trade and probably not before. It will take more than a starting up of the idle mills to make all the coal men busy, much as it would mean to the business of the country.

Some of the shippers find their sales to be fully up to the figures of a year ago and they are looking forward to the time when a small additional increase will make business really good. The mine owner as a rule complains of poor prices more than anything else. Still the disposition is to keep putting out coal. There is only a small amount of unsold coal on track. When the market drops off there is always a large amount, but after the slow trade has continued a while the coal stays at the mines till sold. The experience makes shrewd coal men, no matter how little it is relished.

There is not much report of price cutting. Good bituminous brings full prices and other grades at what can be got for it. Quotations remain on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley slack is about on a par with Pittsbugh and sizes from 15 to 25c. less. Slack continues duller than sizes.

Anthracite—There is about as little selling at present as is ever the case. This is the heart of the dull season, when activity is never expected, but were it not for the Lake trade the mines would find it difficult to keep in operation and as it is some are running only about four days a week. Shipments for the week were 195,000 tons and but for the washouts in the Scranton district, that crippled the railroads for several days, the amount would have considerably exceeded 200,000 tons.

TOLEDO

Situation somewhat improved. Prices firm and there is more buying. Grave fears as to the strike situation in Belmont County.

The situation in Toledo is showing some betterment during the past week or so. The threshing coal demand has begun in earnest while a good many contracts are being awarded by school boards. The factories are still running light which is holding the steam-coal demand down somewhat and there is no better business in the Lake trade. It is expected that the Lake business will improve in the near future as there are signs of an upward tendency in the iron and steel industry.

Others are not so optimistic, being fearful of the conditions in eastern Ohio where matters have not improved during the past week. The I. W. W.'s are still busy at the mines, and although Governor Cox is making every effort to avoid sending the troops to the mining district it is feared by many that the situation may ultimately become as serious as in Colorado. The closing down of the mines has not really affected Toledo in the least as the shortage was easily made up by West Virginia. Prices have remained unchanged.

COLUMBUS

Domestic trade better, arrangements being made to stock when mines get under way. A heavy Lake business also anticipated.

Demand for domestic coal is growing stronger every day. Dealers stocks, which have been sufficient to the present time, are rather low and as business is good they are in need of Ohio coal. Arrangements are being made to stock up just as soon as the mines are placed in operation. There is a good tonnage of West Virginia coal coming into the state.

Steam demand is also working stronger. Many users of steam grades are using West Virginia fuel and may stock it in preference to Ohio coal. Railroad contracts will be taken up as soon as the mines resume operations. Considerable is expected of the Lake trade at that time also. Preparations are being made to rush a large tonnage of Ohio coal to the Northwest via the lakes.

Prices in the Ohio fields are:

	Hocking Valley	Pittsburgh	Pomeroy	Kanawha
Rescreened lump	$1.60		$1.65	$1.50
1¼ inch	1.50		1.50	1.40
¾-inch	1.30	$1.20	1.35	1.30
Nut	1.25		1.25	1.20
Mine-run	1.10	1.05	1.15	1.10
Nut, pea and slack	0.70		0.75	0.65
Coarse slack	0.60	0.60	0.65	0.55

CINCINNATI

Domestic demand is slowly improving but is still hampered, by the light consumption of steam grades. However a distinctly better feeling prevails in all quarters. The Lake movement is also below par, the volume handled to date being far below the average figure.

In spite of the adjustment of differences in the Kanawha and parts of the Ohio fields, there appears to have been no general resumption of work; and yet, with low production still the rule, the market continues decidedly sluggish, save for the normal demand for smokeless. Splint and Eastern Kentucky domestic coals are in fairly good call, but nothing out of the ordinary, and inasmuch as the industrial situation has not improved lately, operators are finding it difficult to dispose of any quantity of screenings.

However, the trade in general is thoroughly convinced that a general awakening in demand is coming very shortly. While the car supply at present is more than ample, it is rapidly falling off in some quarters, due to the demand from the wheat-growing sections. As a general industrial call for cars is anticipated, following the expected business revival, the situation may be such within a few weeks that all grades of fuel will be at a premium. At present prices are only fair, both for spot delivery and contract.

The Lake demand is proving very disappointing, and operators are more and more of the opinion that large quantities of coal were carried over from last season. Nearly all members of the trade selling coal for the Lakes report that their business is much below last year, and as the season is now well advanced the total volume handled will be abnormally small.

CLEVELAND

Inquiry for slack has brought a slight advance. Receipts are light largely because mines are making less coal. Lake conditions show slightly decreased traffic. Deadlock still prevails in the labor trouble in the No. 8 district.

There is a fair demand for slack at prices ranging from $1.65 to $1.70. Receipts, which were expected to be heavy over last Sunday, were light and the market is temporarily able to hold its own. Lake shipments are somewhat smaller than they have been owing to the large stocks. As slack is made from three-quarter screenings the light shipments of Lake coal has somewhat curtailed the output.

Cambridge operators are quoting run-of-mine coal at $1.02½ to $1.05, at the mines, subject to 90c. freight rate into Cleveland. The first coal will probably be shipped before the end of the week, but it will be toward the middle of next month before the prepared sizes can be offered. No quotations on anything except mine-run have been reported so far.

Coarse coals are much more plentiful than the market warrants and shading is quite common. High-grade coals from Pennsylvania and West Virginia are offered freely, and cancellations on Fairmount are being made. The reopening of Cambridge mines is the real cause of these cancellations, as they are coming from factories using that coal. The difference in freight rate between Cambridge and the Fairmount field to Cleveland is 25c. a ton. The consumers also prefer the local product.

No. 8 mines are no nearer operation than they were a week ago. The warlike action of the southern European miners has caused much trouble in the miners' union and the chances of making a settlement are small at this time.

The Lake trade shows a slight falling off, principally because of dock congestion. Practically all of the space devoted to coals other than those mined in Ohio is full. Reservations have been made for Ohio coal and Hocking and Cambridge will be delivered in large quantities early in August. Shipments from upper Lake docks will be better after the middle of next month, as new grain will begin to arrive at the Lake front at that time.

Quotations for shipments are as follows:

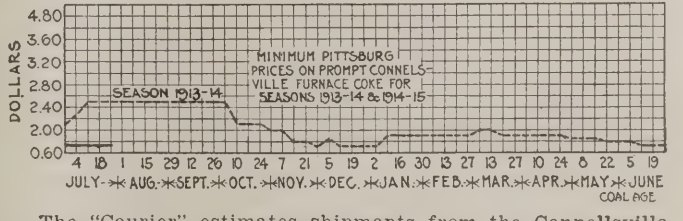
	Pocahontas	Youghiogheny	Fairmount	W.Va. No. 8
Lump	$3.60			
Lump, 1¼ in.		$2.35		
Lump, ¾ in.		2.20	$2.05	$2.05
Egg	3.60			
Mine-run	2.60	2.10	1.95	2.00
Nut		2.15		
Slack	2.20@ 2.35	1.65@ 1.70	1.65	1.65@ 1.70

COKE

CONNELLSVILLE

Coke market entirely stagnant and prices possibly a shade easier. Production in the first-half of the year equal to 80% of the production rate in the three best years.

Signs of an improvement in coke, which appeared last week, have not resulted in anything tangible, and the market is as dull and stagnant as at any time. Offerings of small lots of prompt coke have been made at less than $1.75, which has hitherto been considered the minimum of the prompt market. It is said, however, that no large tonnage could be picked up even at $1.75. Consumers appear to be well covered and no activity is to be expected until about Aug. 1, when a few furnaces will have to cover August requirements. We quote: Prompt furnace, $1.75@1.80; contract furnace, $1.90@2; prompt foundry, $2.25@2.35; contract foundry, $2.35@2.50, per net ton at ovens.



The "Courier" estimates shipments from the Connellsville and lower Connellsville region in the first half of the year at 8,150,000 net tons, or at fully 80% of the maximum rate maintained for any full year, the years 1906, 1912 and 1913 all having shown about 20,000,000 tons for the full year. Production in the week ended July 11 is given at 264,605 tons, an increase of 5333 tons, and shipments at 257,107 tons, a decrease of 15,795 tons.

BUFFALO

It is still impossible to find anything favorable in the coke market. The dealers are positive that the market is still weakened. They are able to obtain former prices, based on $4.25 for best 72-hr. Connellsville foundry, but the sales are so unsatisfactory that jobbers are steadily going out of the trade. It seems to be that the slow movement enables the consumer to find more time to complain of his purchases than if business were active.

CHICAGO

A number of contracts are being signed for both furnace and foundry coke to be delivered during the last half of the year. The price fixed for most of the coke is $5 f.o.b. Chicago. This is on the basis of $2.50 f.o.b. the ovens at Connellsville. In some districts foundry coke has sold at $4.85, or, if the business was specially good, at a slightly lower figure. There has been a drop of 25c. a ton in the price of furnace coke. Quotations are:

Connellsville and Wise County, $5; byproduct, egg, stove and nut, $4.75; gas house, $4.25.

MIDDLE WESTERN

INDIANAPOLIS

Mining conditions not so satisfactory. Crop movement only beginning and railroads have not yet increased their purchases of coal. Mines doing about half-time, but an improvement is anticipated later, when domestic grades begin moving.

Coal operators express disappointment that conditions have not shown greater improvement, in fact, appear to have receded slightly. It was expected the movement of grain would increase the railroad buying, but this seems to be only starting and the coal business has not yet derived any benefit. It is not thought there will be any shortage of cars, on account of the large number idle.

Mine operations have been reduced until it is doubtful whether the general average is half-time. Some operators say there is just demand enough to avoid suspension, and that some coal is being sold at cost to keep the mines running. One large colliery has had only four days' work in two weeks. William Houston, president of the Indiana Mine Workers, says 4000 out of the 20,000 miners of the state have not had work since March, when the mines ceased operating at full capacity. Some improvement will naturally come in August when domestic grades begin to move to retailers' yards. In fact there is some buying of this kind now, as retailers do not guarantee present prices beyond Aug. 1. Consumers will be expecting an advance Sept. 1 and there will be increased demand to get coal into their bins before that date. Retailers have seemed to get better results this year than formerly in trying to stimulate summer demand.

CHICAGO

Labor scarcity, due to large crops, interfering with handling of coal. Domestic trade slow. Advances in some circulars scheduled for Aug. 1.

Scarcity of labor in the country districts is the controlling factor in the present slump in the domestic coal trade. Attracted by the high wages offered by farmers, workers have gone to the harvest fields and rural dealers find themselves without sufficient help to unload coal into their bins. These dealers realize that unusually advantageous prices now prevail, but state they will be unable to handle their supplies until late in August.

Carterville operators find it impossible to dispose of much coal to the domestic trade and are crushing their larger sizes and selling it to steam users. Mines in this district which have been attempting to sell to the domestic trade are working only a few days a week. In the Franklin County field operators are finding it difficult to maintain the new circular price of $1.50 on domestic sizes and some of the smaller producers have been compelled to make cuts in the circular. Springfield operators report that there is scarcely any demand for domestic coal; about half of the mines are in operation with a record of four and one-half to five days a week.

There will be an advance in the smokeless circular on mine-run Aug. 1, from $1.25 to $1.40. Orders are now being freely placed by retailers who wish to take advantage of the lower figure. Smokeless lump and egg continue scarce. It is reported that the shipments of Hocking coal will be resumed within a few days.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07	$2.40@2.55	$2.12	
Steam lump	1.97		1.97	
Egg		2.40@2.55		$4.05
Mine run	1.87	2.15@2.25	1.87	3.30
Screenings	1.57@1.67	1.85@1.95	1.57@1.95	

Harrisburg quotations are: Domestic lump and egg, $2.40; steam lump, $2.25; mine-run, $2.15@2.25; screenings, $1.85@1.95; No. 1 nut, $2.55; No. 2 nut, $2.40.

Prices for Carterville coal are: Lump and egg, $2.40; No. 1 washed $2.55; No. 2 washed, $2.45.

ST. LOUIS

Improved tone to the better qualities in the high-grade field. Washed coal market weak. Mining operations in the standard district increasing and higher prices expected shortly.

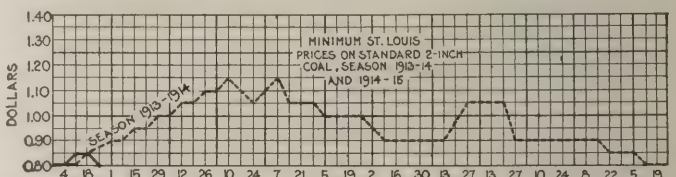
A slightly better tone in the high-grade market has been noticeable in the past week. This, of course, applies to the better grades. There are still some coals from West Frankford and from Williamson County that are down to $1 and $1.05 for lump and egg, but on the whole there is a tendency towards better prices, with a slightly increased demand. One of the largest companies in the field, closely allied in the past with the Missouri Pacific holdings, is concentrating domestic sizes for the season at $1.35. This is considered suicidal by other operators. The washed market is still weak.

In the Standard field 75c. is the basis for screenings, 2-in. lump, and mine-run. The demand has not increased to any extent for this grade of coal, although some of the mines are gradually resuming operations, which keeps the market flooded. It is likely that Standard fuels will start to pick up a little in the next week or ten days on domestic sizes, and the market on screenings can be expected to drop.

Anthracite, smokeless, and coke are exceptionally dull, with the first two usually under demurrage at East St. Louis.

The circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.20	$0.80@0.85	$0.95
3-in. lump	.....	....	.....	....	.....
6-in. lump	$1.15@ 1.35	....	1.30	0.90@1.00	1.15
Lump and egg	1.85@ 2.15	$2.00	.....	....	1.15
No. 1 nut	1.15@ 1.35	....	.....	....	.....
Screenings	0.75@ 0.80	....	0.80@0.85	0.70@0.75	0.75@0.80
Mine-run	1.00@ 1.15	....	.....	0.75@0.80	.....
No. 1 washed nut	1.40@ 1.50	2.25	1.50	....	.....
No. 2 washed nut	1.35@ 1.40	....	1.35	....	.....
No. 3 washed nut	1.20@ 1.30	....	.....	....	.....
No. 4 washed nut	1.20@ 1.30	....	.....	....	.....
No. 5 washed nut	0.70@ 0.80	....	.....	....	.....



KANSAS CITY

The big wheat yield creates favorable sentiment and the market is excellent.

Business is good in Kansas City, sales offices of various mines reporting a brisk demand from the Southwest. The wheat crop has aided both directly and indirectly in stimulating the demand for coal. Future bookings are coming in briskly. A feature of recent demand has been contracts from municipalities in both Missouri and Kansas. Many are now arranging for their fuel supplies for the next year and indications are that fall trade will be unusually brisk. Dealers are inclined to load up because of the big wheat yield. Mines in Kansas are handicapped somewhat by an interurban strike, but production is continuing in good shape.

PRODUCTION AND TRANSPORTATION STATISTICS

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for May and the eleven months ending May 31, 1912 and 13, in short tons:

	May				Eleven Months			
Destination	1914	%	1913	%	1914	%	1913	%
Tidewater	298,180	17	284,109	20	3,238,342	19	3,277,754	23
East	187,432	10	155,872	11	2,389,123	14	2,357,236	17
West	1,224,767	67	908,536	62	10,361,424	61	8,153,781	56
Total	1,710,379		1,348,517		15,988,889		13,783,771	
From Connections								
Bituminous	110,632	6	101,854	7	1,034,622	6	638,124	4
Anthracite	1,270		2,638		14,594		13,952	
Total	1,822,281	100	1,453,009	100	17,038,105	100	14,440,847	100
Coke	31,040		29,438		359,360		285,459	

VIRGINIAN RAILWAY.

Total shipments of coal over this road for May of the current year amounted to 359,879 tons as compared with 342,843 tons for the previous month.

PENNSYLVANIA RAILROAD ....

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburg and Erie for June and the six months of 1913 and 1914, in short tons:

	June		Six Months	
	1914	1913	1914	1913
Anthracite	855,247	776,237	5,654,277	5,418,231
Bituminous	3,897,544	4,189,969	23,555,182	24,282,419
Coke	793,463	1,161,521	5,227,885	7,386,908
Total	5,546,254	6,127,727	34,437,344	37,087,558

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for May, 1913-14, and for the eleven months ending May, 1912-13-14, in long tons:

	11 Months			May	
Imports from:	1912	1913	1914	1913	1914
United Kingdom	6,691	8,750	10,684	200	551
Canada	963,033	1,255,854	938,182	74,638	55,410
Japan	13,165	78,812	83,851	12,315	410
Australia and Tasmania	182,266	140,825	230,081	10,840	3,136
Other countries	1,992	3,257	3,613	.....	183
Total	1,167,147	1,487,498	1,266,411	97,993	59,690
Exports:					
Anthracite					
Canada	2,624,644	4,131,075	3,469,646	495,958	469,441
Uruguay	.....	.....	84	.....	.....
Other countries	52,489	73,741	56,119	7,417	6,042
Total	2,677,133	4,204,816	3,525,849	503,375	475,483
Bituminous,					
Canada	9,613,219	10,563,330	10,678,541	1,470,590	705,562
Panama	447,412	443,249	336,617	49,800	221,50
Mexico	306,072	406,249	280,526	56,048	20,951
Cuba	1,032,532	1,167,681	1,048,379	132,571	82,851
West Indies	649,226	550,055	532,108	47,164	50,824
Argentina	.....	.....	129,432	.....	11,078
Brazil	.....	.....	229,059	.....	16,391
Uruguay	.....	.....	56,252	.....	11,581
Other countries	1,300,897	1,060,966	1,228,486	149,667	162,425
Total	13,349,358	14,191,530	14,519,400	1,905,840	1,083,813
Bunker coal	6,525,093	6,666,494	7,124,527	690,228	674,805

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for February of the years 1913 and 1914:

State	1913	1914	Increase	Decrease
Missouri	260,586	259,270		1,316
Kansas	414,413	492,304	77,891	
Arkansas	130,888	113,354		17,534
Oklahoma	297,004	257,162		39,842
Totals	1,102,891	1,122,090	77,891	58,692

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during June and the past four months of the current year in short tons:

	March	April	May	June
Pocahontas Field	1,161,793	1,156,670	1,239,653	1,245,440
Tug River District	246,490	221,344	263,155	244,342
Thacker District	274,786	232,181	280,148	261,248
Kenova District	88,616	96,116	101,768	97,352
Clinch Valley District	153,704	156,502	150,916	156,028
Other N. & W., Territory	2,741	2,827	2,596	2,337
Total N. & W. Fields	1,928,130	1,865,640	2,038,236	2,006,747
Williamson & Pond Creek R.R.	43,865	79,828	74,875	76,822
All other railroads	140,123	171,818	225,561	232,387
Grand total	2,112,118	2,117,286	2,338,672	2,315,956

COAL FREIGHT DECISIONS

Investigation and Suspension Docket No. 344—Coal rates from Oak Hills, Colo.

Proposed joint rates of the Denver & Salt Lake R.R. Co. and Chicago, Rock Island & Pacific Ry. Co., for the transportation of bituminous coal from Oak Hills, Colo., to destinations on the line of the Rock Island found not to be justified, and Walsenburg district basis of rates via the Rock Island to the same destinations ordered in lieu thereof.

I. C. C. No. 5702—American Coal & Supply Co. vs. Chicago & Northwestern Ry. Co. et al.

Defendants' through charges for the transportation of soft coal from Indiana mines to Terra Cotta, Ill., via Chicago, found on the facts of record not unreasonable. Complaint dismissed.

I. C. C. No. 5336 and Sub. Nos. 1, 2, 3, No. 5358 and Sub. No. 1.—McCaa Coal Co., Elliott Splint Coal Co., Gilmer Consolidated Coal Co., Queen Shoals Coal Co., Morris Fork Coal Co. and and Elk Manor Coal Co. vs. Coal & Coke Ry. Co.

1. In the distribution of coal cars during car-shortage periods the defendant arrived at the mine rate by adding to the estimated physical capacity the commercial capacity taken for the twelve-month prior period, dividing the result by two; **Held,** That in the instant case this method permits of discrimination and defendant will be required to distribute cars hereafter on basis figured on the average shipment per days worked by the mines located on its line taken for a two-year period prior to January 1, 1913.

2. The proper distribution of cars is a question of fact to be determined according to the circumstances and conditions existing in each particular case.

FOREIGN MARKETS

GREAT BRITAIN

July 10—The market is still quiet for prompt and firmer for ahead. Prices about unchanged.

Approximate quotations:

Best Welsh steam	$4.80@5.04	Best Monmouthshires	$4.08
Best seconds	4.38@4.40	Seconds	3.84@3.96
Seconds	4.14@4.26	Best Cardiff smalls	2.58
Best dry coals	4.20@4.32	Seconds	2.46

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those of Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

Coke is quoted at: Special foundry, $6.72@6.96; good foundry, $5.04@5.76; furnace, $4.32@4.80.

Production and Imports in Chile for 1913—The estimated production of coal in Chile for 1913 is put at 1,400,000 tons, of which the greater portion was consumed in the country. The production in 1910 was 999,918 tons, which shows an increase, but not equal to the larger consumption.

The importation of coal for 1913 was 1,218,840 tons, against 1,428,181 tons for 1912. This decrease is accounted for by the increased use of fuel oil in the nitrate fields of the north, and an increased consumption of native coal. Of the imports the United Kingdom supplied 577,795 tons, Australia, 637,310 tons, and the United States the remainder. It is generally understood in Chile that the United States will get a greater proportion of the coal trade on the opening of the Panama Canal, when the shipment of large quantities of iron ore to the United States will provide a large tonnage for this trade. When normal conditions return there will be a largely increased demand for fuel in Chile, and it would be well for American interests to be prepared for the greater market.

Coal Imports into Smyrna, Turkey—The entire amount of coal imported into Smyrna, from all sources, is about 203,500 tons annually, as follows: From England (Newport, Cardiff, Newcastle), 50,000 tons at $6 to $7.30 per ton; from Germany (Westphalian mines) 2000 to 5000 tons at $5.82 to $7 per ton; from Black Sea regions, 150,000 tons at $4.40 to $7.30 per ton. The Black Sea grades, being from Turkish mines, are free of duty. Coal from all other sources pays the regular Turkish duty of 11 per cent. ad valorem, which, with local dues and other expenses, amounts to about 13 per cent. An effort has been made to introduce American coal on this market. A local steamship company, flying the American flag, has been induced to give space in its warehouse for carrying the necessary stock, and trial orders for a railroad and for the gas company have been sent in.

Hongkong, China—The importation of coal in Hongkong during 1913 was the heaviest in the history of the port, the large volume being due to the large shipping tonnage entering and clearing and the increasing use of fuel industrially. The total imports for the year amounted to 1,487,750 tons, compared with 1,240,144 tons in 1912 and 1,261,672 tons in 1911. There were increased importations of Chinese coal for use locally and for reshipment to Canton. Indo-China shipments also showed notable increases, but otherwise the trade remained about the same as in recent years. Japan furnished 1,023,564 tons, Fushun, 125,608 tons, Kailan, 119,794 tons, Indo-China, 171,474 tons, Cardiff, 38,560 tons, Borno, 5250 tons, and Tsingtau, 3500 tons. The market showed a rising tendency during nearly the entire season, contracts for the new year being made at advances of from 50c. to $1 per ton.

Financial Department

Consolidation Coal Co.

President J. H. Wheelwright, of this company, reports, in part for year ended Jan. 1, as follows:

Tonnage—The mines of the company in 1913 produced 11,157,989 net tons, compared with 10,347,100 net tons in 1912, as follows:

COAL MINED BY THE COMPANY AND ITS SUBSIDIARIES, BY DIVISIONS

	Maryl'd.	W. Va.	Penna.	Mill Cr.	Elkhorn	Tot. Gross	Net Tons.
1913	2,127,131	4,656,640	1,743,536	459,202	973,302	9,959,811	11,157,989
1912	2,162,996	4,576,484	1,748,091	522,900	228,011	9,238,482	10,347,100
1911	2,178,391	3,925,329	1,671,639	456,544	.....	8,231,903	9,219,731

The coal mined by lessees in theMaryland, West Virginia and Pennsylvania divisions aggregated 537,871 net tons, against 600,769 in 1912.

Floods—The disastrous floods in the Middle West in March last destroyed many miles of railroad track, practically suspending through railroad traffic for several weeks, and months elapsed before transportation companies were again in normal condition. Although our mines and the transportation facilities locally escaped any direct damage by the floods, our production and shipments for the year were curtailed at least 1,000,000 tons.

Elkhorn Field—The development work in the Elkhorn field in eastern Kentucky, which has been in progress during the past 2½ years, is rapidly approaching completion, and at this date 14 mines have been opened, with an aggregate producing capacity of from 12,000 to 13,000 tons daily, or approximately 2,500,000 tons per annum. Tipples and mine buildings have been completed, mines equipped with the most modern mining machinery, all with a capacity for handling a tonnage largely in excess of the present developed capacity of the mines. The central-power plant located at Jenkins furnishes electric current for operating and lighting purposes at all of the mines, both at Jenkins and McRoberts.

Modern brick buildings, such as hospital, school houses, bakery, drug store, post office, general office, etc., have been completed, as well as dwellings for employees. Therefore, all extensive development work in this field is behind us. To increase the production from now on is a question of additional employees and from time to time the construction of additional dwelling houses for their accommodation. The coal is uniformly of the highest quality of byproduct coal produced in the United States.

Miller's Creek—The development of an additional mine was begun during the past summer some two miles from the present mines, to which point the Millers Creek R.R. has been extended. This mine will be equipped with most modern equipment, its production now being about 300 tons daily. When fully developed the mine will produce about 1800 tons daily; 100 miners' houses have been completed and a substation is in operation. The central-power plant at West Van Lear generates electricity for operating all of the mines in this district.

Jenner Field, in Pennsylvania.—A new mine has been located and the necessary shafts will be completed this summer. The mine is planned for a large production with most modern equipment.

Central Power Plant at Hutchinson, W. Va.—This plant was completed early in the year. Transmission lines and substations have been built; 25 miles are now electrically operated through 15 substations. Additional transmission lines and substations will be constructed this year, so that practically all of the other mines in the West Virginia division will be connected up during the year.

Capacity—The capacity of our various mines is now fully 50% above the present rate of production.

Convertible Bonds and Stock—While on Dec. 31, 1912, $14,956,000 of our first and refunding mortgage bonds were reserved for additions, betterments and improvements, and an additional $1,497,000 were in the treasury, the conditions of the bond market precluded the sale of bonds except at a prohibitory figure, and, therefore, as a means of procuring funds with which to carry on the development work in the new Elk Horn field, and to provide for other additions and betterments, your board early in Mar., 1913, issued $6,500,000 of its 10-year 6% convertible secured gold bonds, convertible at 105 of par into stock any time prior to Feb. 1, 1922.

RESULTS FOR YEAR ENDING DEC. 31 (INCLUDING SUBSIDIARIES)

	1913	1912	1911	1910
Coal mined	9,959,811	9,238,482	8,231,903	9,370,633
Coke manufactured	76,050	62,647	43,740	96,692
Coal mined by lessees	480,242	536,401	473,008	524,858
	$	$	$	$
Gross earns. (mining)	15,443,246	13,708,564	11,420,694	12,712,256
Int. & divs. on sec.own'd.		811,853	311,431	197,848
Total gross earnings	$15,443,246	$14,520,417	$11,732,125	$12,910,104
Operating expenses	11,281,655	$9,896,157	a$8,467,662	$9,186,013
Taxes		220,215	222,194	212,179
Interest and exchange		62,092	22,437	5,969
Insurance		39,424	41,803	29,306
Royalties		212,847	172,343	234,180
Deprec. mining plant	334,888	247,508	221,618	251,410
Deprec. misc. equipment		95,284	78,999	59,607
Total	$11,616,543	$10,773,527	$9,227,056	$9,978,664
Net earnings	$3,826,703	$3,746,890	$2,505,069	$2,931,440
Int. on Cons. Coal bds.	1,085,894	639,225	517,084	265,094
Int. on sub. cos. bonds		334,858	355,926	650,376
Sink fd. Cons. Coal bds.	174,120	162,958	153,618	108,950
Sink fd. sub. cos. bds.	106,960	106,492	94,605	194,444
Cash dividends (6%)	1,509,000	1,358,865	1,201,513	1,141,552
Total deductions	$2,866,974	$2,602,398	$2,322,746	$2,360,416
Balance, surplus	959,729	1,144,492	182,323	571,024

a Cumberland & Pennsylvania R.R. depreciation amounting to $108,230 in 1911 and insurance, $3,544, is charged to operating expenses in according with Inter-State Commerce Commission classification.

COMBINED GENERAL BALANCE SHEET DEC. 31

Assets—	1913 $	1912 $	Liabilities—	1913 $	1912 $
Property acct.	a51,333,115	47,918,327	Capital stock	31,190,500	25,000,000
Adv. payments on coal land purch.	1,569,900	1,355,855	Bonded debt	22,729,000	24,410,000
			Convert. 6s	6,500,000	.....
Due from 1st & ref. mtge. trustee	b240,339	1,650,901	Car trust bonds—assumed by C. & P. R.R.	380,000	456,000
Stock reserved for convers'n of 6% secured bonds	6,190,500	.....	Pur. mon. oblig's Briar Hill C.&C. bds. retired June 1, '11 & June 1, '12	5,995	31,429
				.....	60,00
Stks. of allied cos.	c3,906,888	3,636,888	Bills payable	950,000	1,050,000
			Accts. payable	430,431	833,767
Other investments	116,400	91,400	Pay-rolls	205,477	308,805
Sinking funds	806,926	776,934	Royalties payable	223,574	205,953
Coal and coke	400,969	260,785	Bd. int. & divs. due	49,536	61,921
Materials, supp., etc.	1,416,680	1,130,882	Bond int. accrued	399,393	246,686
Bills receivable	200,480	271,650	Sinking fds. accrued	142,658	136,340
Acct's receivable	4,847,662	4,643,426	Div. pay. Jan.31	375,000	375,000
Cash in banks, etc.	1,770,806	971,401	Individuals and cos.	806,888	1,640,181
Cash for bond int. and divs. due	49,536	61,921	Profit and loss	d8,774,252	8,159,416
Special deposits to cover royties	222,503	205,128	Total	73,162,704	62,975,498
Total	73,162,704	62,975,498			

a Property account ($51,333,115) includes: Coal lands and other real estate, $34,625,763; less reserve for exhaustion, $2,824,075; balance, $31,801,688; mining plants and equipment, $18,056,313; less reserve for depreciation, $2,981,031; balance, $15,075,282; Cumberland & Penn. R.R., $3,297,910; less sinking fund for redemption of binds, $774,879; balance, $2,523,031; Cumberland & Penn. R.R. equipment, $1,856,687; less reserve for depreciation, $593,021; balance, $1,263,666; floating equipment, $1,142,419; less reserve for depreciation, $472,971; balance, $669,448.

b For 75% of cost of improvements, extensions, etc., $93,419, and for expenditures on Northern Coal lands, $146,920; total, $240,339.

c Stocks of other cos. owned include 18,900 shares Northwestern Fuel Co. common stock, 5,400 shares Northwestern Fuel Co. pref. stock and 7,513 shares Metropolita Coal Co. common stock. Of the above, 5,000 shares of M. C. Co. stock and 18,000 of the N. W. F. Co. com. stock, together with $6,388,000 1st and ref. M. bonds and $112,000 in cash are held by Equitable Trust Co. of N. Y., trustee, as collateral for convertible 6s.

d After deducting $344,892 for discount on bonds and adjustment of accounts of previous years.

Note—For previous annual report of the company see Vol. 3 p. 904.

Note—For previous annual report of the company see Vol. 3, p. 904.

DIVIDEND ANNOUNCEMENTS

Lehigh Coal & Navigation Co.—Regular quarterly dividend, No. 143, of $1, payable Aug. 31 to holders of record, July 31.

Nova Scotia Steel & Coal Co., Ltd.—Regular quarterly on the common of 1½, and on the preferred of 2%, both payable July 15 to holders of record, June 30.

Central Coal & Coke Co.—Regular quarterly dividend of 1½% on the common, and 1¼% on the preferred, both payable July 15 to holders of record July 1 to 15.

Consolidation Coal Co.—Regularly quarterly dividend of 1½%, payable July 31 to holders of record July 23.

COAL AGE

Vol. 6 NEW YORK, AUGUST 1, 1914 No. 5

No matter how powerful the driving energy of a locomotive, it can only pull in proportion to the weight that rests upon its wheels. Take off the weight and the wheels will revolve, but the engine won't pull. *Experience* and *character* in a man are like the necessary weight in a locomotive. A man may have great power, but if he lacks character, he can't move any considerable load.

* * *

We hear a lot about the practical and impractical man. The former is one whose proposals can be accomplished *under existing conditions*. The latter is a person whose ideas can only be made effective by changing conditions. The practical man inquires—*what is best* to do under existing circumstances. The impractical fellow asks—*what is right*. The practical are the doers; the impractical the onlookers. The practical accomplish things. The impractical only want to see what is worth accomplishing. Practical people care most for a certain class, sect, party, organization, or corporation. Impractical people speak for all humanity. What an unfit place this world would be to live in if we were all practical, or if we were all impractical.

* * *

The most misleading and certainly the scariest things in the world today are statistics. The modern scientist can juggle his figures so as to prove beyond doubt that in 1990 A. D. there will be no wood for lumber, coal for fuel or meat for food. Each family will live on a farm 20 ft. x 20 ft., and everyone will have a pair of mechanical wings, necessary because there won't be room to walk on the earth. There will be no churches—religion will have died out—and as to finance three men will own all the money in the world. The thing we seem to forget is that *growth is limited*. When anything gets too big, it becomes top-heavy and falls. It is so with trusts, labor organizations, etc.—they are all "self-busting." Caesar and Napoleon found this idea true. Militarism in Europe is trembling from its very top-heaviness. Its fall may cost the lives of a million men; rivers may run red with human blood, but in the end all nations will be glad to disarm and live in peace.

* *

A man may have accumulated lots of money and attained industrial success, and still have only a minimum of brains. We are strengthened in this conclusion by the stupid attitude of so-called big business in leaving publicity to its enemies. We may not agree with Haywood, Moyer, Sinclair, Mother Jones, et al., but we admire their ability in the matter of obtaining publicity for their cause, no matter how unrighteous it may be. It is not the event, but the printed facts that live in history.

Successful men are usually specialists; they may know manufacturing, mining or finance, but have no understanding of psychology. Few men deny that today we are sitting on the edge of a volcano. It is no time to cultivate dignity or encourage class distinction. Silence is golden"—for the other fellow. If big business is honest and a desirable thing, if the men in charge are just and humane, now is the hour to say so, and say so, and then again say so.

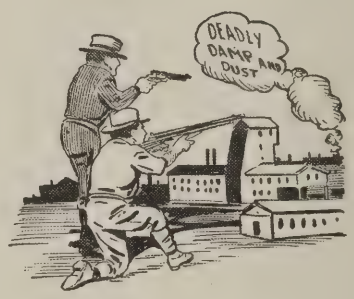
Our patriotic congressmen, who get their salary regularly whether business is good or bad, send thousands of copies of their rampant speeches to the people at large—all mailed at public expense—which charges are largely paid as taxes by big business itself. As long as employees are trained to believe that the boss is their enemy, just that long will there be industrial war. Either big business deserves what it is getting, or the men at the helm today are something less than captains of industry.

The Goal

By Berton Braley

Written expressly for Coal Age

We're working slowly towards it
—The thing we hope to do,
We've planned and schemed and figured
To make it all come true,
And if the fiscal powers
Will give us half a chance,
We "engineering dreamers"
Will win to our romance.



We learn to put in timbers
That men may safely trust,
We'll conquer ventilation
And deadly damp and dust,
From tipple and from breaker
To where the pumps are placed,
You'll find us grimly fighting
Extravagance and waste.

We pore and fret and study
With purpose straight and stern,
And steadily and surely
We do our work and learn—
Learn we must win our battle
Again and yet again
And fight with Fate and Nature
The Elements and Men!



But 'mid our costly blunders
Our wastes and losses dire,
We still toil on and labor
To reach our heart's desire,
For sure as seas that thunder
And sure as suns that shine,
Some day we'll gain our vision
And make the Perfect Mine!

Commendation and Censure

It is a universally conceded fact that the highest efficiency of any machine organization is obtained when there is the least friction between the working parts.

Mr. Superintendent, you are he head of the organizations of the various plants under your charge. Are these organizations working up to their highest efficiency? Have you reduced the friction in the working parts to a minimum?

You may possess all the prerequisites that experience has established as characteristic of a competent man, but there is a large sized u (you) in luck, which changes the orthography of that word to success or failure.

Your organization is 99 per cent. the reflection and representation of your own individuality.

Is that individuality the narrow, selfish egotism of the "Boss," or is it the universal egotism of the Man?

Gen. Lew Wallace defined a captain as being "A fighting man armed with an army." The metaphor loses nothing in its application to all men in positions of authority.

Do you go among your men in the various departments with a chronic grouch? Do you don your nitroglycerin humor with your working garments? Do you have your blue glasses on from Monday morning until Saturday night? Do you congratulate yourself upon the fact that after a supervision of one of your departments, you have succeeded in making each individual sit up and take notice by impressing him with the fear of your authority?

If censure, alone, be the prominent feature of your relations, you will have an organization that will be merely mechanically operative and precariously adhesive through fear, and it is not fear of your individuality—your displeasure, but a sullen fear of your power, companioned by retaliation when opportunity offers.

Criticism and censure are necessary in any successful organization, but when used in conjunction, they should be preceded and accompanied by sound judgment and common sense.

Commendation is more effective in securing the ultimate perfection of an organization than censure. Have you ever tried it out and marked its effects? When you have found work performed in such a manner that it meets your approbation and proves the proficiency of the workman, have you taken the trouble (?) to give that man the meed of praise which his work merits, or have you simply regarded it as being what it is his duty to produce for the compensation he receives?

It would be well to remember that every man, no matter how humble his station in life may be, possesses an ideal of what he would like to become. The attempt to realize this ideal constitutes ambition. Does it not seem reasonable that a man will become more efficient as a factor if opportunities be afforded for the realization of his ambition? Nothing is so destructive to ambition as continual censure. Nothing is so contributive to it as sincere commendation.

You are not asked to be diplomatic—to indulge in fulsome flattery—but to be just. Express your approbation when your judgment deems it merited.

This will cost you nothing and will return you 100 per cent. in effective results.

Try it. Lubricate the frictional parts with sincere commendation, and let your censure be alloyed with kindness and suggestion. Every man who is worthy of the name, in your organization, will come to regard himself as an essential part of the working whole upon which success or failure depends. Every faculty and power he possesses, both mental and physical will be brought into active operation to produce efficiency. He will be actuated by a righteous fear of losing your appreciation and good opinion because he has learned to appreciate and respect your worth and dignity as a man.

Plant of the Bessemer Coal & Coke Co.

By J. G. Bart*

SYNOPSIS—The improvements made in the firing apparatus made possible the burning of bone instead of coal as well as a material reduction in the amount of labor required for operation.

The power plant of the Bessemer Coal & Coke Co. at Russelton, Penn., is a good illustration of the tendency toward conservation in coal mine operation and the utilization of facilities at hand. The mines of this company are located about 18 miles north of Pittsburgh in Allegheny County, on the Bessemer & Lake Erie R.R., and in what are known as the Twin Freeport seams of coal.

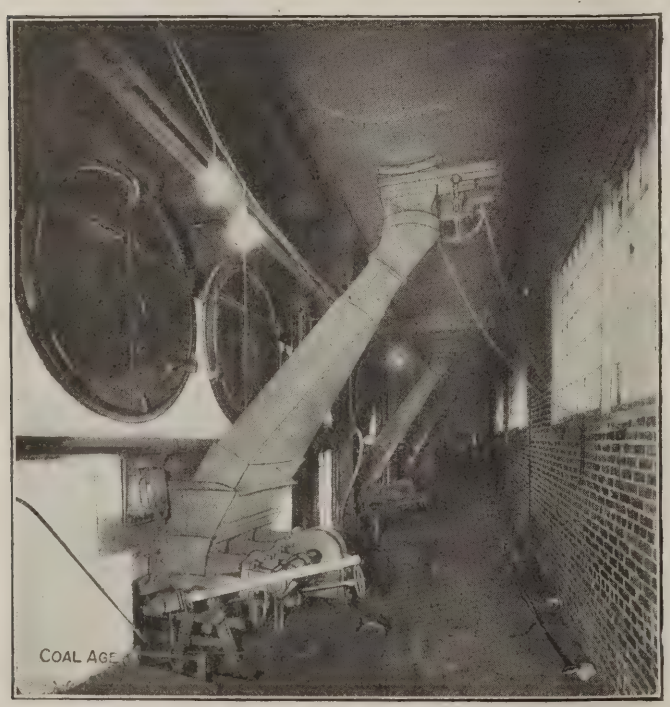
The two seams are about 3½ ft. thick and have between them a binder commonly called bone. This consists of layers of slate and thin strata of coal. In the process of mining, this bone is laid aside by the miners in headings that are to be used for air courses and haulage roads. Formerly this material was loaded on cars, sent to the surface and then hauled away by the railroad for filling. About 60 carloads were produced monthly and the cost of haulage was from $5 to $7 per car. This bone contains about 36 to 40 per cent. ash and averages 8000-9000 B.t.u. per lb. as fired.



General View of Engine and Boiler House

The boiler plant equipment formerly consisted of 8 horizontal return tubular boilers 72 in. in diameter and 18 ft. long, rated at 150 hp. each. Six of these were hand fired, located in one house and equipped with steam jets. The remaining two were in an adjacent house and equipped with a distributing type of coal feeder and

*General superintendent, Bessemer Coal & Coke Co., Russelton, Penn.



The Firing Alley in Front of Boilers



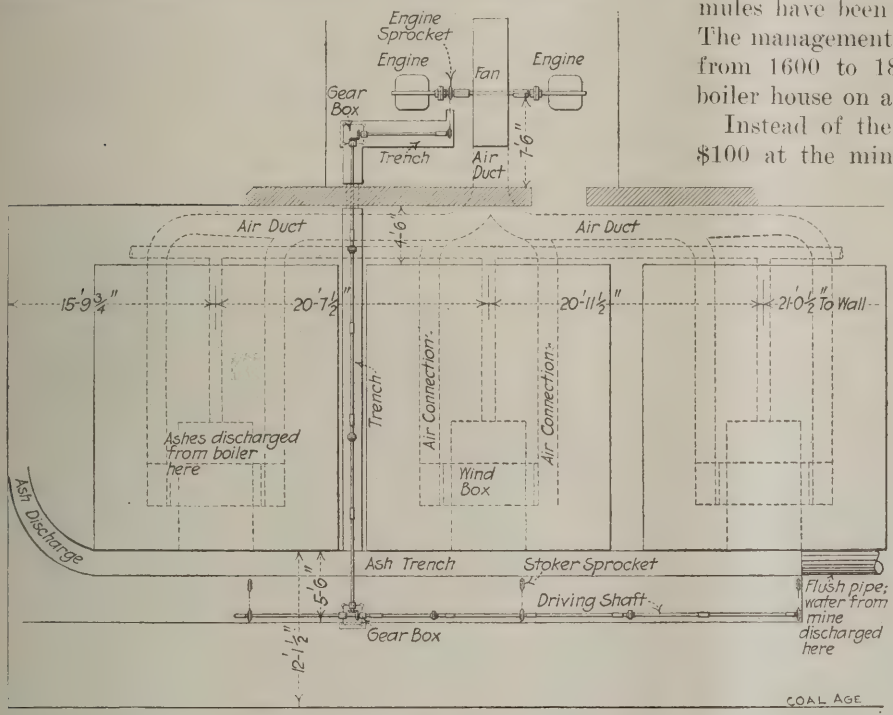
Inside of Furnace, Showing Tuyere Blocks

steam jets which had been installed to burn the bone coal.

This had not proven a practical operating proposition due to the large amount of ash in the fuel and all boilers were burning the best slack and ¾-in. nut coal valued at $1 per ton at the mine.

About two years ago the management decided to install stokers in order to burn the bone and also increase the capacity of the plant and reduce the labor charges. To eliminate all labor possible in handling the large amount of ash produced, a self-cleaning type of firing apparatus was essential and it was finally decided to install Taylor stokers under the 6 boilers in one house.

In order to reduce the initial cost of installation it was decided to hang two boilers over one 3-retort stoker. To



General Arrangement of Boilers, Fan Stokers and Ash-Disposal Trench

do this straps were riveted on the sides of the shells in place of the supporting lugs and the drums were hung from "I"-beams, which in turn were supported by columns at the side of the boilers. The two shells were brought to within 6 in. of each other and the space between filled with plastic cement. The distance from bottom of boiler shell to top of tuyeres is 3 ft. 6 in. The distance from top of bridge wall to bottom of drums is 4 ft. This gives a combustion chamber back of the bridge-wall 11 ft. 9 in. wide by approximately 8 ft. long and 5 ft. 6 in. high.

The two boilers over each stoker were equipped with a feed-water regulator and operated as a single unit, for which a separate stack was installed. Automatic regulation of coal feed and air in accordance with the demands for steam by the standard Taylor system was provided.

The Ashes Are Flushed from the Pits

A 10-in. stream of drainage water pumped from the mine was available for flushing, so the ash-pits were arranged to slope to a trench running on a line parallel with the front of the boilers. As the plant is located on the top of a considerable elevation, it was only necessary to run the trench to the edge of the hill, where sufficient ground was available to take care of the ashes for an indefinite period.

A crushing and conveying system was installed by which the bone is reduced to 1½ in. and carried from the top of the shaft to the bin over the stokers.

Formerly 8 boilers were required to carry the load and approximately 100 tons of coal per 24-hour run were burned. Ten men were required in the boiler room each 24 hours and owing to the hard firing conditions it was even then difficult to keep firemen.

With the new equipment the six stoker-fired boilers are carrying a materially heavier load than formerly, as the output of the mine has increased 75 per cent. and many mules have been replaced by an electric haulage system. The management states that the boilers frequently deliver from 1600 to 1800 hp. Six men are required in the boiler house on a 24-hour run.

Instead of the 100 tons of marketable coal valued at $100 at the mine, there are now burned approximately 125 tons of bone coal "straight" per day of 24 hours. The cost of disposing of the bone by railroad which formerly ran from $300 to $400 per month is also being saved.

The operation is practically smokeless excepting on extreme loads with an exceptionally poor quality of bone. For a short time while the remainder of the plant was being installed, two units were run on slack coal, when the operation was entirely smokeless.

The maintenance of the steam pressure automatically within 5 lb. of the operating figure has been an important item. The management states that furnace and stoker repairs for over a year during which time the equipment has been in service have been practically nothing. This power plant is now considered one of the most modern in the Pittsburgh district.

Lignite in Montana

As the northeastern portion of Montana is barren of timber except along some of the larger streams, a supply of fuel other than wood is all-important. According to a recent report by the U. S. Geological Survey, thin beds of lignite are exposed along the valley of Poplar River, near Scobey, from which enough fuel may be obtained for local use.

In the vicinity of Plentywood, in the valley of Big Muddy Creek, the beds of lignite are much thicker and contain an amount sufficient not only for the needs of the ranches in that vicinity, but also for shipment to other places as the population increases.

In the region between Scobey and Plentywood, little information regarding lignite was obtainable, as the region is so deeply covered with glacial drift that exposures of the hard rocks can seldom be found. It is probable, however, that even here lignite may be found by shafting.

A general description of the field is contained in Bulletin 541-H, of the U. S. Geological Survey, Washington, D. C.

Leaks in the Preparation of Anthracite Coal

By D. M. Hopkins*

SYNOPSIS—Some comments on modern breaker practice from the viewpoint of the practical man.

There are probably few people who appreciate the great importance of this subject. After an experience in breakers dating back to 1889, I feel that I have an intimate knowledge of the subject, and it is my intention to deal with it in a purely practical manner. As a preface to the article, I wish to remind the reader of the great importance of maintaining as large a proportion of the domestic grades as possible, since it is upon these that, essentially, the whole profit of the anthracite operator hinges. As is well known there is little or no profit in the steam sizes.



Bliss Colliery of D. L. & W. R.R. Co., Nanticoke, Penn.

This colliery employs 1100 men, and prepares more than 600,000 tons of coal annually. There was not a single fatal accident at this plant in 1913, which record was undoubtedly due largely to the fact that 66% of the men are students of the Nanticoke Mining School.

Let us first consider certain state laws regulating the manner in which coal shall be handled from the mine to the breaker, about which there is considerable difference of opinion. To reduce the breakage to a minimum, there is no doubt but that the coal should be conveyed in the mine cars directly to the point where it is to be first treated in the breaker without any intermediate dumping.

Treatment in the Breaker

The first operation in the breaker proper consists in screening over either stationary or shaking screens. The shaking screen, as a rule, is the most desirable, since the sizing is more thorough and there is not the violent speed and consequent breakage characteristic of the gravity bar screens. Poor screening is also a result of the latter method, a certain percentage of the domestic grades being carried through with a consequent loss in profits.

The prepared sizes from the screen are passed on to a moving table for preliminary cleaning. It is highly important that adequate facilities be provided to permit of a thorough cleaning at this point, since one piece of impurity may be removed here which, if passed through the roll, may become 40 or 50 distinct pieces, and hence require this much additional treatment. Indeed, it has frequently been an open question in my mind as to whether this phase of the breaker receives the attention it justifies.

From the table the coal is passed on into the roll, which, owing to the exceedingly large sizes which occasionally must be crushed, usually consists of two pairs. To avoid unnecessary crushing, it is customary to screen out the domestic sizes and smaller between the first and second rolls. These latter are usually perforated plate or stationary bars, but I am of the opinion that they should be shaking screens. The rolls are generally of the high-speed toothed variety, ranging in speed from 250 ft. per min. to 1500 ft. per min. It is my opinion that 750 ft. per min. is the speed about best suited for our coal.

It has occurred to me a number of times that we are perhaps devoting too much attention to the speed of the roll and too little to the proper design. Let us take, for example, two types of rolls: The first, 27 in. in diameter by 36 in. long, with teeth located at 2½-in. centers. This class of roll will ordinarly produce 53 per cent. prepared sizes, and under the most favorable conditions 60 per cent. The second type is of the same diameter and length, but the teeth are centered at 3½

*Assistant foreman Bliss mine, D., L. & W. Co., Nanticoke, Penn.

in. and the yield of prepared sizes would be about 81 per cent. Assuming now a colliery having a capacity of 2000 tons per day, the difference in the prepared sizes produced by these two different types of rolls would amount to 252 tons, which, in turn, means a saving of about $156 per day. It is thus obvious that the question of rolls is a most important one.

Notes on Operation of Rolls

Another important consideration in connection with rolls is the period they should be operated, it being the custom here, as is frequently the case around mining operations, to continue working the machine as long as it will hold together. Dull teeth pulverize the coal badly, and it is generally agreed that at the end of a year's service the crusher is producing 5 per cent. less of the prepared grades than was originally the case.

In another instance we installed a rather unusual device to prevent coal from pounding against sheet iron, consisting of old rubber belting bolted to it. In another case, it was found that an important saving was effected by changing certain chutes from a 5- or 6-in. pitch to a 2 or 3 in., and conveying the coal through the increased elevation by means of a spiral. Again, a large saving can be effected by eliminating all right-angle turns in chutes.

While many of these modern improvements are very desirable from a humane standpoint, this unlimited introduction of machinery and the mechanical handling of the coal has had a decided tendency toward deterioration in the process. For instance, let us consider the treatment of egg and stove coal, which is now considered of too inferior a quality to pass inspection. Some of our predecessors evolved the idea of putting these grades back through what was termed the boney roll, where they were reduced to pea, buckwheat, rice and barley that could be passed. The great evil in this practice is that enormous tonnages of what is really good coal is now thrown out in this way by careless slate pickers.

Another condition replete with many undesirable possibilities is the competition between breaker foremen. Let us assume a hypothetical condition of two breakers each producing 50,000 tons per day from the same coal. In one, 50 per cent. of the coal is prepared grades and the cost of preparation is 10c. per ton, making the gross breaker operating charge $5000. The other breaker produces 65 per cent. prepared sizes at a cost of 15c. per ton, making a gross of $7500. Even though the cost of operation at the second breaker is 50 per cent. greater it will be found that, at a selling price of $3.50 per ton, the earnings of the second colliery exceed those of the first by $32,500. It is a case of not the cost per ton as the kind of a ton you produce.

Lake Trade Lifeless

Another month has gone by and, if anything, lake trade is in a worse condition than it was a month ago. There was some hope of an improvement about July 1, but it did not materialize, and, if anything, the trade is more listless than ever. Sales of ore have been extremely light and vessel after vessel has gone into ordinary. Now that the first rush of grain is over, it is clear that there have been too many ships in commission all along for the business offering. No material change is now expected until the fall months. Grain has been carried at figures that leave no profit to the ship and the rates for future chartering are very low. Were it not for the fact that crops are very heavy, there would not be a single ray of sunlight in the whole situation. Scores of mines have shut down, some because they cannot sell the ore and others because they cannot be profitably operated at present prices. All along the line the whole business is being conducted at a loss and there has never been a time when things have been as dull on the lakes as they are now.

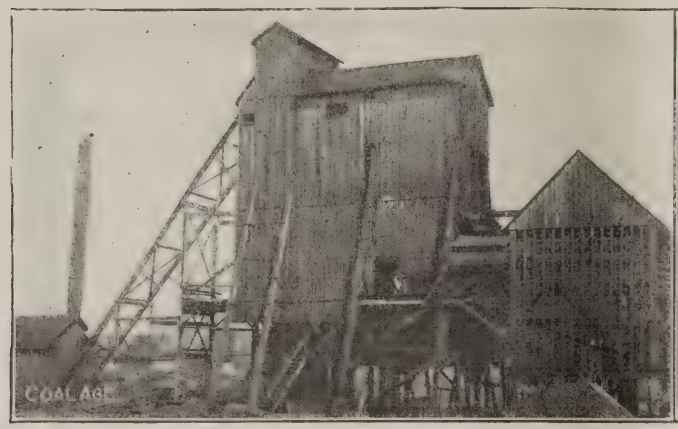
Sorry sights are to be seen at all Lake Erie ports. Dozens of ships are moored broadside to broadside behind the breakwaters. Some have been there since the season opened, some have made a trip or two, and some more that are now making trips will be added to the idle fleet as soon as they discharge present cargoes. And some people say that the depression is only sentimental. We wonder what they consider a real depression to be? The depression of 1893 was certainly not as complete as the present one.—*The Marine Review.*



Another View of the D. L. & W. R.R. Co.'s Bliss Colliery, at Nanticoke

Firetrap Headframes in Arkansas

The five firetrap headframes shown in the accompanying illustrations are all in Johnson County, Arkansas, not far from Spadra and Montana near the Arkansas River. It is unfortunate that any such menaces to the lives of the miners have been permitted to be constructed in that state or in any other. Surely the vested rights of the coal companies are in no case so sacred that corporations should be allowed to operate their mines under such hazards.



Sunshine Mine of Spadra Coal Co.



Superior Anthracite Coal Co.'s Mine



Consolidated Coal Co.'s Mine



Clark-McWilliams Coal Co.'s Mine

The coal mined is a semi-anthracite and that fact calls to memory the terrible mine fire at Avondale mine, Plymouth, Penn., Sept. 6, 1869, when 179 men were killed as a result of a breaker fire. Consequent on the conflagration, regulations needed, and none too stringent, were passed in Pennsylvania. On May 21, 1871, smoke from a burning breaker destroyed 20 persons in the West Pittston mine, West Pittston, Penn.

These proofs of the danger of rattletrap headframes with extensive headworks should be enough to give operators warning of their danger. The recent fire at the fan house of the Sycamore Coal Co., at Cinderella, near Williamson, W. Va., in which five men were suffocated, only adds to the evidence already overpowering that buildings over mine openings should be fireproof. We are to be congratulated that having so many combustible topworks, the accidents have been so few and so rarely the cause of a large number of deaths, but this immunity may not always be granted us and at any time we may hear of accidents in which many hundreds may be involved. The bare timber headframe is not so much to be reprobated, but when the shaft is surrounded by a group of buildings all highly inflammable and all filled with workingmen who may set fire to the flimsy structures, the danger is extreme especially if the escape shaft is near-by or the shaft thus incumbered is a downcast.



Scranton Anthracite Coal Co.'s Mine

Costs and Various Applications of Piping at Coal Mines

W. B. Richards*

SYNOPSIS—A detailed analysis of the cost of piping, worked out on practical rather than theoretical lines, and supplemented by some valuable and original tables. Also notes on the different types of pipe, including spiral riveter, wood, cast iron, etc., with comments on their various usages in and about colliery operations.

The accompanying tables show the complete cost of laying pipe of various types and sizes, being an average of actual cost of such laying under conditions encountered in the Panther Creek valley.

These tables are used as a basis in compiling estimates where excavation is through medium hard clay or soil, with some loose rock and laid under summer conditions. Cost of excavation and back fill for pipe laid in winter weather will run higher than in summer, depending on the depth of the frost in the ground. Length of haul, and conditions of road must be considered, as the cost of carting and distributing largely affects the cost per lineal foot of laying pipe. The average haul in the lines covered by the tables was about three-fourths of a mile. The figures are, of course, approximate, but with careful consideration of conditions under which pipe will be laid, they form a reliable basis for estimating.

TABLE SHOWING COST OF BLACK AND GALVANIZED PIPE LAID IN PLACE AND COSTS OF OTHER VARIETY OF PIPES—1913

	Cost per Foot of Pipe Laid in Place				Cost of Pipe per Foot						
					C.I., B. & S.	C.I. Flanged	Steel Pipe				
Diam. of Pipe (In.)	Black	Galvanized	Laying[1]	Total[2]	@ 24c. per Ton	Extra Heavy	Black	Galvanized	Spiral Riveted	Wood Pipe	Vitrified Sewer Pipe
	Butt Weld										
¾	$0.023	$0.0326	$0.30	$0.33			$0.023	$0.0326			
1	0.034	0.0483	0.30	0.35			0.034	0.0483			
1¼	0.046	0.066	0.30	0.37			0.046	0.066			
1½	0.055	0.079	0.31	0.39			0.055	0.079			
2	0.072	0.107	0.31	0.42			0.072	0.107		$0.16	
	Lap Weld										
2½	$0.129	$0.178	$0.31	$0.50			0.129	0.178			
3	0.168	0.233	0.32	0.55			0.168	0.233			
4	0.23	0.332	0.32	0.65	$0.228	$0.25	0.23	0.332	$0.26	0.28	$0.06
5	0.305	0.450	0.32	0.75			0.305	0.45			
6	0.422	0.582	0.32	0.91	0.384		0.422	0.582	0.43	0.41	0.09
7	0.595	0.85	0.33	1.18			0.595	0.85			
8	0.625	0.89	0.33	1.24	0.576	0.55	0.625	0.89	0.57	0.53	0.13
10	1.03	1.46	0.35	1.81	0.816	2.20	1.03	1.46	0.84	0.64	0.18
11	1.13	1.64	0.36	2.00			1.13	1.64			
12	1.27	1.82	0.37	2.29	1.044	2.97				0.75	0.23
14					1.308	7.64	1.27	1.82	1.21	0.87	
15											0.31
16					1.608					0.97	
18									2.00	1.09	0.44
20									2.18	1.35	0.52
24									2.58	1.77	0.75

Note—In winter excavation and back fill will cost twice as much.
[1]Includes handling, excavating. [2]Equals the total cost per foot of galvanized pipe laid 5 ft. in the ground.

Purpose and Conditions for Which Types of Pipes are Best Adapted

Cast-iron pipe, with ball and spigot joint, is the most widely used type for water pipes. By reason of its moderate cost, and durability, it is almost universally employed in water-distributing systems and various other special forms of distribution. The sizes commonly used run from 4 to 24 in. in diameter. The different grades are designated according to class as follows:

	Designed For			Designed For	
Class	Ft. Head	Lb. per Sq.In.	Class	Ft. Head	Lb. per Sq.In.
A	100	43	C	300	130
B	200	86	D	400	173

Cast-iron pipe, bell and spigot joint, is used in conducting water from reservoirs in Nesquehoning valley to Lansford and Coal Dale boroughs, the sizes varying from 4 to 12 in. in diameter.

Spiral riveted galvanized pipe, 18 in. in diameter, is used in conducting water from Hauto reservoir to Hauto pumping plant, under a head of 40 ft. This pipe is an emergency line laid on the surface; the pumping plant receives water regularly from a channel below the overflow of Hauto reservoir, but in times of drought it is necessary to draw from the dam, through this spiral riveted pipe. Second-hand spiral pipe is frequently used for culverts under public roads.

Spiral riveted galvanized pipe is used extensively in ventilating tunnels and gangways in which there are no return airways. A system in general use is to place an electric booster fan to drive air through an 18-in. pipe to the face of the tunnel or gangway, and allow the air to return out the tunnel or gangway, until a hole is driven to the surface or the upper level, when the fan is moved nearer the face and pipe used again to advance the tunnel or gangway. Gangways and tunnels four miles long have been driven by this method; they are usually ventilated a distance of 2000 ft., when fan must be advanced.

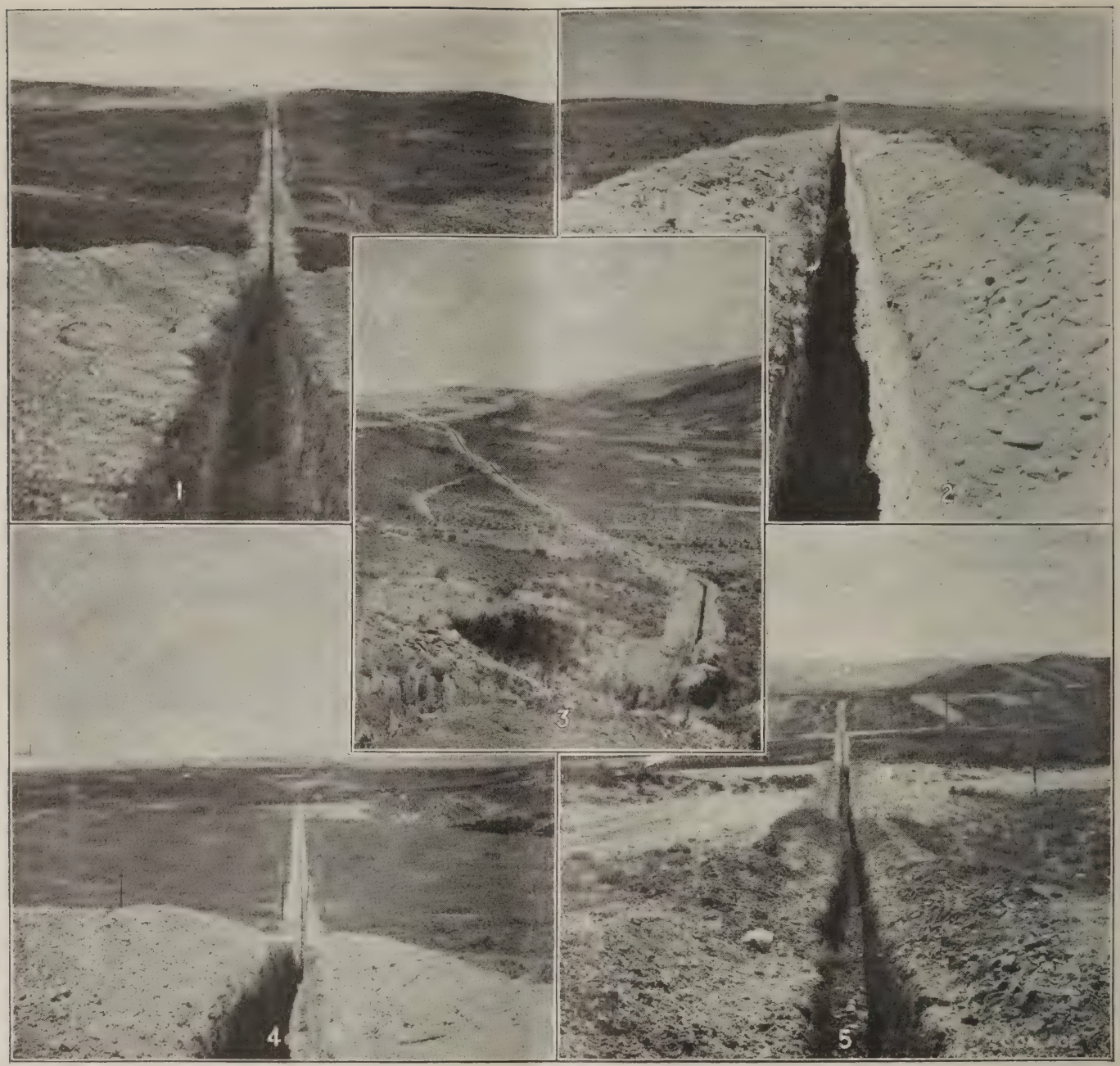
TABLE SHOWING COST OF LAYING VITRIFIED SALT GLAZED SEWER PIPE, 1913

	Per Lineal Foot					Cartage, Distribution and Shipping Loss	Superintendence, Engineers, Etc.	
Diam. (In.)	Weight (Lb.)	Cost	Cost of Cement	Excavation and Filling[1]	Laying			Total
4	9	$0.06	$0.005	$0.35	$0.01	$0.01	$0.04	$0.48
6	15	0.09	0.0075	0.35	0.02	0.01	0.04	0.52
8	23	0.13	0.01	0.35	0.03	0.01	0.04	0.57
10	35	0.18	0.0125	0.35	0.04	0.02	0.04	0.64
12	45	0.23	0.015	0.35	0.05	0.025	0.04	0.70
15	60	0.31	0.0175	0.35	0.06	0.03	0.04	0.80
18	75	0.44	0.02	0.40	0.07	0.04	0.04	1.00
20	100	0.52	0.025	0.40	0.08	0.05	0.04	1.12
24	150	0.75	0.035	0.55	0.09	0.06	0.04	1.52

Note—Where rock is blasted, figure $3 per cu.yd., excavation 60c. per cu.yd., and back fill 20c. per cu.yd. In winter this cost will be doubled for excavation and back fill.
[1] For a trench 5 ft. by 2 ft.

Steel pipe, black, of small sizes, from 1 to 6 in., is used extensively to carry steam to various drive engines, small hoisting engines, steam-heat radiators, etc., in and around

*Mining engineer, Lehigh Coal & Navigation Co., Lansford, Penn.



A Large Water-Works Installation at the Coal Subsidiary of the Amalgamated Copper Co., at Diamondille, Wyo.

Fig. 1 is a view taken from the extremity of the line shown in Fig. 5. Fig. 2 shows the connection to the tank, which latter will also be noted in the left background of Fig. 4. Fig. 3 was taken on the saddle to the left of the intermediate tank, just perceptible against the sky line in the extreme right background of Fig. 5. Figs. 4 and 5 are views taken in opposite directions from the top of the divide, shown against the sky line in Fig. 1. This divide and the saddle from which Fig. 3 was taken were the two high points on the line, which was a gravity system throughout.

coal breakers; also for small water pipe lines where water is not intended for potable use. Steel pipe, galvanized, laid underground, is used to carry potable water for domestic purposes.

Extra-heavy cast-iron pipe is used for column lines through mine shafts and slopes in unwatering the workings. It is also used in breaker practice to conduct wash water to the shaker screens, jigs and lip screens, used in the preparation of the coal. They are made extra heavy, the better to resist the action of the sulphuric acid in the mine water, the added life of an extra-heavy pipe being about twice that of standard weight pipe. This same result is obtained, although at somewhat higher cost, by installing wood-lined, cast-iron pipe for conducting acid water and slush.

Vitrified salt-glazed sewer pipe is commonly used for conducting sewage; its chief use in the anthracite-coal industry is to convey wash water or drainage (particularly acidiuous mine water) under team roads and railroads, water from storage dams, into which mine water is delivered, to breaker.

Wood-stave pipe, machine made, from 4 to 14 in. in diameter is used extensively in and around the anthracite mines. A 7000-ft. line of 14-in. wood pipe is now being laid from a slush pump at one of the breakers of the Lehigh Coal & Navigation Co., to a point over a mine fire. Three 8-in. holes, 700 ft. deep, are being drilled from the surface to the area affected by the fire, and the waste water from the breaker, which contains a small per cent. of culm, is to be pumped through this 14-in. wood pipe

line to slush the fire area. Slush or coal dirt will be conveyed by rail to a point about 50 ft. from the drill holes, where it will be dropped into two wooden flumes laid beneath the railroad; the water delivered by the 14-in. wood pipe line will then be turned through a 2½-in. hose on the slush to wash it through the wooden troughs to the drill holes and down into the mine-fire area. By this method it is expected that the fire will in a very short time be extinguished.

pipe depends upon the water conducted, clear spring water, turbid river waters, or waters carrying organic matter. Growth on the interior of the pipe can be removed by sending an instrument generally known as a "Go Devil" through the pipe, cutting away the tubercles.

The carrying capacity of spiral riveted pipe is from 10 to 15 per cent. less than cast-iron pipe, owing to the increased friction caused by the laps and projecting rivets. When used for a number of years the inside of wood-

TABLE SHOWING DISTRIBUTION OF COSTS IN LAYING WATER PIPE—1913

B. & S. Pipe, 250 Ft. Head, Class "E"			Lead			Hemp Packing			Cost Per Lineal Foot					
Dia. of Pipe (In.)	Wgt. per Length[4] (Lb.)	Wgt. per Lin.Ft. (Lb.)	Cost per Lin.Ft.[1]	Pounds per Joint	Pounds per Lin.Ft.	Cost per Lin.Ft.[2]	Pounds per Joint	Pounds per Lin.Ft.	Cost per Lin.Ft.[3]	Material	Pipe Laying	Haulage	Supt.	Labor	Gross
4	230	19	$0.228	6.5	0.5	$0.03	0.02	0.2	$0.0014	$0.26	$0.03	$0.01	$0.03	$0.315	$0.58
6	380	32	0.384	9.0	0.75	0.045	0.03	0.3	0.0021	0.43	0.04	0.015	0.03	0.33	0.76
8	575	48	0.576	12.0	1.00	0.06	0.045	0.5	0.0035	0.64	0.05	0.02	0.03	0.345	0.99
10	810	68	0.816	15.0	1.25	0.075	0.055	0.7	0.0049	0.90	0.07	0.025	0.03	0.37	1.27
12	1040	87	1.044	18.0	1.50	0.09	0.06	0.75	0.0052	1.14	0.10	0.03	0.03	0.405	1.55
14	1208	109	1.308	24.0	2.00	0.12	0.03	0.8	0.0056	1.43	0.11	0.035	0.03	0.42	1.85
16	1610	134	1.608	30.0	2.50	0.15	0.095	0.85	0.0059	1.76	0.12	0.04	0.03	0.435	2.20

[1] Based on the ruling price in 1913 of $24 per ton. [2] Computed on a basis of 6c. per pound. [3] Computed on a basis of 7c. per pound. [4] Includes B. & S. to lay 12 ft.

Note—In winter the cost per lineal foot of laying pipe will be doubled for excavation and back fill.

Excavation and Back Filling—A trench 5 ft. by 2 ft. contains 0.37 cu.yd. per lin.ft. Where excavating costs 4.5c. per cu.yd. the cost per lin.ft. is 17c. Back filling @ 20c. per cu.yd. amounts to 7½c per lin.ft.

Wood pipe is also extensively used in breakers for conveying wash water from the reservoirs to screens and jigs, and in water-works practice to conduct water to the pumping plants. A 23,000-ft. line of 6-in. wood pipe is now being laid over the ground by the Panther Valley Water Co. from a creek in Nesquehoning Valley to the Hauto pumping plant; this is a reserve supply to be used as an aid to the Bear Creek reservoir supply in times of drought. From this is furnished the domestic water supply of Lansford and Coal Dale Boroughs.

TABLE SHOWING COST PER FOOT OF LAYING WOOD PIPE ON SURFACE

	200 Ft. Head, 86 Lb. Pressure					
Diam., In.	Weight per Ft., Lb.	Cartage and Distribution	Laying	Superintendence	Cost of Pipe	Total
2	5	$0.065	$0.01	$0.03	$0.16	$0.21
4	10	0.005	0.01	0.03	0.28	0.33
6	11	0.005	0.015	0.03	0.41	0.46
8	14	0.007	0.02	0.03	0.53	0.60
10	18	0.01	0.03	0.03	0.64	0.70
12	20	0.01	0.03	0.03	0.75	0.82
14	25	0.01	0.03	0.03	0.87	0.95
16	28	0.01	0.03	0.03	0.97	1.05
18	31	0.015	0.035	0.03	1.09	1.20
20	36	0.015	0.04	0.03	1.35	1.45
24	45	0.02	0.045	0.03	1.77	1.90

Wrought-iron pipe will stand the following pressures per square inch:

Dia. In.	Lb.	Dia. In.	Lb.
1	1500	6	600
2	1000	8	500
3	900	10	500
4	800	12	500

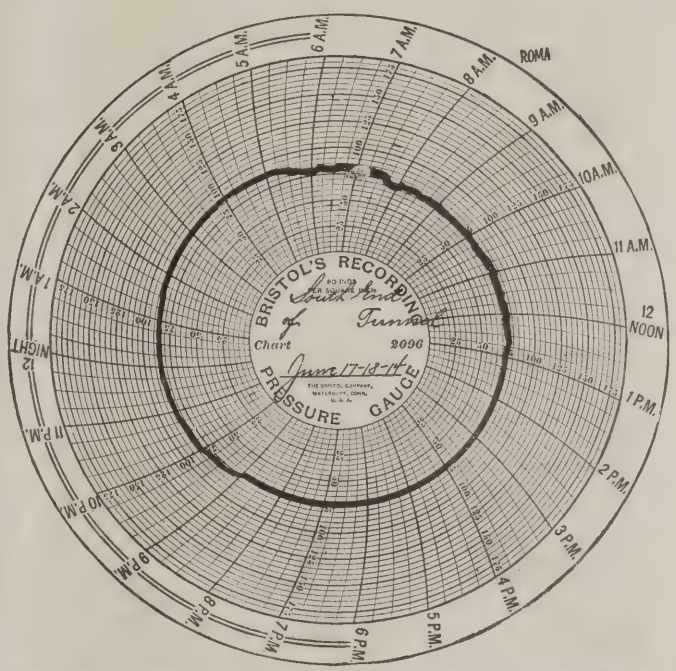
Safe pressures for cast-iron pipe depend on the thickness of the metal, and runs as follows, where the metal is ½ in. thick:

Dia., In.	Lb. per Sq.In.	Dia., In.	Lb. per Sq.In.
4	224	10	44
6	124	12	24
8	74		

Wood-stave pipe is made to stand a pressure up to 300 lb. per sq. in.

Flow of Water in Pipes

In estimating size of pipe required, it must be remembered that friction of liquids in pipes increases as the square of the velocity, and doubling the diameter of a pipe will increase its capacity four times. Frequently, in the case of cast-iron and wrought-iron pipe, the carrying capacity is reduced by the growth of tubercules on the interior about 1 per cent. per annum. In small pipes the deterioration is more rapid. Deterioration of the



Typical Pressure Gage of Panther Valley Water Co., Showing Fluctuations over a 24-Hr. Period

stave pipe wears smooth and the friction is decreased. The quantity of water discharged through a pipe depends on the head, i.e., the vertical distance between the level surface of still water in the chamber at the entrance of the pipe, and the level of the center of the discharge end; also upon the length of pipe, the character of its interior surface, as to its smoothness, and upon the number and

TABLE SHOWING COST OF LAYING SEWERS IN COAL DALE, CONTRACTORS BARRETT & BRESLIN JAN. 4, 1909

6-in. pipe, per lin.ft., in place	$0.96
8-in. pipe, per lin.ft. in place	1.09
10-in. pipe, per lin.ft. in place	1.35
12-in. pipe, per lin.ft. in place	1.44
12-in. c.i. pipe, per lin.ft. in place	2.95
6-in. "Y," each extra	0.88
8-in. "Y," each extra	0.93
10-in. "Y," each extra	1.25
Man-hole, complete	98.00
Flush tanks	179.00
Concrete, per cu.yd.	7.95
Sheathing, per thousand left in place	28.00
Rock Excavation, per cu.yd.	2.95

sharpness of the bends, but it is independent of the position of the pipe, horizontal, inclined upward or downward.

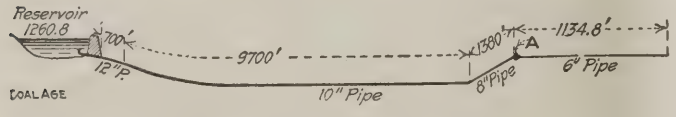
The head, instead of being an actual distance between levels, may be caused by pressure, as by a pump, in which case the head is calculated as a vertical distance, corresponding to the pressure one pound per square inch, equal to 2.309-ft. head, or 1-ft. head equals 0.433 lb. per sq.in. Small pipes with a high rate of flow when using a pump, cause a great loss of power. The head or pressure is what would be indicated by a pressure gage attached to the pipe near the point of delivery. Readings of the gage should be taken while the water is flowing from the pipe.

Friction Loss in Pipes

The following table shows discharge, friction head and velocity of flow through smooth cast-iron pipes, 8, 10 and 12 in. in diameter:

Discharge Gal. per Min.	8-In. Pipe Loss of Head per 1000 Ft.	8-In. Pipe Velocity Ft. per Sec.	10-In. Pipe Loss of Head per 1000 Ft.	10-In. Pipe Velocity Ft. per Sec.	12-In. Pipe Loss of Head per 1000 Ft.	12-In. Pipe Velocity Ft. per Sec.
200	1.1	1.3	0.35	0.82	0.14	0.57
500	5.6	3.2	1.87	2.0	0.78	0.14
1000	20	6.4	7.7	4.1	2.8	2.8

On a test made on a cast-iron, bell and spigot joint, pipe line 11,790 ft. long, as shown on the accompanying



Profile of Line Tested

sketch, with water flowing through main and service pipes, the following observations were made by means of a pressure gage:

At point marked *A* the gage registered from 14 to 40 lb. pressure per sq.in., the water in the pipe being in motion when the gage was read:

Elevation of reservoir was..	1260.8
Elevation at gage was.....	1134.8
Calculated	126.0 = head × 0.434 = 54.68 lb.

It was calculated that when the pipe was passing 950 gal. per min. at the gage, that it should register 16.77 lb. pressure per sq.in. The loss of head in feet (due to friction in pipe) per 1000 ft. when delivering 950 gal. per min. was computed as follows: 12-in. pipe, 2.55 ft.; 10-in. pipe, 6.1 ft.; 8-in. pipe, 18.4 ft.; 6-in. pipe, 72.0 ft. On this basis the respective losses (see sketch) were: 700 ft. of 12-in. pipe = 1.78 ft.; 9700 ft. of 10-in. pipe = 60.17 ft., and 1380 ft. of 8-in. pipe = 25.39 ft., making a total of 87.34 ft. With a total head of 126 ft. and a friction loss of 87.34 ft., the effective head works out 16.77 lb. when the pipe was delivering 950 gal. per min.

TABLE SHOWING COST OF LAYING SPIRAL RIVETTED GALVANIZED PIPE, WITH BOLTED JOINTS, COMPLETE, 1913

Diam. of Pipe (In.)	Wire Gauge	Cost per Lin.Ft. Small Orders[1]	Large Orders[2]	Laid on Surface
4	18	$0.30	$0.26	$0.30
6	16	0.49	0.43	0.49
8	16	0.65	0.57	0.63
10	14	0.96	0.84	0.91
14	14	1.38	1.21	1.28
18	12	2.26	2.00	2.08
20	12	2.48	2.18	2.27
24	12	2.93	2.58	2.68

[1]Involving less than $250. [2] In large quantities at which discounts of 12% are obtainable.

As the quantity of water delivered in the pipe was checked by less water being consumed, the pressure increased, as registered on the pressure gage, and when consumption was lowest, gage registered 40 lb. pressure per sq.in. By making this a 12-in. line, the entire length, the loss of head due to friction would have been 30 ft., and the pressure at the gage would have registered 41 lb. per sq.in. when delivering 950 gal. per min.

The accompanying record on a recording gage, as used by the Panther Valley Water Co., shows the pressure per square inch for every minute of the day. It will be noted that at 5 a.m., with practically no water being used, gage registered 90 lb. pressure; at about 5:15 a.m., when the early morning domestic consumption began, the pressure dropped to about 80 lb. Between 7 and 7:45 a.m., with full consumption of water being drawn in practically every dwelling, the gage dropped to about 75 lb. and held at that until about 9 a.m., when the demand commenced to decrease, and from then on the gage shows the pressure to have increased rapidly to 90 lb. and remained there until 5:15 a.m., proving that the greater the consumption the lower the pressure.

The elevation of the reservoir is 1260.8 and the elevation at the gage is 1015.0, a difference of 245.8 ft., equal to a pressure of 106.67 lb. per sq.in. From the above it can be determined, if the information is carefully considered, what size and type of pipe should be used to best advantage for different pump or gravity conditions, and the tables showing cost of pipe per foot will be of value.

Montana Breaks Coal Record

The production of coal in Montana in 1913, was, according to E. W. Parker, of the U. S. Geological Survey, 3,246,973 short tons, valued at $5,653,539, being the record figures for the industry in the state.

The influences which have affected the coal-mining industry in Montana during the past year were first an influx of settlers into the state which resulted in an increased demand for domestic coal, second, a decreased consumption by the railroads because of the increasing use of oil, and third, extensive hydro-electric development to supply light and power to many cities, also to mining plants and manufacturing establishments.

The second and third influences named have naturally resulted in a decreased demand for steam coal, but the larger demand for domestic fuel more than outweighed the two adverse influences combined, and the production of 1913 showed an increase over the preceding year of 192,478 short tons, or 6.3 per cent. in quantity, and of $95,344, or 1.7 per cent. in value. As in each of the four preceding years, the output for 1913 was the maximum yet attained.

There were no serious interruptions to mining operation in 1913 on account of labor trouble. The number of men employed in the coal mines of the state was 3640, working an average of 228 days, against 3440 men on an average of 220 days during the preceding year.

The mine workers of Montana have a good record for efficiency, and in 1912, the state showed the best average production per man per day among all of the coal-producing states. In 1913, the average production per man for the year exceeded that of 1912, 893 tons against 886 tons, but the average daily output by each employee decreased from 4.03 to 3.92 tons. The fatality record maintained by the Bureau of Mines shows an unfortunate increase from the low point of 7 in 1912 to 20 in 1913.

An Endless-Rope System for an Inclined Plane

By A. D. McFarlane*

SYNOPSIS—A long and steep plane is operated by an endless-rope system and carries a fair tonnage at an expense of a little over 3c. per ton, seven men being employed in its operation.

West Virginia produced 59,581,774 tons of 2240 lb. of coal in the year ending June 30, 1912; of this at least 27 per cent., or 16,335,247 tons, had to be lowered from the mine to the tipple by some system of haulage or conveyance. This was accomplished by various means which may be divided into two general classes. The first may be taken to include all systems in which mechanical power was required, the second those in which the force or power of gravity developed by the descending load was utilized to return the ascending load to the mine level. It is not the purpose of this paper to compare the merits and defects of the various systems, but to describe a system of the second class as used by the LaFollette Coal, Iron & Ry. Co., at their Gem mine, in Campbell County, Tennessee. The system used may be described as an endless-rope gravity plane because the loaded cars in descending pull the empty cars back by means of an endless rope.



View of Incline Loaded and Empty Trips

The Gem mine is situated on a branch of the Louisville & Nashville Ry. and is working the Jordan seam, with an average elevation of 1986 ft. above sea level. The railroad in the valley is 1340 ft. above tide level, so that all coal shipped has to be lowered a vertical distance of 613 ft. to the tipple floor. The horizontal distance between the knuckle and the tipple is 3640 ft., and the length of the plane is 3700 ft. and its average inclination is 16.8 per cent. The plane starts from the knuckle with a 19.8 per cent. grade; this runs for 750 ft. and then increases to 28.4 per cent. for 600 ft., after which it decreases to 18.8 per cent. for a distance of 300 ft.; from this point the grade gradually decreases until it ends at the tipple with a 3.3 per cent. grade.

The Plane

The plane is laid with 30-lb. rails, two tracks of 36-in. gage on 6-ft. centers. One track is used by the descending loads while the other is used by the ascending empties. Cast-iron rollers, 6 in. in diameter and 6 in. wide, with chilled surfaces, are placed in the center of each track on 50-ft. centers. A 10-in. board is spiked to the ties, which are placed on 20-in. centers. The board keeps the rope from dragging on the ground. Owing to the topography, it was deemed advisable to place two curves in the plane, one near the top which is on an inclination of 20 per cent., while the other near the bottom is on a 3 per cent. grade. On the curves the outer rail is elevated and sheaves are placed 20 ft. apart to deflect the rope.



Going around a Sharp Curve

The Rope

The rope in use is of plow steel, 1⅛ in. diameter and composed of 6 strands of 19 wires each wrapped around a hemp center. It has a rated breaking stress of 55 tons per sq.in. The rope runs down the center of one track, around a sheave wheel, placed on a tension carriage running underneath the tipple floor, then up the center of

* Chief engineer LaFollette Coal, Iron & Ry. Co., Box 334, LaFollette, Tenn.

Note—Article read before the West Virginia Coal Mining Institute at Cumberland, Md., June 3, 1914.

the second track to the drums, which are beneath the floor of the head house, then four times around the drums to the center of the first track.

The Tension Carriage

The tension carriage is made from a standard freight-car truck. Upon this truck is mounted an iron sheave wheel 6 ft. in diameter with a $4\frac{5}{16}$-in. shaft. This truck rolls on 30-lb. rails set on an angle of 35 deg. to the horizontal and is loaded with scrap until it weighs three tons. Its distance of travel scarcely exceeds 3 in. except in a wreck, then the travel is violent and long.

The Drums and Brake

At the head of the plane are two cast-iron drums, 6 ft. in diameter and 4 ft. high, set vertically on 10-ft. centers with their line of centers parallel to the plane and grooved to receive the rope. These drums are controlled by an ordinary friction-band brake, suitably counterweighted so that the brake is set, except when held released by the drumman. This brake is connected by a ½-in. chain to a handwheel, such as is used on freight cars. This wheel is set to one side so as to be out of the way of the cars, but sufficiently close enough that the drumman can see the headmen attach and detach the trips.

Method of Operation

The mine cars are pushed into the head house by the mine motor and made up into trips of 5 cars coupled together by the regular mine-car couplings; to the rear drawbar of the last car a special grip is attached, which is fastened to the rope by tightening a setscrew. While the loaded trip is being attached to the rope, an empty trip has been detached on the adjacent track; at the same time the couplers in the tipple have detached a loaded and attached an empty trip. When the couplers in the tipple have everything in readiness, they signal to the drumman, either by an electric bell or telephone; he then looks to the couplers on the head for the signal, and if they are ready, he tightens his wheel, thereby raising the counterweight, loosening the brake, which releases the drums and allows the loaded trip to descend and an empty trip to ascend to the proper point in the head house.

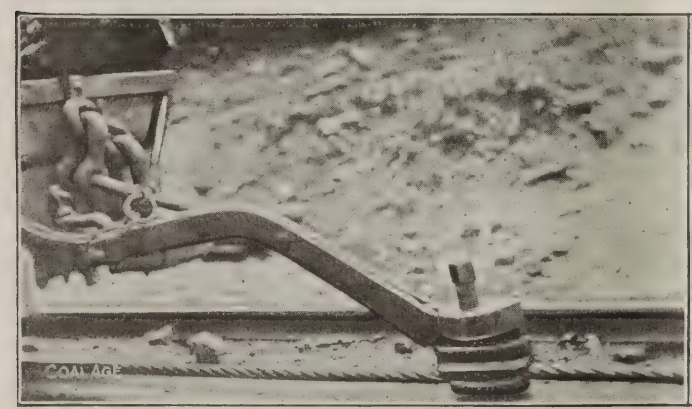
When this point is reached, the brake is tightened, the rope stopped and an empty and loaded trip detached and attached as before. In the meantime, the first trip has descended approximately 700 ft. This operation is repeated until 5 loaded trips are on the rope; as the sixth is being attached, the first is being detached on the tipple. The tipple is equipped with a Phillips cross-over dump, necessitating the empty track being some 4 ft. lower than the loaded at the point where the trips are attached and detached. With this difference in elevation and the grade of the tracks being opposite in direction, the important point in landing the trips is to stop the empty trip at the proper point in the head house. This being directly under the eye of the drumman, little trouble is experienced on this score.

There is surprisingly little difference in the spacing of the trips, and it is seldom they have to be respaced. There is no physical or mechanical difficulty in increasing the number of cars per trip or the number of trips suspended on the rope, but in designing such an installation, it must be borne in mind that the rope distance between the attaching and detaching points in the head house and tipple must be the same, and that this distance will govern the spacing of the trips. In this particular installation there are 6 trips of loads and 6 trips of empties on the plane at one time, counting the trips at the head and at the tipple; so that the distance between trip centers is equal to one-twelfth of the total rope length.

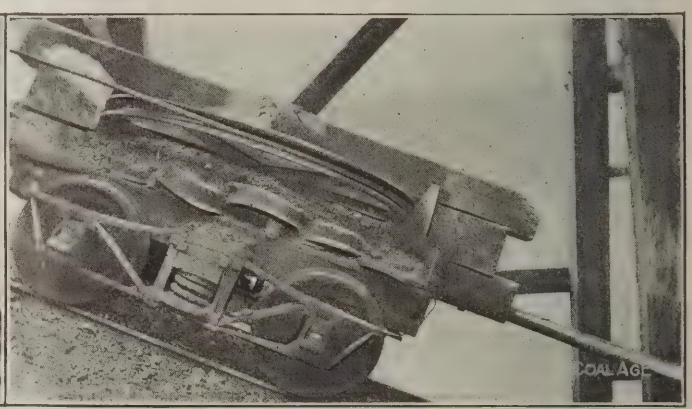
The Grip

By referring to the accompanying drawing, it will be seen that the grip is composed of two parts, the arm and head held together by a ⅞-in. rivet. The arm is made from machine steel 2½x⅝ in. thick, doubled back and riveted by ⅝-in. rivets, forming an arm 1¼x2½ in. The upper end of the arm is rounded out to receive the 1⅛-in. clevis pin of the car coupling; the lower end is flared out in the form of a yoke to receive the head. The arm is bent vertically to compensate for the difference in height of the drawbar and rope. The head is made of three parts, one of which is a standard setscrew, 1½x4½ in.

The grip block is made from a piece of steel 2x2¼x6 in., forged as shown and drilled to receive the point of the setscrew. The bottom and outside are grooved—the bottom to receive the rope and the side to clear the flange of the curve sheaves. The jaw is forged from a piece of steel 4x4¼x6 in., recessed as shown to receive the rope and drilled and threaded for the setscrew. Both the grip block and the jaw are turned in the form of an arc, so that when the setscrew is tightened the rope is crimped, thereby preventing any slippage. The crimping being only ⅛ in. does not injure the rope. The grips weigh about 50 lb. each and their maintenance is almost



Showing Type of Grip Used



View of Tension Carriage

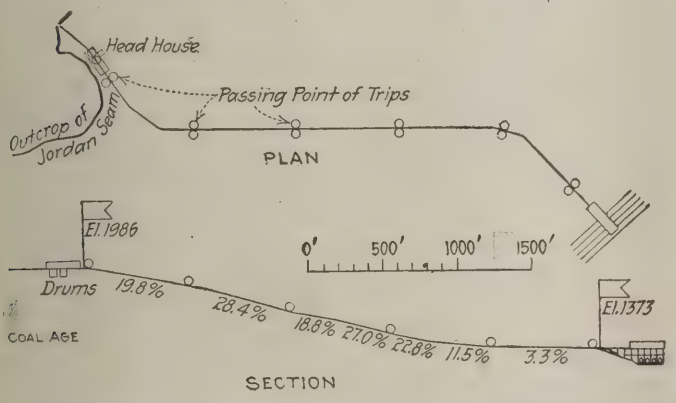
negligible. To attach or detach one takes considerably less than a minute.

Labor Required

Seven men are required to operate the plane. The drumman operates the drum and has supervision over the head. Two couplers in the head house and two on the tipple attach and detach the trips. A man is stationed where the loaded trips first stop, and at this point there is a derailing switch which can be thrown in case of a wreck or runaway on the track above. The planeman is furnished with a wrench, and tests the grips and oils the outer wheels of the descending trips. At the first stop of the ascending trip another oiler is placed; he oils the outer wheels of the ascending trips. Both of these planemen are stationed so that they command a view of the upper and lower curves respectively, and at each station is placed a switch, which, when thrown, flashes an electric light in the head house. In case of a wreck or accident, the switch is thrown, warning the drumman, who immediately stops the rope.

Cost of Operation and Maintenance

Two years ago the present rope was installed and cost in place $2000. A new rope, recently ordered for installation during the summer, will cost much less. In 1913, 140,497 tons of coal were lowered down this plane in 268 days of 9 hours each, or an average of 524 tons per



Plan and Elevation of Inclined Plane

day. The maximum tonnage handled in one day was 885 tons in 8½ hours, which is at the rate of 104 tons per hour.

Taking the life of the rope at two years, which has been proved by past experience to be the average, the depreciation of the rope amounts to $\frac{7}{10}$c. for each ton of coal handled. The wages of the 7 men employed aggregate $11.83 per day, or 2¼c. per ton; this also includes the labor of oiling the mine cars. The cost of maintenance and renewal of ties, rollers, sheaves, grips, etc., averaged over a period of months is approximately $25 per month, or $\frac{2}{10}$c. per ton of coal handled. This includes cleaning up wrecks, replacing derailed cars, etc. There is an average of one wreck per month, which takes two hours to clean up. Most of the wrecks occur on the curves. The total cost of running and maintaining the plane per ton of coal handled is:

	Cents Per Ton
Depreciation of rope	$0.70
Labor	2.25
Maintenance	0.20
Total cost	$3.15

Strength of Rope

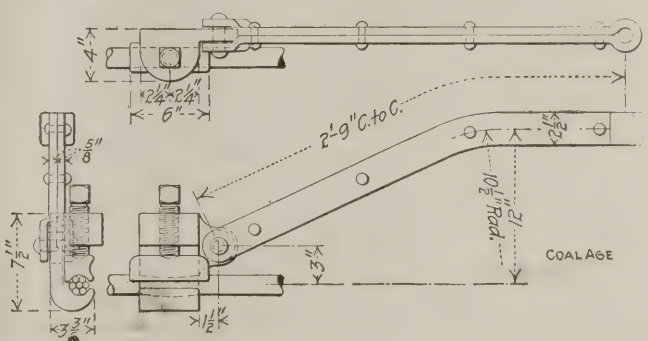
The tension on the rope can be calculated in a simple manner by assuming it to be stationary and composed of two independent ropes suspended at the top of the drums. Then the point of maximum strain will occur where the rope supporting the loaded trips first comes in contact with the drums and the strain at this point will be the greatest just as the loaded trip has cleared the knuckle, and the rope is supporting 25 loaded mine cars plus the length of one rope from the drum to the tension carriage plus half the pull of the tension carriage. The other rope will be sustaining the same weight less the actual weight of the coal in the mine cars. The empty cars weigh 1200 lb. and the loaded 4000 lb., so that the total movable weight on the loaded side that the drum supports is:

	lb.
25 loaded cars @ 4000 lb. each	100,000
½ weight of tension carriage—6000 lb.	3,000
4000 ft. of rope @ 2 lb. per ft.	8,000
Total	111,000

The average inclination of the trips at that point where the tension on the drum is greatest is 18.8 per cent., or 10 deg. 39 min. The tension T on the rope due to the loaded trip is:

$T = W$ (sin a — cos a × Z) where
W is the weight of the loaded trip, 100,000 lb.
a is the angle of the plane, 10 deg. 39 min.
Z is the coefficient of friction equal to 1/20.

Substituting the above values in the formula and solving for T, we find that the tension on the rope due to the loaded trip is 13,568 lb. Morin gives the coefficient



Rope Grip for Incline

of friction of metal on oak as ½. Using this coefficient and W, the weight of the rope as 8000 lb., in the above formula, it can be shown that the dragging of the rope acts as a brake to the extent of 2453 lb. In the same way, it can be shown that the pull exerted by the tension carriage amounts of 1598 lb. The total tension on the loaded rope at its point of contact with the drum will be 13,568 plus 1598 minus 2453, or 12,713 lb., or 6.4 tons, which gives a factor of safety of 8.6 for the rated breaking strength is 55 tons per square inch.

The advantages claimed for this system are the low cost of installation, cheapness of maintenance, large capacity with minimum breakage of coal.

There was a fire at the Bold collieries in Lancashire. After the fire the pit was stopped three days, and the government inspector and everybody made as thorough an investigation as possible in the hope of finding out the real cause. There was a large stack of timber at the place,, and also a built chock of timber to support the roof at the top of a brow. It was there that the fire originated, and the only conclusion they could come to was that someone had hidden some matches there, and the weight had come down and set them off.

Engineering Practice of the Consolidation Coal Co.--Office Methods

By A. W. Hesse*

SYNOPSIS—A description of the office methods of the Consolidation Co. The work is subdivided along very comprehensive lines as is necessary in a large organization of this character. Elaborate blueprinting and photo-reduction apparatus are part of the equipment. Unusually thorough methods of preserving and filing office records are used.

In the engineering department of the West Virginia Division, the Consolidation Coal Co., there are employed forty persons, most of whom are assigned to the six divisions comprising this department. Four divisions handle the work connected with the mines and the respective allotted territories, the outside division being given general and miscellaneous work, while the sixth division or drafting department handles special drafting and photographic work.

To each division is apportioned separate office space, so that its particular work will not become confused with that of some other section. Tables, instruments, calculation books, traverse and acreage sheets are all arranged so that no division interferes with the other in its work; and calculations, traversing, map work, tracing and miscellaneous duties are performed by the parties forming this division.

The office work, or what may be termed as such, of this department, may be classified under the following headings:

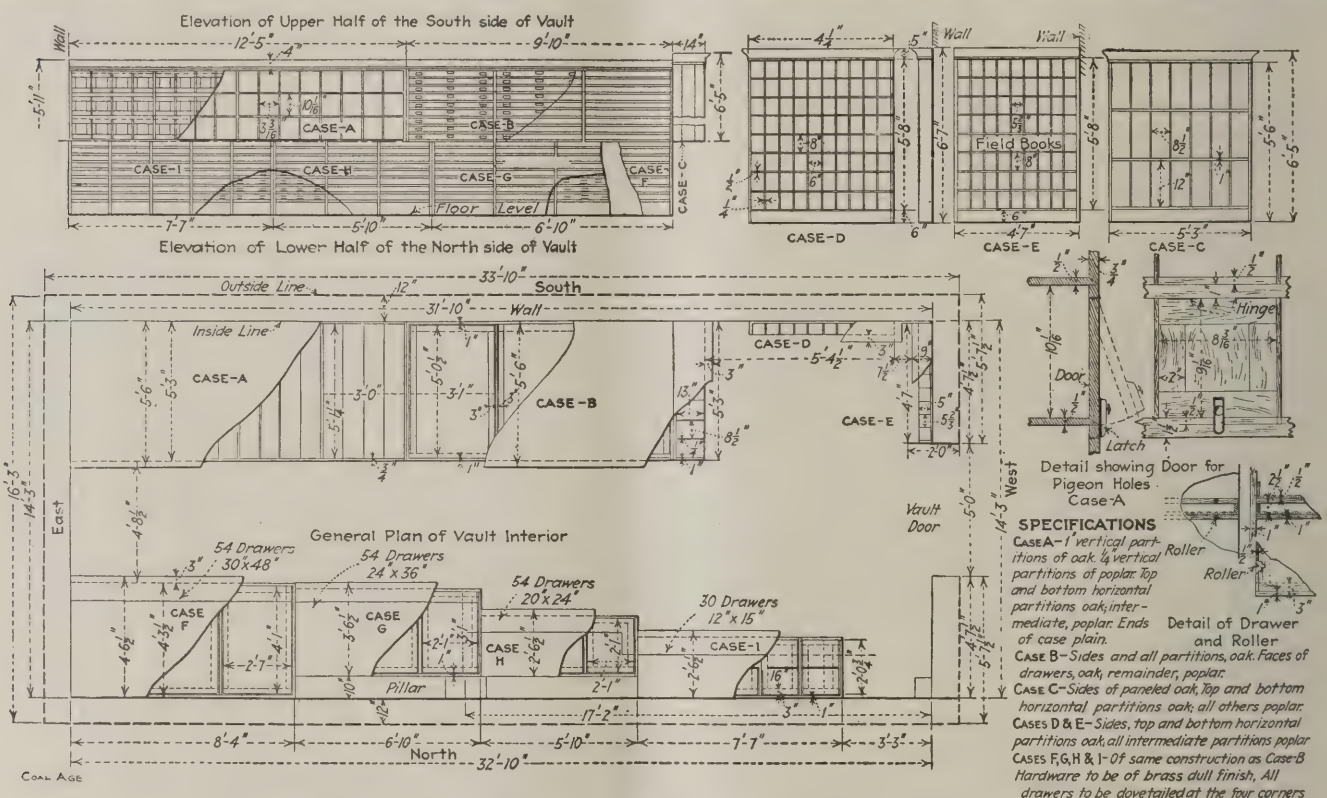
First—Computations.
Second—Mapping and Tracings.
Third—General Drafting and Indexing.
Fourth—Photographing and Printing.
Fifth—Miscellaneous.

Computations

In all the surveys (as previously explained in Coal Age) there are horizontal distances, latitude and longitude differences to calculate, and the traverse sheets to make up. If a property has been surveyed, or an outside boundary line located, this being done by locating the corners of the property from survey lines not co-inciding with the boundaries of the property, coördinate values must first be obtained of the property corners and the courses and distances between these corners calculated.

It is a rule of the department that all property corners along the outside boundary of our properties, or of special importance, must each be located from two stations of the random survey to avoid error in location. After all the available courses and distances are calculated between the known or located corners, they are compared with the deed of that property and an average of the differences taken for a correction on the remainder of the calls requiring traversing. The traverse is then made between located corners with the corrected calls.

But discrepancies usually exist in the total latitude and total longitude differences, known as errors of closure. These are distributed among the latitude and long-



Plan, Elevation and Details of the Consolidation Co.'s Main Vault

*Assistant chief engineer, Consolidation Coal Co., Fairmount, W. Va.

itude differences in proportion to their lengths. Then from the adjusted latitude and longitude differences, new courses and distances are calculated between the unlocated corners. After these new coördinates are obtained, attempts have been made, and sometimes with success, to find the corner in the field by calculating a course and distance from survey stations to these calculated corners. The property sheet herewith illustrates my explanation.

After all the courses and distances have been established beyond any reasonable doubt, they are placed on acreage sheets, also shown herewith, and the acreage calculated by the double-longitude method.

Mapping and Tracing

Maps covering mine work and allotted territory are made by the same parties having charge of the survey of these mines. The map paper used is the rough, thick mounted "Paragon" paper of 58-in. width. It is usually bought in rolls of ten yards and cut off as required.

Before working on this paper, after a map size is decided upon, the piece is stretched out upon a table for several days, or longer if necessary, in order that it may be properly seasoned before the coördinate lines are blocked out. Also, when a certain territory is allotted to a new mine, before the lines are blocked out on the map, the coördinate values are obtained upon the extreme corners of the boundary in order to determine just which direction across the map to draw the first line.

This line is usually the longest on the map, and points are marked off corresponding to 1000 ft. (on the 100 ft. to the inch maps). After this is done, a beam compass is used to get perpendiculars to this line by the intersection method. Having drawn the perpendiculars, these likewise are marked off in 1000-ft. spaces and the block completed by drawing lines across these points. A 6-ft. beveled-steel straight-edge is used in this work, the lines being first put on in pencil and blocks carefully checked before finally established with drawing ink.

All survey stations are then plotted on from their coordinate values; the 18- or 24-in. parallel rule on rollers and the engineer's scale, graduated to fiftieths, being used in this work; these locations are verified by plotting or checking the course by protractor and measuring the distance between each pair of stations.

The blueprint tracings and the working tracings, from which acreages are calculated, are made from these maps by the members of the division to which these mines are assigned. Worked-out acreages and theoretical tonnages are likewise calculated by the respective parties.

General Drafting and Indexing

The drafting room is equipped with four 5x10-ft. drafting tables, which are so placed as to allow for a 3½-ft. passageway around the entire table, affording the draftsman free access to his work from all sides.

These tables are placed on two cabinets and substantially bracketed to them to insure rigidity. The cabinets are equipped with three sections of drawers, those in one cabinet being full length and half-length drawers in the other. The upper half-length drawers are fitted with locks, in which are kept the supplies and instruments of the draftsman. This same class of table is also installed in each division office.

The drafting room is 16x50 ft. in size, lighted by six

THE CONSOLIDATION COAL COMPANY—West Virginia Division. ENGINEERING DEPARTMENT—PROPERTY SHEET No. 18

Incorporated

John Rogers Tract. 10 Deed Acreage Mine No. 99 Property Jno. Rogers Deed No. 128 D. B. 76 Page 104

Note—Values indicated by *b* are calculated from actual location; Values indicated by *a* are calculated from adjusted deed courses; Values indicated by *c* equal *a* values balanced; Values indicated by *d* are adjusted to agree with adjoining property.

Deed										Calculated															
		Distance				Calculation Books						Lat. Difference		Dep. Difference						Traverse					
Corner	Quadrant	Poles	Feet	Corner	Remarks	Volume	Page	Corner	Quadrant	Hor. Distance	North	South	East	West	Total Latitude	Total Departure	Corner	Folio	Sheet	Remarks					
										S80°30E (From deed)															
										S82°38E (From location)															
									Correction +	2°08 on S.	E. & N.	W.:—Used + 2°01													
*	N80°30W	56	924.00	.....	*At a ravine back of Rogers House To Jones Tract	125	76		*c* N82°37W	*c* 943.70	*c* 121.38			*c* 935.91		*c* S 566.94	*c* E 140.21									
									a N82°31W	*a* 924.00	*a* 120.34			*a* 916.13		*a* S 570.68	*a* E 140.86									
..	S 6° E	15	247.50	W. O.		125	77		*c* S7°55E	*c* 245.30		*c* 242.96	*c* 33.76			*c* W 795.70										
									c S 8°01E	*a* 247.50		*a* 245.08	*a* 34.52			*a* W 775.27	W.O., Tie									
W. O.	S75° W	30½	503.30	Stake		125	77	W. O.	*d* S78°10W	*d* 497.85		*d* 144.17		*d* 476.51		*b* S 688.52	+6.90, —									
									b S73°35W	*b* 498.78		*b* 141.00		*b* 478.43		*d* W1238.45	21.19	26	78	Cor. to Jones						
Stake	S80°30E	83	1369.50	Stake		125	77	Stake	*d* S82°38E	*d* 1360.20		*d* 174.23	*d* 1348.93			*b* S829.52	Use Stake	26	78	3' up hill from a Linn						
									b S82°31E	*b* 1362.45		*b* 177.40	*b* 1350.85			*b* S1006.92	*b* E 110.48									
Stake	N 6° E	26½	437.30	Beginning		125	78	Stake	*c* N 3°52E	*c* 441.00	*c* 439.98		*c* 29.73			*c* 566.94	*c* 140.21	26	78							
									a N 3°59E	*a* 437.30	*a* 436.24		*a* 30.38			*a* S 570.68	*a* E 140.86	Post								
																		Beginning							
																Note:—The errors of closure = +6.90 and —21.19 which are distributed over the										
																Lat. Diff. and Dep. Diff, respectively, between W. O. which are located corners										
Calculations by					and			Copied by				Checked by				Approved:				Division Engineer.					

44½-in. by 7-ft. 10-in. windows arranged in pairs, while over each table are suspended two 40-watt "Tungsten" electric lights, additional portable stands and bracket lights being used when necessary. Full drafting room equipment is provided for topographical, mechanical and architectural work, and for enlarging or reducing drawings to various scales by pantograph.

Indexing of all drawings is handled by the drafting division. The accompanying print shows the arrangement of filing cabinets in the vault, which is built on the department's floor especially for this purpose. The sets of drawers for tracings are designated as cabinets *A, B, C, D* and *E;* in size ranging from *A*, the smallest, to *E*, the largest. In each cabinet an individual system of numbering is maintained, each beginning with number one, and every tracing is classified as belonging to a particular cabinet file by the use of the cabinet letter as a prefix, as A-1461, for example. In numbering the drawers, the number of the last tracing filed therein is used instead of the first and last being indicated, as is usually done; thus, if 100 tracings were in the first drawer of a particular cabinet, the number of the plate card would be 100 and the second drawer card 200, instead of 1-100, and 101-200.

Form 263. 500. 7-1-12.

FAIRMONT COAL COMPANY. Engineering Department. ACREAGE SHEET No. 12

John Rogers Tract Mine No. 99 Property Jno. Rogers Deed No. 128

Property Sheet	Corner	Quadrant	Horizontal Distance	Lat. Dif. North	Lat. Dif. South	Dep. Dif. East	Dep. Dif. West	Double Longitudes	Double Areas North	Double Areas South	Total Latitude	Total Departure	Corner	Remarks
											S 566.94	E 140.21	.....	
18	..	N82°37W	943.70	121.38			935.91	— 935.91		113600.76	S 445.56	W795.70	.....	
	..	S 7°55E	245.30		242.96	33.76		—1838.06	446575.06		S 688.52	W761.94	W.O.	
	W.O.	S 73°10W	497.85		144.17		476.51	—2280.81	328824.38		S 832.69	W1238.45	Stake	
	Stake	S 82°38E	1380.20		174.23	1348.93		—1408.39	245383.79		S1006.92	E 110.48	Post	
	Post	N 3°52E	441.00	439.98		29.73		— 29.73		13080.61	S 566.94	E 140.21	Beginning	
				561.36	561.36	1412.42	1412.42		1020783.23	126681.37				
									126681.37					
									2) 894101.86					
								4356	0) 447050.93	(10.26 Acres				
									43560					
									114509					
									87120					
									273893					

Calculations by ..... and ..... Copied by ..... Checked by ..... Approved: ..... Division Engineer

Indexing

There are only two standard sizes for drawings; correspondence, which is 8½x11 in., and legal, 8x13 in. It has not proven advisable to further standardize, either from necessity or economy; but when making new tracings or drawings they are sized to fit drawers which will best accommodate them. All tracings are filed flat except when so large there is danger of crushing, or when very long and narrow. In these cases they are rolled on sticks and placed in the drawers they fit the best.

Drawers of the depth shown on the accompanying drawing will accommodate from 100 to 300 tracings, depending on size and age. For keeping the tracings in position it has been found better to place a fairly wide board of light wood, such as boxwood, on top of the tracings rather than the usual covering of tin across the back portion of the drawer. It frequently happens that the tracings are both new and old and not all the same size and in this case they are liable to work out of position and become crushed and torn between the edge of the tin strip and drawer partition.

Two indexes are employed; the progressive index, in which the numbers of all tracings are entered in consecutive order as they are placed in the file, and the classified index which is referred to when a particular drawing is desired. The progressive index provides against the possible repetition of file numbers, and from it a new indexing system may be inaugurated at any time. The classified or reference index is arranged as follows:

Mines—Meaning mine numbers, under which sub-divisions are shown the various tracings of mine workings, properties, etc.

Alphabetical, which is virtually a general division according to the first letter of the principal word in the title.

Mining Plants, including all structures and equipment pertaining thereto.

Property, under which heading all property maps are included.

Profiles, of whatever nature.

Photograph, Working and Blueprint tracings, under which headings have been grouped these particular classes of drawings as they are of the most importance and frequently used.

In addition to this general outline, there are several miscellaneous divisions. The positions of the various mounted mine maps in the pigeonhole cabinet are indicated by cards bearing the mine numbers, these being placed on the drop doors and no further indexing being necessary.

Photography and Blueprinting

All this class of work is usually handled by the drafting department. At the end of the year, the mine working maps throughout the region are reduced from 100 ft. to 500 ft. to the inch by copy-process photography. These maps are then bound in folios for the various officials. In order to obtain uniformity, these tracings are brought up to date by the drafting department, and then photographed on 11x14-in. plates. In all, about 150 plates of this size are used throughout the year, from which about 3000 prints are made.

The studio room in which this work is done, is the largest of the three communicating rooms, reserved for photographic work, being 18x30 ft. in size, with an overhead skylight 9x17 ft. There are four large windows, arranged in pairs on either side of the room and in line with the skylight. Mercury vapor lights are used for artificial lighting.

Curtains are provided, properly fitted with rings, and so arranged that the overhead and side light can be controlled to the best advantage at any time of the day.

The arrangement of the photographic apparatus in this room is designed specially for copy-process work; the maximum limit of reduction by any one operation being 1 to 10.

The exposure board, upon which the tracings or print to be photographed is securely fastened by thumb-tacks, is 5x8 ft. in size, and constructed of the best grade of seasoned white pine. It is mounted on a special carriage by pivot supports, their position being such as to distribute the weight of the board enough past center to provide for either a horizontal or vertical stationary position as required.

A 11x14-in. camera, fitted with anastigmat lens, and mounted on a cabinet stand (used for supplies, loaded plates, holders, etc.), is moved to any desired distance from the exposure board upon a triangular shaped steel rail track, this being accomplished by means of a chain gear attachment to the stand operating on a milled third or center rail.

The sliding door between the studio and the enlarging or general supply room, is used as a support for the enlarging camera. An opening in the door panel, exactly fitting the enlarging camera box, is used for the transmission of artificial light, mercury vapor lights being generally used for this purpose. The exposure board for enlargements is 5 ft. 2 in. square, fitted in a stand 12 in. from the floor. The window in this room is fitted with orange-colored glass, and provided with inside shutters so that all light may be excluded when necessary. The enlarging room is 18x20 ft. in size, but a portion of this area is included in the dark room, entrance to this being directly from the enlarging or supply room.

There are two cabinets in the enlarging room, which are of special design and intended for the preservation of chemicals, negatives and various photographic apparatus. The first, or chemical and mixing cabinet, in addition to the uses implied by its name, is also used for the storing of plates, the lower portion of the case being adapted to this purpose. The second, or negative cabinet, is fitted with shelves which are properly partitioned to accommodate 6½x8½-in. and 11x14-in. negatives in the upper part, the lower being used for the storing of photographic apparatus pertaining to enlarging work.

The Blueprinting and Dark Rooms

The dark room is located on the northeastern corner of this floor, with the dark-room window facing the east. This window is fitted with sliding doors of full length, frosted orange and ruby glass, with wooden dark-room shutters on the inside, the interior of the dark room being painted dead black. This room has a concrete floor, printing box, properly fitted dark-room light-box, water filter, hinged wall drop-leaf table and a cabinet especially designed for the uses peculiar to dark-room work in the handling of negatives, storing of printing paper, trays, holders and the like; it is provided with a ventilator, dark or blind entrance, electric lights and is steam heated. Two 18x36-in. sinks, 6 in. deep, are supported by a built-in framework extending across the entire width of room on the east side, provided with proper draining and splashboard equipment, and located 3 ft. 4 in. above the floor. This room is 8 ft. 6 in. in width and 17 ft. long, including the blind entrance above mentioned. A shelf for the accommodation of the chemicals most frequently used in dark-room work, a developer cabinet beneath the developing table, for stock solutions, and a full line of graduates, trays, fixing and washing boxes, etc., constitute the equipment.

The blueprinting room is 24 ft. 10 in. wide and 38 ft. 8 in. long, lying in parallel to the photograph department rooms. There are four large windows fitted with orange glass for properly subdued light in addition to the electric lights which are used for direct lighting. A concrete floor 6 ft. in width extends from one end of the room along the side wall for a distance of 25 ft.

The washing tank is equipped with hot- and cold-water spigots, lined with copper, and is 5 ft. wide, 10 ft. long and 10 in. deep, allowing for 8 in. of water up to the overflow standpipe. A table 5x10 ft. in size is mounted on wooden horses, and fitted with a center drawer for keeping supplies.

The table for sizing the unexposed printing paper is 4 ft. 2 in. wide and 8 ft. long. It is also fitted with a center supply drawer, and is mounted on two cabinet stands. The interior of these stands is divided into compartments for storing sensitized printing paper of all kinds, in addition to which, metal tubes are secured to the edges of the table, in which an entire roll of paper may be placed and the amount desired for a print is measured and trimmed off automatically without danger of exposure during the process.

The blueprinting equipment consists of an electric cylindrical blueprinting machine accommodating tracings 42x72 in. in size, and two 36x60-in. sun frames. The latter are mounted on portable carriages and tracks so that the loaded frames may be moved out on the roof and exposed at any angle. Plate holders for making prints 6½x8½ in. and 11x14 in. are used when such prints are required.

In addition to the copy-process photographic work, there are numerous pictures taken of the various improvements about the mining plants throughout the year, comprising interior, landscape, commercial and flashlight photographic work. In this work a 6½x8½-in. plate is always used, and about 1000 prints of these negatives are required throughout the year.

An inspection of our blueprinting record for work done during the past year shows that 42,960 ft. of printing paper of various kinds was used, or about 8.1 miles.

Miscellaneous

Under this heading is included the compilation of the annual report, abstracting, complete file index record of deeds, agreements, etc., analysis of cost statements, and numerous odd jobs which are constantly arising.

Each year the various divisions, of which there are five, assemble the data of interest and importance on their division and forward it to the Fairmount office where it is compiled, pages properly numbered and indexed and bound in a volume as an annual report. Nineteen of these reports of 560 pages each were made up for the year 1913.

This department keeps copies of all the deeds, leases, agreements, etc., of the coal and surface conveyances, all of which are filed and indexed in this office, and maps made showing the various fields with the index numbers on the tracts included. Frequently abstracts are made of properties to show the exact condition of the title, to which are attached colored plates to assist the reader in following the conveyances.

The Kanawha Labor Agreement

SYNOPSIS—This wage agreement penalizes idleness in violation of the scale, provides for a nine-hour day, grants a check off, excludes certain employees from the union and requires that the workers during strikes shall perform all necessary work except the mining of coal for shipment.

This agreement was submitted to the miners and approved on July 15, 1914. It supersedes the tentative agreement of the operators and miners arising out of their combined acceptance of the second proposal of the commissioners of conciliation. Details regarding the history of the strike, the conciliation, the agreement and the area it affects can be found on pp. 973 and 975 in the previous volume and on pp. 21, 22, 69 and 113 of the present volume. The document has not been reproduced in its exact words, but it is believed that its meaning has not been changed nor have its provisions been in any way abridged in this reprint.

Articles of Agreement

Memorandum of agreement, made and entered into this 11th day of July, 1914, by and between the operators of the Kanawha District of West Virginia and the United Mine Workers of America, governing the operation of mines in the said district for the period ending Apr. 30, 1917.

The scale prices of the 1912-14 agreement are hereby reaffirmed with such additions as are recommended below and these additions are hereby made a part of the scale as follows:

It is agreed that the present prices paid for labor between the drift mouth and the mine tipple—that is to say men working in, on or around said tipple—shall constitute the scale of wages to be paid during the life of this contract.

Drawing pillars by pick in the gas seams shall be left to local adjustment by the operators and miners interested but the rate agreed upon for said drawing of pillars, shall in no case be less than 40c. per net ton. Drawing pillars by pick in the splint seams shall be left to local adjustment by the operators and miners interested but the rate agreed upon for said drawing of pillars, shall in no case be less than 46c. per net ton. No yardage is to be paid in air ways following entries and breakthroughs where the width exceeds 15 ft.

It is agreed that negotiations for a new contract shall commence 30 days prior to the expiration of this contract.

It is further agreed that if at the end of 30 days after the expiration of this contract, a completed contract has not been agreed to, that the disputed point shall be submitted to the scale committee of the operators' association and an equal number of miners; which committee and miners so selected shall decide the matters in dispute within 30 days from the time of submission and in the event that either the miners or operators are not satisfied with the decision rendered they or either of them have the right to revoke the same. It is expressly understood and agreed that during all such negotiations the mine workers shall continue at work and the new contract shall be retro-active to the expiration of this contract.

The rules as amended and the scale with the changes named above are hereby made a part of this agreement.

Rules

CHECK-OFF

There shall be a check-off for dues and assessments only, not exceeding $1.10 per month or 55c. per pay collected by the coal companies which are parties hereto, from those for whom the scale is made. This check-off shall be collected only on the voluntary individual order of the person from whose pay it is deducted and shall be subject to revocation by those who no longer wish to pay the same; such order or orders of revocation with list of same must be in the companies' hands 24 hr. prior to the expiration of each half month.

(a) All assessments must be levied by the national or district organization of the United Mine Workers of America.

(b) The check-off herein provided shall be collected after store, house rent and smithing charges have been paid.

(c) Only moral suasion shall be permitted in influencing men to pay dues or to join the union.

(d) The form signed by each person desiring collections made shall be as follows:

To.....Co.:

Please pay to the authorized agent of Local Union No. .... of the United Mine Workers of America, the sum of 55c. each two weeks out of my earnings or $1.10 for each month while in your employ until this order is revoked. The money thus collected is to serve as dues and assessments to the United Mine Workers of America.

.....

Dated .....

Witness.....

MACHINE WORK

2. The price paid for loading coal after machines in narrow work, by the ton, shall be, if the operator so desire, the same as in wide work; the excess price now paid for loading to be paid on a yardage basis according to the number of tons of coal produced in each yard of narrow work.

3. Machine men will be required to cut coal level and close to the bottom, and all machine men leaving more bottom than 4 in., except in case of pots or extreme variations of level, will be required to lift same or it shall be lifted at their expense.

4. In case sprags are left by the machine men, the latter shall be notified by the loader, and if they refuse to remove same, the loader shall do so and be allowed 50c. for so doing; the said 50c. shall be charged to the machine men.

5. All machine loaders shall be awarded two rooms, or the equivalent of three rooms in thin seams, for each two men, and they shall work as "buddies," and in that way load from one room at a time, so that it will give an opportunity to cut the other room, and so that no time will be lost by machine or loaders. The operator will provide such rooms for each two men at the earliest possible moment, but in the event of territory becoming scarce from a squeeze or when striking a horse-back, or any other unavoidable obstacle, this clause shall not be construed so as to diminish the output of the mine.

CHECK-WEIGHMAN

6. Check-weighmen, selected as required by law from among the employees at any mine, may be placed on each tipple at the expense of the miners, and their duties shall be only those prescribed by the laws of the State of West Virginia, and all weigh scales may be tested by the miners at any reasonable time. In case a suitable man cannot be found at any mine an outsider may be employed by and with the mutual consent of the operator and his miners.

TRADE

7. Employees have the right to trade where they please.

RUN-OF-MINE OR SCREENED-COAL BASIS

8. The mining rate per ton for splint or hard coal shall be fixed upon a run-of-mine basis, but screened-lump coal may be mined provided the increased rate paid for screened-lump coal shall be according to the percentage of screenings in producing screened-lump as against mine-run coal.

HIRE AND DISCHARGE

9. The operator or his superintendent or mine boss shall be respected in the management of the mines and the direction of the working force. The authority to hire and discharge shall be vested in the mine superintendent or mine boss, and nothing in this agreement shall be construed to abridge the rights of the employer in either of these respects.

LOADING CARS OR BARGES

10. The operator shall at all times be at liberty to load with coal any railroad cars or barges whatsoever, regardless of their ownership, and sell and deliver such coal in any market, and to any person, firm or corporation that he may desire.

NINE HOUR DAY

11. Nine hours shall constitute a day's work: 9-hr. day means 9 hours work at the face, exclusive of noon-time, 6 days or 54 hr. a week, provided the operator desires to work the mines, and no local ruling shall in any way affect this rule or impose conditions affecting the same, and any class of day labor may be paid, at the option of the operator,

for the number of hours or fraction thereof actually worked at the hour rate, based on one-ninth of the scale rate per day, except that when the day men go to the mine in the morning, they shall be entitled to two hours work whether the mine works two hours or not, provided that the failure to operate the mine is not the result of men being out or declining to work. If for any reason the regular routine work cannot be furnished to the inside day labor for any portion of the first two hours, the operator may furnish other than regular labor for the unexpired time.

12. All classes of labor are to work full 9 hr., and going to and coming from their respective working places is to be done on their own time. All day men shall perform whatever day labor, the foreman may direct, and a nine-hour day means 9 hr. work in the mine at the usual working places, exclusive of the time required in reaching said working places in the morning and departing from the same at night.

Drivers shall take their mules to and from the stables and the time required in so doing does not include any part of the day's labor, their time beginning when they reach the change where they receive empty cars and ending at the same place. The prevailing customs relative to harnessing and unharnessing their mules shall continue.

SEMI-MONTHLY PAY

13. All labor shall be paid semi-monthly. Semi-monthly pay means that the miners shall be paid twice a month, pay days to be determined locally, and statements shall be available 24 hr. prior to pay day.

MINING—WORKMANLIKE METHODS—TIMBERING

14. The miner shall be required to load his coal in every case free from slate, bone, nigger-head and other impurities.

15. All coal must be mined, drilled and blasted by the miners in a practical and workmanlike manner and in accordance with the state mining laws of West Virginia.

16. In paying for coal before it is screened, it is not intended to encourage unworkmanlike methods of mining and blasting coal, or to decrease the proportion of screened lump, and any miner will be subjected to discipline who, from ignorance, carelessness, or any other cause, fails to mine, shoot and load the coal properly.

17. The scale of prices agreed on for mining coal shall include the work required to mine, shoot, clean and load the coal, and timber the working places in the mines properly, and the operator shall be required to furnish the necessary props and timber to timber all working places properly.

18. If any miner shall fail to timber properly and care for his working place, and such failure shall entail falls of slate, rock and the like, or if, by improper and reckless shooting of the coal in room or entry, the mine props or other timbers shall be disturbed, or unnecessary falls result, the miner whose fault is the occasion of such damage, shall repair the damage without compensation, and if such miner fails to repair such damage, it shall be considered a dischargeable offense, and he may be dealt with at the discretion of the superintendent.

19. In any case where the mine boss directs the placing of crossbars to secure the roadway, then and in such cases only, the miner shall be paid prices for such cross bars as may be agreed upon between him and the mine boss. In case of miners shooting bottom, should any of the props be loosened or displaced, thereby endangering the safety of the workmen, the miner agrees to reset same. The above does not contemplate any changes from the ordinary method of timbering by the miner for his own safety.

DOCKS

20. In case any slate, bone, sulphur or other impurities are sent out by the miner, it shall be the duty of the trimmer of the car to call the attention of the weighman, and checkweighman where one is employed, to the same, so as to deduct the weight of such impurities as estimated by the trimmer or dock boss from the ascertained weight of such car; for the second offense he may be suspended for one working day or fined 50c.; for the third and each subsequent offense occurring in any one calendar month, he may be suspended, discharged or fined $1 at the option of the superintendent. In malicious and aggravated cases, the superintendent shall have the right to suspend or discharge for the first or any subsequent offense.

21. Any miner abusing, or seeking to embarrass the trimmer from performing his duties shall be fined $3, or be discharged at the option of the superintendent.

22. It is understood that if the checkweighman leaves his post to investigate the amount of impurities thrown out, or for any other purposes, the running of the coal over the tipple will not be suspended during his absence.

23. Splint coal loaded out with gas coal, when it is ordered to be separated, shall be considered as impurities and shall be dealt with as such.

24. The proceeds of all fines arising under this clause to be paid into the funeral fund. Under no circumstances shall the fines be remitted or refunded.

MINE COMMITTEE—GRIEVANCES

25. The duties of the mine committee shall be confined to the adjustment of disputes that the mine boss and miner, or miners, have endeavored but are unable to adjust.

The mine committee shall have no other authority nor exercise any other control, nor in any way interfere with the operation of the mine, and for violation of this clause the committee or any member thereof may be discharged.

25-a. In case of any local trouble arising at any mine, the aggrieved party shall first make an earnest effort to adjust the dispute with the mine foreman. In case they are unable to agree, the matter shall be referred to the mine committee and the local management of the mine, and if they fail to agree, to the commissioners of the miners and operators' association, and if they fail to agree, to the district board of the two organizations, and should they fail to agree, they shall select an umpire or referee, and the decision of a majority of them shall constitute a final and binding award. In all such cases all parties involved must continue at work pending the investigation and adjustment as above set forth.

25-b. If any employee for whom the scale is made refuses to work because of any grievance which has not been taken up in the manner provided herein and such action shall seem likely to impede the operation of the mines, such employees or any of them will subject themselves to dismissal without recourse at the option of the company, and the mine committee shall immediately furnish a man or men to take such place or places at the scale rate in order that the mines shall continue at work, and it shall be the duty of any member or members of the mine workers who may be called upon by the mine boss or mine committee to take immediately the place or places assigned him or them in pursuance hereof.

25c. The mine committee shall under no circumstances go around the mine for any cause whatsoever unless called upon by the mine boss or by the miner or day man who may have a grievance that he cannot settle with the mine boss and then only to investigate that grievance with the parties involved.

25-d. Members of mine committee employed as day men shall not leave their places of duty during working hours except with the permission of the mine boss or in cases involving the stopping of the mine.

25-e. Any employee or employees guilty of throwing the mine idle or of materially reducing the output of the mine by failing to continue at work in accordance with the provisions of this agreement, for the purpose of enforcing some demand in violation of this agreement or to force a decision of some case in dispute by methods other than as provided for herein shall be fined $1 each for each day so idle. All fines collected as above shall be paid to the treasurer of the Kanawha Coal Operators Association; such fines to be distributed from time to time for charitable purposes by the presidents of the two organizations, and under no circumstances shall any fines so collected be refunded except when mutually agreed to by the two organizations.

NEGOTIATIONS DURING SUSPENSIONS

26. Under no circumstances will the operator recognize or treat with any representative of the United Mine Workers of America during the suspension of work contrary to this agreement.

WORKING IRREGULARLY

27. Should any employee absent himself from his work for two days or persist in working irregularly, unless through sickness, or by first having notified the mine boss and obtained his consent, it shall be construed as a dischargeable offense; and in case of sickness it is the duty of said employee to notify the mine boss at once in order that arrangements may be made to fill his place.

TURN

28. The operator will see that an equal turn is offered each miner, and that he is given a fair chance to obtain same. The check-weighman, where one is employed, shall keep a turn bulletin for the turnkeeper's guidance. The drivers shall be subject to whoever the mine boss shall designate as turn-keeper in pursuance hereof. This rule is not applicable, and shall not be considered as preventing the operator from driving entries as rapidly as he may desire.

DOUBLE SHIFTING ENTRIES

29. Miners shall drive double-shift entries when called upon to do so by the operator, and 25c. per yard extra shall be paid for pick entry and 20c. per yard for machine entry.

BURIAL FUND

30. A burial fund may be established by each mine or local, to which fund each miner shall contribute 25c. per month until a sum of not less than $75 and not more than $150 shall have been created, when collections shall cease until the fund is reduced by death, when a collection of 25c. per man per month shall again be made until the amount reaches the maximum agreed upon, and so on, and the operator shall contribute in case of death of miner, or any member of his family, an amount agreed upon by the operator and the Burial Fund Committee. In consideration of this contribution, it is agreed and understood that the miners and day men will not cease work to attend the funeral of either miner or member of the miners' family. However, if a miner is killed outright while at work in the mine, the mine may be closed the day of his death, but it shall resume work the following morning. This is not to be construed to mean that individual mine workers or relatives of the deceased shall not attend the funeral if they desire so to do.

31. There shall be a committee appointed known as the Funeral Fund Committee to take charge of these funds, and make all necessary funeral arrangements in case of any death, and said committee shall be paid for such duties as may be agreed upon locally.

ENTRY GOB

32. Where there is not sufficient room to gob the dirt and draw-slate in entries with ordinary conditions the loader or miner shall load it in bank cars and the company shall unload it.

MEMBERSHIP IN U. M. W. OF A.

33. The following employees are not eligible to membership in the United Mine Workers of America; Mine boss, inside boss, weighman, dock boss or boss trimmer, stable boss, electrician and night watchman.

34. It is understood that in the event of a disagreement between operators and mine workers, steam and electrical engineers, firemen and pumpmen are required to continue to perform such work as is in line with their duties.

TRACK-LAYER

35. No mine shall be compelled to hire more than one man as head tracklayer; all others shall be known as helpers, and so paid, and all helpers shall be expected to do such work as is laid out for them by the head track-layer.

DEAD-WORK—LOCAL CONDITIONS—INCREASE IN COST

36. For dead work where unusual conditions exist, the price to be paid for same shall be a question for local adjustment, but no local demand shall be made that will increase the cost of coal during the life of this agreement unless mutually agreed upon.

37. Under the terms of this contract nothing shall be done or enacted that shall increase the cost of producing coal to the operator, or decrease the earning power of the mines, except by mutual consent.

38. During any strike or suspension, it is hereby understood that all men on all kinds of outside construction and repair work, together with all men at such kinds of work inside the mines as does not produce coal, must continue at work; and it is further understood that such miners as are necessary are to be permitted to mine coal for the boilers and domestic consumption on the property; but this is not to be construed to mean to mine coal for shipment.

SPLINT COAL SEPARATION

39. Where splint coal is separated and thrown back, to meet exceptional market conditions and afterward loaded, there shall be paid 12½c. per ton extra.

DAY WAGE SCALE

40. Though in many cases a higher wage than the Kanawha scale is paid for day labor, the right is reserved to apply the Kanawha scale for day wages should the companies elect to do so.

41. All local rules in violation of this contract shall be null and void and no local union or group of local unions shall pass any rules which violate it, neither shall any company enforce any rule in violation of this contract.

Scale of Prices

Basis—Ton, 2000 Pounds—Run of Mine

KANAWHA THICK VEIN NO. 1 AND 2 SEAMS	
Pick mining	$0.49
Pick mining, Powellton seam	0.46¼
Yardage in pick entries and breakthroughs between entries	1.08¼
Machine loading in rooms	0.26
Machine loading in entries, breakthroughs in entries and room necks	0.31
Machine cutting in both rooms and entry	0.06½
KANAWHA HARD COAL NO. 5 SEAM	
Pick mining	0.51
Yardage in pick entries and breakthroughs between entries	1.19
Machine loading in rooms	0.27
Machine loading in entries and breakthroughs in entries and room necks	0.31½
Machine cutting in rooms	0.07
Machine cutting in entries and breakthroughs between entries and room necks	0.08
Screened coal to be paid on basis of percentage of screenings	
COALBURG SEAM—RUN OF MINE	
Pick mining	0.56½
Yardage in pick entries and breakthroughs between entries	1.35
Machine loading in rooms	0.32½
Machine loading in entries and breakthroughs in entries and room necks	0.37
Machine cutting in rooms	0.07½
Machine cutting in entries and breakthroughs between entries and room necks	0.08¾
COALBURG SEAM OVER 1½-INCH SCREEN	
Pick mining	0.81¾
Machine loading in rooms	0.43
Machine loading in entries and breakthroughs in entries and room necks	0.51½
Machine cutting in rooms	0.10
Machine cutting in entries, and breakthroughs between entries and room necks	0.11½
RAYMOND CITY SEAM	
Pick mining over 1¾-in. screen, per hundred bushels	2.87
Yardage in entries and breakthroughs between entries	1.35
CEDAR GROVE SEAM	
Pick mining	0.56½
Yardage in pick entries and breakthroughs between entries	0.92
Machine loading in rooms	0.32½
Machine loading in entries and breakthroughs between entries and room necks	0.37
Machine cutting in rooms	0.09¾
Machine cutting in entries, and breakthroughs between entries and room necks	0.10¾
OTHER SEAMS	
Lewiston seam to be same as Coalburg	
Kanawha seam to be same as Coalburg	
Elk River seam same as Kanawha Hard Coal or No. 5 seam and Coalburg	
Winifrede seam same as Coalburg	
Gauley River seam to be based upon Kanawha seams that apply to them	
INSIDE DAY LABOR	
Water haulers, machine haulers and drivers of one mule	$2.05
Drivers of two mules	2.16
Motormen and machine runners	2.55
Tracklayers	2.43
Tracklayers' helpers	2.00
Slate shooters	2.28
Couplers	1.18
Greasers	1.08
Trappers	0.87
All other inside day labor	2.00

Signed:

On behalf of the miners:
THOS. CAIRNS
C. C. GRIFFITH
THOS. HAGGERTY
BEN F. MORRIS

On behalf of the operators:
EDW. SCHONEBAUM
MICHAEL GALLAGHER
D. C. KENNEDY
D. T. EVANS
J. W. DAWSON.

The Labor Situation

SYNOPSIS—There has been no marked development in the labor situation. The strike of the Lackawanna employees still threatens. That in Ohio drags along wearily, the participants suffering much destitution and many of the mines having been flooded. The men driven from Prairie Creek, Ark., by the rioting Union men are also destitute and their families are, in many cases, scattered. The Western Federation of Labor may unite with the United Mine Workers of America. The Scotch miners desire a 4-day week.

The dispute regarding the patrolmen of the Delaware, Lackawanna & Western R.R. coal department has reached a menacing stage. Colonel R. A. Phillips, general manager, recently refused to treat further with the miners on the subject. On July 18, the general grievance committee of the Lackawanna miners met in West Scranton and voted unanimously in favor of a strike at all Lackawanna collieries unless the company officials agreed to discontinue the patrol system. The meeting was attended by 72 men from 18 different collieries, employing more than 10,000 men. The question was referred to the locals for ratification where the referendum vote was everywhere favorable. It did not, however, provide for a strike, but only gave the general grievance committee power to call one at any time.

It has been quite generally thought that the action of the company in closing its collieries recently for short periods arose not from lack of orders, but from a desire to let the miners have an early foretaste of the idleness they are seeking. If that is really so, which is somewhat unlikely, for business is now facing the regular summer dullness, the company could hardly be blamed, because the strike against the patrolmen is a flagrant violation of the agreement and should subject the union to suit by all the regular laws of business. The company, however, is disposed to treat with its men despite the earlier declaration, and on July 22, Col. R. A. Phillips, the general manager, had a conference with D. Fowler, the chairman of the grievance committee.

It will be remembered that in accord with James E. Roderick's suggestion, a safety patrol was inaugurated at great expense to the company. The miners said the men were spies and demanded their discharge. The local grievance committee has so far acted on its own authority, John T. Demsey, the president, participating in only one of the meetings. It is doubtful whether the organization will support the miners, and it is believed that the company may seek an injunction to prevent a strike which violates the agreement entered into by the company with the United Mine Workers of America.

The safety patrol, known by that or any other name, has been the most successful means of reducing accidents, having been adopted also by the U. S. Steel Corporation's affiliated coal companies, the Lackawanna Steel Co. at Ellsworth and Cokeburg, and the Susquehanna interests in the anthracite region. It has and deserves the approval of every mining man and has always been proved to reduce accidents.

Safe practices are sometimes burdensome and the insistence on them annoying, but if the miners rise against safety inspectors they deserve and will receive the unstinted condemnation of the public, and the responsibility of the coal companies for accidents will be largely removed.

LAW BREAKING IN ARKANSAS

Lawlessness still continues in Arkansas and there is a disposition to criticise Attorney-General McReynolds for the preliminaries which led to the present situation. It has been altogether too general in the past to take the easy way in dealing with disorder and to wait till threatening and manhandling turn to arson and murder.

The head of the attorney-general's department had, it appears, ample warning. The mines at Prairie Creek are surrounded by several others in which are about 2000 union miners. Nearly half of these work in the mines of the Central Coal and Coke Co., which are located in the same valley and surround Prairie Creek on three sides.

On April 6, fully 1000 miners from the Huntingdon and Hartford field marched to Prairie Creek mine and sent a committee to confer with Superintendent Cameron. Haulage ropes had been stretched around the plant and the crowd surged around this barrier. Friction with the mine guards caused an outbreak and four employees were beaten. The superintendent had to withdraw his men from the mine and to put out the fires under his boilers.

THE INJUNCTION OF THE U. S. COURT

Now the statement of these facts might be considered biased, but the judge of the U. S. Court was so impressed with the evidence on inquiry that he made a temporary restraining order, later making it permanent, and he told the Mammoth Vein Mining Co. not to operate without notifying him. On notification, 50 U. S. marshals were sent to guard the mine. James C. McReynolds, the attorney-general immediately ordered them simply to observe the conditions and not to police the mines.

McREYNOLDS' ORDER RESULTS IN VIOLENCE

The marshals were ultimately withdrawn, and the operators, realizing the danger, hired about 125 guards. Those men, for some reason or other, failed to resist the force brought against them and 4 tipples, 2 fan houses, the commissary and boarding house were burned down. Two men were shot and their bodies incinerated so that their skulls and bones were all that was found of them when exploring the burned ruins of the log cabin in which they had been murdered. On the 20th of June, the Coronado tipple was also dynamited and destroyed.

Yet we find people who oppose injunctions and desire the lawless to complete their violence before they are restrained. All that is now needed to complete the farce is to send a few troops to prevent the Mammoth Vein Mining Co. from hiring any men to replace those who have been driven away. We suggest this only because it has been done already in Colorado. If we had not that example before us, we would label such an action "unthinkable," but a labor administration is liable to wink at every manner of violation of the constitution.

The men driven out of Prairie Creek have been separated from their families and are afraid to go to seek them. Most of them are destitute. The Bache-Denman Coal Co. is taking care of most of them, but unable to obtain work in the union mines and with the nonunion plants dynamited and burned down, their situation is deplorable for men in a free country.

PEACE IN OHIO

In Ohio the companies are still anxiously desiring to pump out the water from their mines. The Cambria Mining Co. July 20 started its pumps and fans at Pultney and Webb. Sheriff Anderson brought 50 armed guards to the Pultney mine, but the Webb mine was policed by private guards. The Fort Pitt mine is relying on Sheriff Anderson to supply deputies. Some of the I. W. W. agitators are in prison and the fever heat of the irresponsible miners has consequently declined.

In fact the awakening of Sheriff John Anderson has relieved matters considerably in Belmont County. He has inquired of Attorney-General Hogan whether men could legally be employed to protect mine property, and, of course, the attorney vouchsafed him the information that it was lawful and an obligation under conditions such as exist in his county. So Anderson recruited 150 miners to protect the pumpers and engineers. They were assigned to duty at the mines at Wheeling Creek, Lansing, Barton and Neff, and with the pumping forces working under their protection, it is expected that the mines can be kept in good shape until work is resumed.

It is reported that many of the Industrial Workers of the World left the county disgusted. Joseph Knoblocks, an I. W. W. agitator, is charged with treason. It is declared that he has levied war against the state, and that he has adhered to its enemies, giving them aid and comfort, and also he has failed to give information in his possession of impending acts of volence against the state and the public. The charge is unusual, but it is declared by officers that it can be fully substantiated by facts.

JACKSON DISTRICT TO WORK, OTHER DISTRICTS IDLE

Despite the efforts of operators to have the miners return to work under a temporary arrangement as to weighing both lump and slack coal, the miners in the Hocking Valley district held out all last week and demanded that all the coal be weighed at one time. Conferences of the scale committee of this district started July 20 and lasted for the week.

In the Jackson district an agreement was made and work will be resumed at once. In the Cambridge district a number of the mines have resumed operations. Nothing has yet been done toward signing a scale agreement in the eastern Ohio district.

As a result of appeals to the people of Ohio and West Virginia, funds have been collected for the relief of the families of miners in the Ohio field affected by the recent strike, and commissaries have been opened in about a dozen of the mining towns from which free provisions and household supplies will be dispensed as long as the money holds out. It is said that the distress among the miners has in many cases become acute, rendering immediate relief imperative to avoid actual suffering and death from starvation, and the commissaries were opened to afford prompt aid.

Funds for the suffering striking miners and their families in Ohio have been asked for by the Ohio Federation of Labor at a recent meeting in Columbus. Reports from various districts of Ohio show that there is much suffering among the miners and their dependents, and in many cases subscriptions have been taken up in their immediate localities.

LATEST NEWS OF MINE SCALES

Settlements in Ohio districts are not materializing as actual agreements. Those who signed a mine-run contract on the basis of 47c. a ton have discovered that the local conditions are likely to prove as much an obstacle as was the general scale. Increases are sought for all classes of help and the miners have assumed the position that they made a big concession when they accepted 2c. less than the full demand of 49c., and they should not be asked to concede anything in the framing of local scales. This has delayed the opening of mines in the Hocking, Cambridge and southern Ohio fields. It also appears that the operators are not to be allowed to pay a mine-run scale by weighing three-quarter coal and slack separately, and adding the weights thus obtained. This procedure will be necessary while alterations are being made in the tipples at some of the mines and was sanctioned by the state union officials. ?

Tipples are generally squatty in the Hocking Valley, and it will require a month if not longer to rebuild them. In the meantime the operators hoped to mine coal and take advantage of the demand for steam grades.

The land owners are now objecting to coal being mined on the mine-run basis. All royalties, where paid, are based on three-quarter coal. The land owners are not willing in some cases to rearrange contracts on the mine-run basis because such mining will result in the destruction of the market and eventually will hurt the reputation and reduce the value of the fields. They also are asking more per ton under the mine-run scale than the equivalent of the old royalty on three-quarter coal.

Altogether the situation is not clearing up as rapidly as was hoped. It is frequently predicted that the No. 8 field will be producing coal before the troubles are all settled in other parts of Ohio.

John M. Roan, chief of the Ohio department of mines, denies that he said that eastern Ohio operators would sign the scale giving 47c. for machine-mined coal and 67.6c. for pick-mined coal. The quotations from his recent speech at Bellaire, Ohio, as given in the papers, were incorrect in that particular, according to his statement.

LOCAL DISPUTE IN WEST VIRGINIA

In West Virginia, in the New River district two small strikes were called. One is at Elverton, where 80 miners quit because the company refused to permit the employment of a check-weighman who, they declared, was incompetent. However, the matter was compromised, by putting the father of the elected weighman in the younger man's place. At Kaymoor No. 2 about 50 miners quit because they would not work with a man who had been a guard at the Loup Creek mines.

THE SOUTHERN CONFERENCE

News from Kansas City, where an agreement for the Kansas, Oklahoma, Missouri and Arkansas fields is being made, is scant. Committees consisting of 8 representatives of miners and 8 representatives of operators were formed for each of the four states. These committees will meet separately and provide different agreements for each state. The contract is to be for two years.

DISCONTENT WITH INDIANA AGREEMENTS

In Indiana the delegates from Linton, Clinton, Shelburn, West Terre Haute and Glen Ayr brought formal charges on July 22 against William Houston, president, and James Shiel, vice-president, respectively, of the 11th district of the United Mine Workers of America, also against Thomas Moss, a member of the district board. These charges allege violations of the working agreement in settling strikes. President Houston is charged with neglect of duty. The complainants desire that all three men be removed from office.

WEST KENTUCKY FIGHT

In Muhlenberg County, in Western Kentucky, there has been armed strife between the Bevier Coal Co. and the strikers at Cleaton. The employees of this company, as well as those of the Nelson Coal Co., are on strike, alleging that the employers have broken a contract entered into when the Western Kentucky Coal Operators' Association and the Union Miners met at Louisville in the spring, when the operators agreed to haul the men into the mines. The Bevier company has withdrawn from the operators' association and refused to provide the men with transportation.

The violence consisted of an attack, charged to the striking miners, on the quarters of J. P. Cox, superintendent of the company, at Cleaton. A charge of dynamite was exploded one night last week in the store over which Mr. Cox had his rooms, but Mr. Cox, with a bodyguard, which had been concealed outside, broke up the mob by firing buckshot into its ranks. It is said that 25 men participated in the attack. Five men are known to have been severely wounded and it is reported that one fatality resulted. The authorities are investigating.

COLORADO STRIKE NEARING CONCLUSION

The Colorado situation is unchanged except that as the union funds become more and more depleted, the more do the leaders allege defections of men working at the mines and the more fervently do they appeal for federal intervention. The Union is severely short of funds except in a few of the locals, and those which have the money are keeping it. So it is necessary to find another and better way to end the strike, and the new way sought is by nationalization of the Colorado mines.

It was announced the other day that Samuel J. Gompers, president of the American Federation of Labor, had been asked to head the movement, which shows that it is an impulse arising with the United Mine Workers Union. That Mother Jones and John W. Brown are advocating it seems also to suggest the source of the inspiration.

THE OPERATION OF MINES BY THE NATION

We are by no means either against public ownership of utilities or national socialism. We believe private property is only of value as it promotes happiness and prosperity, and we look, indeed, for a gradual assumption of federal control as time proceeds and socialism becomes not so much a mere creed to enforce on others as a private practice which the individual will enjoin on himself. In fact for socialism we need more socialists—men who aim alone at the social and not at their personal welfare. Such men are rare in all classes of society.

Just recently appeared the German report on insurance for 1913. The wages at the privately owned monopolistic coal mines in Westphalia are $402 per year. In Upper Silesia, the privately owned coal mines paid their men $280. The state coal mines at Saarbruecken paid $327. Thus the state employees received a wage 16 per cent. greater than the Upper Silesia corporation workmen and 19 per cent. less than the employees of companies in the Westphalia district. State ownership consequently, has not been of great benefit to these German coal miners.

THE MINING UNIONS TO COMBINE

The Western Federation of Miners met in its 21st Annual Convention at Denver, Colo., on July 20. President Charles H. Moyer, in his report, said that none of the officers in the Western Federation disapproved of confederation with the United Mine Workers of America. John McLennan, president of District No. 15, U. M. W. of A., called attention to the fact that his organization took steps favorable to the proposed merger at the last convention at Indianapolis, Ind.

From such a union the only gain will be increased numbers and larger funds with countervailing larger responsibilities and divergent interests. There is no real gain such as accrues when two bodies join which are engaged in regulating the same industry in competing fields. The U. M. W. of A. will hardly be any more of a trust when it absorbs the W. F. of M. than it is now, for it already is in undivided control of the unionized coal mines. While the W. F. of M. is even more disposed to violence than the U. M. W. of A., it is hardly likely that the affiliated body will make a perceptible difference in the conduct of strikes and the making and breaking of agreements between coal operators and men. In fact the W. F. of M. may gain in responsibility far more than U. M. W. of A. will lose.

THE SHORT WEEK

The Scotch miners desire to work only 4 days a week. This is 208 days a year, as against 225 days worked in the United States in 1912. If the rule is strictly enforced and bank holidays and days for funerals are not added, the Scotch miners will still work almost as steadily as is customary in America, but the working days will be better distributed. However, it has always been looked upon as a hardship in

America that mining work has not been more steady. In Scotland, there will be a certain loss of trade to foreign countries as a result of the 4-day week, and here, if we decided on such a short week, there would be no less idleness in the summer, so that the working days might fall to 150 per annum.

We hardly think that the standard of living is so high that the Scotch miners are to be commended for seeking the 32-hour week. If it is so, they are imposing on the working men in other trades who have to give a longer period for equal pay. If the hours are to be reduced the rule should be universal, and it is a grave question whether any of us desire to reduce the standard of living by such a considerable factor. If we deliberately reduce production, we must expect to have less products to divide.

The Fife and Kinross miners have given their notice to the number of 20,000 and the operators have declared for a lock-out. So immediate strife seems certain unless a European war makes one of the parties grant a concession.

THE CLAYTON BILL

The Clayton bill (H. R. 15,657), which passed the House June 5, has been favorably reported to the Senate after exhaustive deliberation and many amendments.

Section 2 was so amended as to permit discrimination in price . . . "made in good faith to meet competition and not intended to create monopoly," and also to permit the selection of customers "in bona fide transactions and not in restraint of trade."

Section 3, putting a restriction upon the sale of mine products, was stricken out.

Section 7, is amended by eliminating fraternal and consumers organizations, and inserting the word "lawfully" as applied to the carrying out of the legitimate objects of the organizations referred to. The section as amended reads as follows:

Sec. 7. That nothing contained in the antitrust laws shall be construed to forbid the existence and operation of labor, agricultural, or horticultural organizations, instituted for the purpose of mutual help, and not having capital stock or conducted for profit, or to forbid or restrain individually members of such organizations from LAWFULLY carrying out the legitimate objects thereof; nor shall such organizations or the members thereof be held or construed to be illegal combinations or conspiracies in restraint of trade, under the antitrust laws.

Section 18 is amended to read as follows:

Sec. 18. That no restraining order or injunction shall be granted by any court of the United States, or a judge or the judges thereof, in any case between an employer and employees, or between employers and employees, or between employees, or between persons employed and persons seeking employment, involving or growing out of, a dispute concerning terms or conditions of employment, unless necessary to prevent irreparable injury to property, or to a property right, of the party making the application, for which injury there is no adequate remedy at law, and such property or property right must be described with particularity in the application, which must be in writing and sworn to by the applicant or by his agent or attorney.

And no such restraining order or injunction shall prohibit any person or persons WHETHER SINGLY OR IN CONCERT from terminating any relation of employment, or from ceasing to perform any work or labor, or from recommending, advising or persuading others by peaceful means so to do; or FROM PEACEFULLY PERSUADING ANY person to work or to abstain from working; or from WITHHOLDING THEIR PATRONAGE FROM any party to such dispute, or from recommending, advising, or persuading others by peaceful AND LAWFUL means so to do; or from paying or giving to, or withholding from, any person engaged in such dispute any strike benefits or other moneys or things of value; or from peaceably assembling in a lawful manner, and for lawful purposes; or from doing any act or thing which might lawfully be done in the absence of such dispute by any party thereto; nor shall any of the acts specified in this paragraph be considered or held to BE VIOLATIONS of THE ANTITRUST LAWS.

Section 20 provides that trials for violations of injunctions "may be by the court or upon the demand of the accused by a jury."

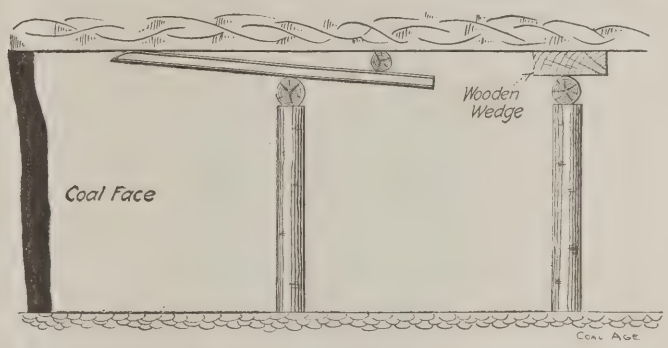
Section 21 provides that judgments of conviction for contempt "may be reviewed upon writ of error in all respects as now provided by law in criminal cases."

The bill is now before the Senate and will soon be taken up for final consideration. The favorable amendments thus far made to the bill justify a hope that continued effort may secure further modifications which will be of advantage. Now if peaceful persuasion is prohibited to more than 5 men in a group, within 1000 ft. of a man's working place or his way of approach thereto and only one man is allowed to appeal to him at a time at his home, the Clayton bill will do a great deal to make injunctions unnecessary and violence less frequent. The difficulty of deciding whether persuasion is peaceable or the reverse has made the injunction necessary. By limiting either the number of persuaders or the necessary proximity of the victims to their forcible logic the freedom to contract and labor may be preserved to working men.

How the French Protect the Man at the Face

Practical Coal Mining describes an interesting method of forepoling in use at the Courrières colliery in France, the mine where the largest mine explosion in history took place. The method has been commented on favorably by George S. Rice, of the Bureau of Mines, who saw it in operation. An iron bar of girder section is pushed forward over the last cross-bar, so as in a manner to forepole the roof. When the place is advanced far enough for putting in other timbers and cross-bars, light laggings are substituted for the iron bars; these are temporarily supported by light props till the permanent timber sets are erected.

The bars are formed of I-section iron about 4 ft. long, 1¼ in. wide and 1¾ in. deep. The front or chisel end is made by heating the metal and hammering the top flange downward till it is welded to the bottom flange. The workman is allowed to leave unsupported only one



A Temporary Method of Securing the Roof at the Coal Face

foot of roof between the iron bar and the face. As soon as that distance is exceeded, the bar must be driven forward again. In driving through heavy falls, similar iron bars of stronger cross-section are used.

Only in this latter case probably would this French system meet American requirements, but in many places a slight and obvious modification would serve to add greatly to safety.

Coal Mining Institute of America

A meeting of the executive board of the Coal Mining Institute of America was held July 14, in the office of W. E. Fohl, Farmers Bank Building, Pittsburgh, Penn. The date of the winter meeting was set for Dec. 8-9, and the Fort Pitt hotel was arranged as the place of meeting. All the details of the program are not completely determined, though the groundwork is laid.

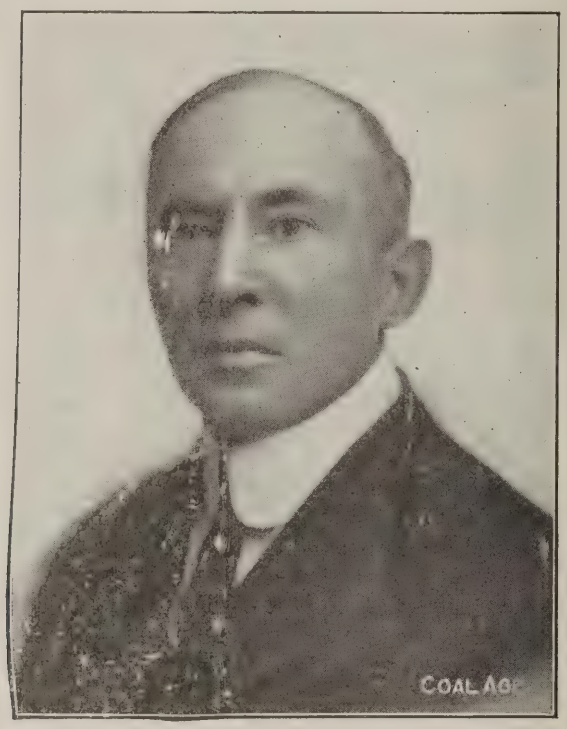
Early in the 18th century the mine light par excellence was a tallow dip set in a lump of wet clay. When gas tests were to be made, the experienced miner surrounded the wick of this brilliant light with more clay. The "fire man" of those days, prototype of the modern fire boss, must have been a man of much nerve and little caution, as his duty was to rid the mine of gas by firing it. Clad in damp leather or sack cloth, his work compelled him to lie prone on the floor and light the gas suspended in the air above him. If he survived the explosion he returned to the surface and reported the mine safe. Another method of disposing of gas was the use of "eternal lamps," kept burning continuously in gaseous mines to burn the gas as fast as it was generated.

Who's Who in Coal Mining

Jesse K. Johnston

Few men are more prominent in the affairs of the western Pennsylvania coal-mining industry than Jesse K. Johnston, of Wilkinsburg, Penn. He is the type of man who is able to handle matters other than those of a purely local nature, and for this reason his influence has extended beyond the limited sphere of his personal interests.

Mr. Johnston was born at Georges Station, Penn., Jan. 2, 1867. His mother was Louisa Kilgore, granddaughter of Capt. David Kilgore, who served with distinction in the Eighth Pennsylvania Regiment during the Revolutionary War. Pennsylvania history records the fact that Mr. Johnston's great-grandfather, Capt.



JESSE K. JOHNSTON

Kilgore, sold his mill property in order to secure sufficient money to clothe the military company under his command. For this act of generosity and patriotism, Capt. Kilgore never asked nor received compensation from the government.

But to return to the present subject of this sketch, Jesse Johnston. He was educated in the Greensburg High School, following which theoretical training he secured employment as topographer with the Pennsylvania Railroad. His next position was that of engineer with the Barberton Belt Line R.R. in Pennsylvania.

Mr. Johnston's first important work in coal mining was with the Pittsburgh Plate Glass Co., for which concern he served as general mine superintendent. Following in succession, he became president of the Lumberport Coal Co., vice-president of the Pitcairn Coal Co., president of the Charleroi Trust Co., president of the Charleroi Improvement Co. and president of the Coal Mining Institute of America.

While superintendent of the mine at Charleroi, he introduced electricity into his colliery, being the first superintendent in the Monongahela Valley to effect such an improvement. A second innovation introduced by Mr. Johnston was the plan of moistening the ventilating current in his mines by exhaust steam. He does not make claim, however, to having been a pioneer in the use of this particular safety precaution.

Mr. Johnston is a member of the American Mining Congress, American Institute of Mining Engineers, Engineers Society of Western Pennsylvania and the Coal Mining Institute of America. He has prepared a number of technical papers for presentation before coal institutes. Some of his most recent contributions are as follows: "Loss of Life in Coal Mines Compared with Other Hazardous Occupations," "Characteristics of the Thick Vein Freeport Coal Seam," "Safety Chambers in Underground Workings of Coal Mines" and "A Study of the Wages and Selling Price of Coal in the Pittsburgh District."

Anthracite Mine Fatalities

The death rate per 1000 employed in anthracite collieries has always remained about the same. The figures did not grow persistently higher up to 1907, as did those for the bituminous coal mines. Whereas, the bituminous mines are slowly regaining their former values, the anthracite region shows increased safety per ton produced and almost equal safety per thousand employed. The fact that the death rate has by one method of calculation barely increased and by another and more correct method has actually decreased, is due largely to the efforts of the operators and first-aid men to reduce accidents.

From 1881 to 1889, inclusive, the number of tons of coal produced per fatal accident was 142,287. In the following decade, the number of tons dropped to 141,915, and from 1900 to 1909, during which time mine rules were more strictly enforced and many safety devices and danger signs were introduced, the number increased to 153,717. The average for the three years 1910, 1911 and 1912, was 160,591. The figures are from the latest annual report of the Pennsylvania Department of Mines.

Basing the estimate on thousands of employees, the death rate from 1881 to 1889 inclusive was 4.45; from 1890 to 1899 inclusive was 4.27; from 1900 to 1909 inclusive was 4.24. The average for the first three years of this decade was 4.32.

Mine disasters are so dramatic and terrible that they are given prominent display in the newspapers of all countries, and this has given rise to the erroneous impression that mining is the most dangerous of all occupations. A recent study of the casualty record of the coal mines, railroads and steel mills in this country, however, revealed that mining was the least dangerous occupation of the three. In 1911, the latest year for which there are official figures in the three industries, 31,334 of the 729,279 coal miners were injured; 126,039 of the 1,669,809 railroad employees; and 35,764 of the 158,604 steel employees. A reduction of these figures to a common basis brings out the fact that for each thousand men employed, 225.48 were hurt in the steel mills, 75.48 on the railroads, and 42.96 in the coal mines.

Editorials

Washouts, Sandbars and Distortions

The first impulse on finding that coal is absent where there is no evidence of faulting is to assume that it was either never deposited or that it was removed by erosion. Some of the coal thinnings and removals result, however, from the effect of readjustment of measures under side pressures. When the rock structure of the earth was subjected to strain, the yielding coal, clays and shales suffered more than the harder strata. This is clearly brought out in Boulton's "Geology of the Coal Measures," forming the first part of the Practical Coal-Mining series, recently published by the Gresham Publishing Company.

Thus in the Somersetshire coal field of England are several "wants," which were believed for a long time to be "washouts" contemporaneous with, or immediately sequent on, the deposition of the seam. But it was found by Mr. Steart that the coal had been replaced not by the hard sandstone of the roof, but by the soft black shale of the floor, that the areas believed to be eroded were too irregular to be the streams of ancient rivers, and that the "wants" occurred most frequently in the vicinity of badly faulted measures and not infrequently paralleled them roughly. Furthermore, in some places the coal became much thicker and consisted of layer upon layer of coal piled on one another. What is more, the thinnings were not common to one bed alone, but were found superposed in several of the beds in any locality.

It is true that erosion by relieving pressure may have produced a flow in the coal measures, especially in newly deposited beds, and that, consequently, thickness exceeding the normal may be due to the exuding of embryotic coal from lightly pressed to unpressed areas. It is also true that a depression, such as causes erosion, may be produced repeatedly in the same place during the deposition of different coal beds, but while these are possible and often probable explanations, the evidences seem sometimes rather to point to the causes being more recent and the action more violent.

The amount of displacement of the coal in the seam in many cases has a relation to the softness of the material on which the coal rests. Where the floor is a hard fireclay, it has failed to transfer so severe a strain to the coal. Further evidences of the dynamic rather than the hydraulic origin of these "wants" are that the appearance of the carbonaceous masses is so smoothed and polished as to suggest extrusion, the striations of the roof are at right angles to the main axis of the overfolds of the district, and in some cases where the thick coal appears, a thin layer of cannel occurs on the top of each layer of coal, as if the quintessence of the bed has been squeezed out under pressure.

While in English coal measures the pressures have been more severe than in much of the bituminous area of this country, it would be well in every case to be cautious in assuming that "wants" are erosions or sandbars wherever they appear. Of course, some will say that it is of no importance what are the causes, but where one is in doubt as to the best way in which to deal with disturbed ground if the cause is rightly determined, the extent of the trouble and its general nature will be better evalued.

The Folly of Defense

There are few persons more unfortunate than a defendant. Seldom does he succeed in being triumphantly vindicated. He often says that he is, and his closest friends confirm him in the statement, however, with less assurance than he himself usually shows; but as a matter of fact, he is besmirched even if there is barely a scintilla of evidence.

And the logic is, don't be a defendant, be a prosecutor. Fail you may, but you are unhurt by that fact for the sting of accusation is still left to plague the defendant. However, it is a poor maxim to advocate this scourging of opponents unless you are sure of the essential justice of your ground and can let loose with a clear conscience.

The leading defendant, the perpetual defendant, is the coal business. The folly of defense has been perpetually evident in the history of colliery ownership. A mean and puny part is that occupied by the industry which, charged with many shortcomings, meets some, extenuates others and admits a few. We all have faults and so the part of the defendant fits us ill; we all should be above suspicion, so contumelious reproach makes cowards of us all.

The successful people are those who attack, who deliver a blow on the ground of their opponent. The wildcatters and smaller oil men of Oklahoma recently fiercely denounced three big oil companies operating in that state. They accused them of all kinds of discriminations, combinations and duress, and, as a result, the public of Oklahoma got to think these wildcatters and smaller oil men needed assistance and enabled them to form a trust of the most law-breaking description.

Thus also the farmers of Missouri attacked the Harvester Trust. The court ruled, to quote the *Independent,* that the slight increase in prices had been preceded by a greater increase in the prices of labor and material, that the increased cost of construction and the improvement in the machines more than offset the increased price, that there had been a reduction in the cost of repair material, that "farmers generally" had "profited by" the companies' competition with other manufacturers, that independent manufacturers "had not suffered by reason of the combination," that many retailers had testified that the company used no unfair methods in the treatment of competitors, and that "on the whole the evidence shows that the company has not used its power to oppress or injure the farmers, who are its customers."

Nevertheless, George W. Perkins and Thomas D. Jones are both besmirched by their connection with this trust. One is in danger of being thrown out of his party and friendship with him has been regarded as casting a stigma

on his most prominent political supporter. The other is subjected to congressional abuse and questioning and debarred from service on the Federal Reserve Board. But on the other hand, the farmers who yelled so lustily at the combination of others, are about to get a bill passed through Congress, permitting them to combine to their hearts' content.

These instances we might continue to multiply but, without further parley, the work cut out for coal men is very clear. Be aggressive. Do not say our profits are too small, we are *not* coal barons; let us point rather to the fortunes of those who oppose and oppress us. No coal man ever made such profits in mining as are made by makers of breakfast foods, soaps, automobiles and a hundred other articles. Let us then rather clamor that such men be restrained and convince the citizen that while wasting his energy in chasing a dog with a can tied to its tail, he is overlooking the slick person who, aiding in the chase, is filching that worthy gentleman's purse.

In the age of feudalism, the seller was little better than a serf; the buyer was a lord. So we have learned as a race to be humble as sellers and lordly as buyers, forgetting that rightly he who buys has as many obligations as the seller. And, by the way, this applies as much to the sale of labor as of any other community, though we are slow to believe it.

The buyer believes he, the lord, has a right to receive coal from the serf whenever he is graciously pleased to buy it. He would have the mines seized if he cannot get the coal he needs. But, viewing the seller as equal to the buyer, why have not the manufacturing establishments of all kinds been seized or at least coerced by government to go on buying coal during the present lull in business? If the seller must saddle and go to market, must not the buyer be there to meet him? If for failure to ship coal, the freedom of the coal operator and miner is to be removed, why not subject the manufacturer to an equal duress when he has a strike and ceases to buy? What are the profits of the manufacturers to the coal man, for none of them has ever cared if the latter made a living?

Only by rebates, promotions, real-estate deals and leases has money been made in the coal business in the past; almost as much has been lost as gained in real coal extraction. What rascality, keenness and chicanery the business has known has almost all come from bankers and lawyers and not from the real operating and developing heads. But let us not enter any defense, seeing we have so clear a line of attack? Let us bring our suit against the exploiters of the public and pursue it without any fear of having to enter a barren *nolle prosequi.*

Co-operative Mining in Illinois

In the recent activity in coöperative mining in the Illinois coal field, a unique condition has been developed replete with interesting possibilities. The move savors strongly of socialism, and indeed there are many rumors current to the effect that radical socialists are the controlling factors in the companies involved.

The innovation is unique in, that, for the first time, we find both capital and labor lined up on the same side. In this modern age of continual and, at times, almost bitter strife between these principals, the situation is indeed unusual, which unites them in a common cause; but such is clearly the case in this instance.

By working on a fluctuating scale, varying according to market conditions, and frequently ranging well below union wages, the coöperatives are violating the most sacred principle of organized labor. On the other hand, the independent, legitimate operators of Illinois are the most acute sufferers. Uncontrolled by the customary principles of economies, which establish an approximately uniform cost basis in all lines of industrial endeavor, the mutual operators continue dumping their product on the market irrespective of the prices received.

While the tonnage involved is relatively small, as compared with the output of the entire state, it is obvious that business along these lines must inevitably demoralize a slow or even normal market. Certainly, the regular companies, compelled to meet a fixed cost of production, cannot compete with such uneconomic methods.

The legitimate operators, having signed contracts with the Illinois Mine Workers adopting a fixed rate of wages, naturally feel justified in holding the union officials responsible for this condition. Indeed, the path of the labor officials is strewn with many difficulties. With the operators assailing them on the one hand for permitting gross violation of the wage scale, and the coöperative miners on the other hand giving up their union charters rather than abandon their mines, the situation is steadily becoming more tense. The issue cannot be long delayed and may ultimately be more far-reaching in its effects on the coal industry than now seems apparent.

Perhaps one of the most distressing features of the situation is the strong appeal for sympathy one must feel for certain cases of the coöperatives. For instance, let us consider the case of some of the older miners, men on the final decline, who are unable to longer stand the rapid pace set by younger, more energetic and ambitious men; coöperation of such men for their mutual protection seems eminently just.

Again, we have a case of a mining community threatened with abandonment. It frequently happens that the more thrifty men in such locations have invested their earnings for long periods in small homes, the intrinsic value of which is directly dependent upon the continuation of mining operations. Will either capital or labor attempt to restrain such men from protecting their interests at whatever sacrifice they see fit to make?

Rules for Mining Plants

Rules, general and special, have been written and posted on our tipples on behalf of men, many of whom cannot read. But rules for mechanics and others who can read and whose duties keep them near where the rules may be posted, we too frequently omit. We need rules to prevent fires, to promote safety, efficiency and economy. They do not need to be stringently written. The average mechanic is a proud man or he would follow a line of work demanding less originality and enterprise. His pride is his asset; do not deprive him of it, but give him rules so couched that they will appeal not to his fears, but to his loyalty and intelligence.

One of the results of the "safety" campaign carried on by the Reading Coal & Iron Co. the past year has been the adoption of broad leather washers on the handdrills of the miners. This precaution has saved many a crushed finger.

Extracts from a Superintendent's Diary

About the most ludicrous, and yet withal the most pathetic sight imaginable, is presented when one encounters unexpectedly one of our typical miners "dressed up."

Today while in the city I chanced upon two who came within the full meaning of the phrase—Tony Williams and Ray Ivy.

Both were bedecked with high, generously starched collars, fancy cravats and waistcoats (after a man has made a study of tailor books and magazine clothing ads. these days, he will assure you that vests and waistcoats are quite different garments), fancy socks, patent leather shoes, creased pants, etc.

Both of them are married men with families, and why they should feel called upon to prepare themselves for dress parade in the city is not evident. Possibly the gaudy posters furnished by the tailoring companies, displayed to such excellent advantage by our commissary manager, could not be resisted, or perhaps a desire to get even with the wife for buying a new dress on credit may have furnished the motive. Be that as it may, every time I happened out on Main St., Tony and Ray were very much in evidence.

Occasionally I overheard passersby discuss them, and everyone who noticed them turned about and observed them critically.

I happen to know that Tony took Bob Jones, our timekeeper, to town with him when he selected his tie, vest and socks, after purchasing a suit from the tailoring company that handles the orders taken by our commissary. (It's easy to believe that commissary clerks might not be eminently fitted to take suit measurements; at least it would be easy to believe that after having gazed upon Tony arrayed in all of his glory.)

Bob is the Beau Brummel of our community, and his taste in dress is beyond question, but it is possible that he decided that our camp is displaying too little originality in the gentle art of choosing raiment and so decided to lead Tony into new pastures. At any rate, judged by conventional standards, Tony was curious looking.

It is possible that I am doing Bob an injustice, and instead of trying to put one over on Tony he had planned to make his tie, socks and waistcoast so conspicuous that Tony's bowed legs, gnarled back and tremendous hands should escape notice. In this, however, giving him the benefit of the doubt, he failed singularly, for poor Tony was followed by a crowd of jeering boys throughout most of the day, and their remarks had reference mostly to "the shape of that guy with the cuffs on his pants."

Ray Ivy early in the day decided that his neck was too large for "biled" collars, so he partially disrobed at a fruit stand and presented the offending collar and his cravat to a blind beggar. Later on, his patent leathers becoming unendurable, he stopped in a second-hand store and swapped them for a pair of boots. Now pants with cuffs were designed by tailors who never heard of boots; Ray gave the cuffs to a messenger boy who was trying to mend a leaky bicycle tire with a piece of handkerchief.

Both Tony and Ray are active members of our first-aid team. While we were en route home tonight they got into a heated discussion with some of their companions about the most suitable topic for next week's first-aid discussion. Bob Jones, sitting over in one corner of the coach, apparently trying to sleep, rose up about this time and remarked that he had never heard any of them make a suggestion as to the first-aid best adapted for a fellow being choked by a necktie. Forthwith, Tony jerked off the offending member of his garb, amid the jeers of the balance of his companions.

Recent Legal Decisions

Responsibility for Failure to Make Repairs—A coal mining company is liable for injury to a miner caused by a defect which it negligently failed to repair after the general superintendent had had knowledge of its existence for several days. (Alabama Supreme Court, Sloss-Sheffield Steel & Iron Co. vs. Dobbs, 65 "Southern Reporter," 360.)

Miner's Choice between Safe and Unsafe Ways.—When a coal miner has a safe means of exit through one entry, he assumes the risk of being injured in passing through an entry which he knows to be unsafe. (Kentucky Court of Appeals, Elliott vs. Greenville Coal Co., 167 "Southwestern Reporter," 424.)

Right to Recover Price Paid for Machines—Under the following state of facts, the owners of a mine were held not to be entitled to recover money paid for machines intended to be used in mining and loading coal: It was agreed between the parties that the machines were to be similar to a machine made by the manufacturer for another mine owner and then in use, with such changes as might be decided upon by the manufacturer and the buying mine owners' manager, to whom the specifications for the machines were to be submitted. The machines were to be furnished at cost, and put in place, "in order to demonstrate their abilities." The mine owners sued to recover the price of the machines, on the ground that they proved to be useless, and that the manufacturer impliedly warranted that they would do the work for which they were ordered. The manufacturer defended the suit on the ground that the buyers' manager had examined an experimental machine made by the manufacturer, and believed that a similar machine could be used in the mine; that during the construction of the machines the manager required a change in power from electricity to compressed air, in order that the machines could be used in gaseous mines; and that this change greatly increased the cost of manufacture—to an amount in excess of the price received by the manufacturer. This defense was sustained by the court, on the ground that the agreement was joint and experimental. (Pennsylvania Supreme Court, Rainey vs. Morgan, 88 "Atlantic Reporter," 798.)

Railway Company's Liability for Refusing to Furnish Cars—A coal operator can recover from a railway company damages resulting from the latter's discrimination against him in favor of other coal shippers, in refusing to supply cars, if the company had an adequate supply of cars on its tracks. (Pennsylvania Supreme Court, Sonman Shaft Coal Co. vs. Pennsylvania Railroad Co., 88 "Atlantic Reporter," 746.) The fact that a coal company instituted proceedings before the Interstate Commerce Commission to recover reparation for discrimination in distributing cars did not preclude subsequent suit against the same company to recover damages on account of discrimination relating solely to intrastate commerce. (Pennsylvania Supreme Court, Clark Bros. Coal Mining Co. vs. Pennsylvania Railroad Co., 88 "Atlantic Reporter," 754.) A railway company which discriminated against a coal shipper by counting cars owned by him in the number of cars allotted to him, whereas that was not done in the case of other shippers, cannot avoid liability for damages resulting to him, by showing that the Interstate Commerce Commission afterwards adopted an order requiring privately owned cars to be taken into consideration in apportioning equipment among shippers. (Pennsylvania Supreme Court, Stineman Coal Mining Co. vs. Pennsylvania Railroad Co., 88 "Atlantic Reporter," 761.)

Coal Used in Operation by Lessee Not Subject to Royalties—"Under the custom prevailing in the anthracite region, coal used by a lessee in the operation of the mine is not subject to royalties," in the absence of provision in the lease to the contrary. (Pennsylvania Supreme Court, Trustee of Proprietors of Kingston vs. Lehigh Valley Coal Co., 88 "Atlantic Reporter," 769.)

Discussion By Readers

Working Coal Seam with Heavy Parting

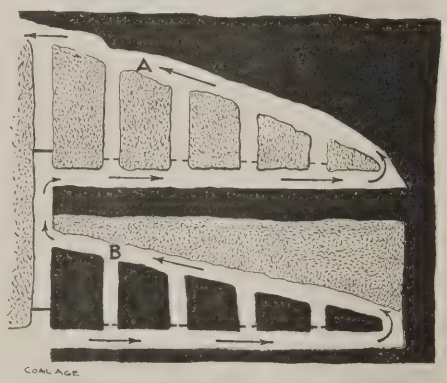
Letter No. 7—Replying to the inquiry of Fred Morck, COAL AGE, June 13, p. 981, I would suggest that he use a coal cutter capable of mining at any desired height above the floor, similar to the Jeffrey-O'Toole. The cut should be made in the base of the parting if the material will cut; if not, in the coal immediately under the parting. After completing the cut, take out the parting and load or gob it before disturbing the coal, so as to avoid loading dirty coal.

The disposition of the material of the parting depends largely on the plan of mining and whether this is a shaft or a drift proposition. If roof conditions are such as to make it possible to draw the pillars, the parting material should be removed from the mine.

W. D. HANLON,
Consulting Engineer, Railways-Mines.
Cleveland, Ohio.

Letter No. 8—Some years ago, an old mining teacher used to tell us boys, who attended his class, that the best way to reason was to use a concrete example to prove our argument. I agree that market conditions are important factors in working a coal seam with a heavy parting. However, from my observations, the thickness of the parting is the most important factor to be considered in this case. I propose to use a concrete example.

In the State of Alabama we have a seam of coal known as the "Mary-Lee" seam. The height of the seam varies from 5 ft. 5 in. to 9 ft. 5 in. The seam has a parting rock known as the "middleman," which varies in thickness from 12 to 24 in. The lower bench of this seam, or the coal under the middleman is usually, about 3 ft. in thickness. The method of extracting the coal is a simple one; the lower bench is taken out to a depth of about 5 ft., after which the parting-rock and the seam of coal above it are shot down. The rock is separated readily from the coal, the latter being loaded out first, and the rock disposed of afterward. The coal is all mined by pick on the room-and-pillar system, the rooms being driven double with a wide breast. The price paid for mining varies from 42½ to 52½c. per ton, the difference in price being due to the varying height of the coal in the lower bench. This seam of coal is mined extensively in Alabama, which indicates that such coal seams with heavy partings can be worked at a profit.



WORKING TWO SEAMS AS ONE

Formerly I had some experience in a seam of coal where the parting-rock was 5 ft. in thickness. The proposition was practically one of working two seams through a single set of openings or roads. The lower seam measured 3 ft., while the upper seam was 3 ft. 6 in., in thickness.

The accompanying sketch may assist, to some extent, in explaining the method of working these two seams as one. As the main roads are advanced, the work of taking out the coal is commenced in the lower seam. This coal is taken out under the parting-rock, on the longwall advancing system, as shown in the section marked *A*. This work is kept several yards in advance of the work in the upper seam, the distance being determined by the settlement of the overlying strata on the waste, which is packed solid.

The work of taking out the coal in the upper seam is performed in panels, on the retreating system of longwall. This is shown in the section marked *B*. A new panel is opened out by ripping the rock and taking down the upper coal, at a point a few yards behind the longwall face in the lower seam. The coal in the upper seam is then worked back on the retreating system until the entire panel is taken out.

By this means, the handling of the rock is entirely eliminated. The method has the further advantage that, owing to the settlement of the parting-rock or middleman, away from the coal in the upper seam, the latter requires no mining and is easily wedged down. The system was very successful in the production of cheap coal. I hope this interesting discussion will continue.

WILLIAM CROOKS.

Edgewater, Wylam, Ala.

Problems in Rescue Apparatus

Letter No. 1—I have read with interest the inquiry of W. H. Moore, COAL AGE, June 27, p. 1062. I fully agree with your statement that, "It is well nigh impossible to give exactly the reactions that take place between the hydrocarbons in the building up of the tissues of the body through the supply of oxygen to the lungs." In this connection, the following quotation from a first-aid book will be of interest:

> This necessary purification of the blood is accomplished by the process of respiration, which may be defined as the function by which oxygen is absorbed into the blood and carbonic acid given off. To understand the necessity for the respiration process, it must be remembered that the leading feature of the chemical changes that go on in a living body is of the nature of a burning up or a combustion of the tissues, as shown by the production of bodily heat. To allow for this combustion going on and continuing, a certain amount of oxygen is absolutely required, just as an ordinary fire could not burn if no air or, in other words, no oxygen reached it.
>
> But it is also a well established fact that there can be no combustion without the formation of waste products, one of the chief being carbonic acid. The tissues of the body are no exception to this latter law, and they freely give off car-

bonic acid as one of their waste products. Proof of this can be furnished by examining the blood in an artery going to, and in a vein coming from, any part of the body. From a pint of each of these varieties of blood, about half a pint of gas could be obtained by means of the air pump; but there would be a great difference in the composition of the respective gases. That obtained from the arterial blood would be made up of some nitrogen, a good deal of oxygen and a considerable quantity of carbonic acid; while that gotten from the venous blood would be composed of some nitrogen, but of only half the amount of oxygen and a much larger amount of carbonic acid. From this it is quite apparent that, as the result of nourishing the tissues, the blood has lost oxygen and gained carbonic acid. In fact, it is the presence of this large amount of the latter gas that constitutes the chief difference between arterial and venous blood and accounts for the difference of color between the two.

There is then going on in every part of the body a conversion of the red arterial into dark venous blood, owing to the tissues using up or breathing, as it were, the oxygen of the blood and pouring back into it the waste products of combustion in the form of carbonic acid and other substances. As long as this interchange of gases goes on regularly, everything works smoothly, but if it is in any way interrupted, and the blood that comes to the tissues contains no oxygen, then combustion ceases, the nutritive changes stop, there is a complete slowing if not an entire cessation of the machinery of the body, and death results.

I am inclined to believe that the 70 liters of oxygen, which Mr. Moore says are unaccounted for, must play an important part in sustaining life while wearing an apparatus, let it be the Fleuss, Draeger or Meco. I am not prepared to say what becomes of it, but I believe that the nitrogen, also, has its duty to perform just the same. It is true that the three types of apparatus named are expected to supply the wearer with two liters of oxygen per minute, which is $2 \times 61 = 122$ cu.in. According to tests made, a man wearing an apparatus and walking 4 miles per hour, requires 50 liters of air per minute, or $50 \times 61 = 3050$ cu.in. of air. Then, if we breathe at the rate of from 15 to 20, say 17 times per minute, we inhale $3050 \div 17 =$ say 179 cu.in. at each respiration.

Again, quoting from the first-aid book:

The full capacity of the lungs is 330 cu.in., in adults. In an ordinary respiration, from 20 to 30 cu.in. of air enters the lungs. This is called "tidal air"; and 200 cu.in. remains in the lungs after ordinary expiration. This is called "stationary air." In deep expiration, 100 cu.in. of air can be expelled from the lungs, and this is called "supplemental air." The remaining 100 cu.in. is the "residual air," and this cannot be expelled. By taking a deep inspiration, 100 cu.in. extra can be drawn into the lungs, making the full capacity of 300 cu.in. This is called "complemental air."

The above shows that 2 liters, or 122 cu.in. per min., or a little less than 8 cu.in. of oxygen per respiration, is supplied to the wearer of the apparatus while engaged in ordinary work; but apparatus wearers doing strenuous work require 50 liters of air per minute, or 179 cu.in. of air at each respiration. If they forget to turn on the bypass valve to replenish the volume of air, they at once experience that inability to draw a deep breath, begin to gasp and, in a few seconds, either fall or require assistance from others to enable them to stand and walk. This occurrence proves that they are not getting the necessary amount of air from the 8 cu.in. furnished by the 2 liters per minute. The purest air that we get is what Nature provides, which consists of about $^1/_5$ oxygen and $^4/_5$ nitrogen. This is why it is necessary to fill up the breathing bag with the outside atmosphere before turning on the oxygen in the apparatus. This provides the proper supply and mixture to start. If the breathing bag is too much distended release some of the exhaled air from the bag, by means of the release valve, until you breathe comfortably. This will also test the tightness of the apparatus and show that the release valve is in working order.

In reference to the moisture being absorbed by the caustic potash or caustic soda, I will say not all of it is absorbed, and that remaining I consider a dangerous element. This may be where some of the 70 liters of oxygen goes. I understand that water will hold in solution its own volume of CO_2, while nitrogen has no affinity or very little for either gas or water, serving only as a diluent. Be this as it may, some men yield more moisture than others. With the Draeger apparatus, I have found the saliva cup full and running over, besides enough water in the tube in front of the injector to interfere with the regular supply of air. This feature may be overcome by removing the saliva trap to the bottom of the regenerator, as is done on the improved or positive-pressure type. This trouble is also found both in the Meco or Westfalia, and Fleuss or "Proto." The caustic soda becomes nearly a liquid, after the apparatus has been worn an hour or more, and this is a source of great danger. I would like some advice as to the best method of overcoming this collection of moisture.

THOMAS ENGLISH,
Supt., Mine Rescue Station.
Springfield, Ill.

Graft in Labor Unions

I have read with great care and interest every article bearing on the working conditions of the present industrial movement, which seems to be rife in almost every coal-mining state at the present time. I have nothing to say against miners' organizations; I believe they can be made to prove helpful to every honest workman, if conducted properly by the officers in charge. This, however, is far from being the case.

I wish to relate a little of my past experience in the Westmoreland County strike of 1910-11. During that strike, I served as committeeman in the Ligonier Valley, Wilpen, Penn., Local No. 729, U. M. W. of A. This was the only local on the whole branch north of Ligonier. The companies who were affected by this strike are the following: Ligonier Coal Co., Peters; Columbia Coal & Coke Co., Old Colony; Marietta-Connellsville Coke Co., Marietta; Ligonier Diamond Coal & Coke Co., Seger Plains; and the Fort Palmer Coal & Coke Co., Ligonier.

Of the miners working on this branch, 95 per cent. are foreigners, and of these, only about 3 per cent. can read and speak English. On May 3, 1910, all the miners working on the branch were called out by strike agitators from Latrobe, who promised to see that the union was established; that the men would gain everything they wanted; and that the strike would not last long. They found the foreigners ready listeners; and, at that meeting, officers were duly elected.

The chairman of the Relief Committee knew nothing about the coal and coke business; but he knew how to keep his hands in the treasury and to get drunk. As was learned later, the graft in one day was from $50 to $70. After the reading of the treasurer's report at one meeting I asked for an explanation of how the money in the treasury was obtained. The chairman explained to me that the National Organization sends to every local $2.50 for each striker, $1 for his wife and 50c. for each

child. He explained, we pay three-fifths of this amount for relief and retain two-fifths for our own use; and added, "You know they are all dummies and know nothing of the transaction. You would be crazy not to grease your axle when you handle oil."

Investigation showed that the pages were torn from the ledger and the minute book; and that the treasurer's book showed only the full amounts. We succeeded in having new officers elected and I was appointed distributer of the relief funds. The following week the new officers went to Greensburg to have the books corrected at headquarters. At that time, it was found that the chairman had extracted from the treasury $600.75. I asked what could be done, and the reply was, "If he gave no bond, you can do nothing with him." An examination of the check book showed that one check for $8 endorsed by an organizer, was drawn in favor of another party, whom it never reached.

As I have pointed out, at another time, if coal companies would interest themselves to see that the locals in their vicinities are properly conducted; and that trade conditions are more fully explained and understood, there would be more coöperation on the part of the men and less labor troubles.

JOHN MAJER.

Listie, Penn.

A Longwall Proposition

Letter No. 6—Referring to the recent discussion of the longwall proposition, presented by Mr. Hartsuff, COAL AGE, June 6, p. 944, my experience of 30 years in longwall work in Scotland leads me to suggest the use of the "conveyor system" in this case. The advantage of that system would be that it would be possible to carry a much greater length of coal face and thus avoid the expense of maintaining so large a number of roads leading to the face as are necessary in the common longwall system.

The main roads, only, would require heavy brushing, and if the packwalls, say 20 ft. wide, are well built on each side of the road, these would probably be good for all time. The slate roof overlying the seam, and beneath the hard "sulphur binder," would probably furnish sufficient material for building the required roadpacks.

The principal features to be considered in the adoption of the longwall method of mining are the thickness of the seam, depth of overburden, character of top and bottom, and whether the work can be advanced continuously. The main point, in this system of working, is to take out all the coal anl allow the top to settle down solid on the packwalls and waste.

JOHN SHEPHERD.

Glencoe, Ohio.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

EVOLUTION

The word "evolution" means an unrolling or unfolding. The process is the reverse of involution.

Involution is finding the product of equal factors.

Evolution is finding the equal factors of a given number. In the latter case (evolution), the given number is a certain power of another number called the **"root."**

Roots of Numbers—The number of equal factors required is the **"index"** of the root.

The extraction of a root is indicated by the character $\surd$ called the **"radical,"** written just before the given number. The index, denoting the root required, is a small figure written above and before the radical. For example, $^2\surd$, $^3\surd$, $^4\surd$ written before a number, indicate, respectively, that the second, third or fourth root of the number is required.

As in involution, the first root of a number would be the number itself; while the second root is commonly called the **"square root"** and the third the **"cube root"** of the number. When the square root is desired, it is indicated by the radical sign alone, the index figure 2 being omitted. Thus, $\surd 4$ indicates the second or square root of 4 is to be extracted; $^3\surd 8$ indicates the cube root of 8; $^5\surd 9$, the fifth root of 9; etc., etc.

It is customary to write a bar over the number whose root is to be extracted; thus, $\surd 144$ indicates that the square root of 144 is to be extracted.

To Find a Root by Trial—The root of a number can always be found, to any desired degree of approximation, by the successive multiplication of trial factors.

Example—Find, by trial, the following roots: (a) $\surd 81$; (b) $^3\surd 216$.

Solution—(a) By trial, $7 \times 7 = 49$, low;
$8 \times 8 = 64$, low;
$9 \times 9 = 81$. Hence, $\surd 81 = 9$.

(b) By trial, $5 \times 5 \times 5 = 125$, low;
$7 \times 7 \times 7 = 343$, high;
$6 \times 6 \times 6 = 216$. Hence, $^3\surd 216 = 6$.

In evolution, it is important to note the following observations:

1. Beginning at the units place, divide the number into periods of as many figures each as there are units in the index. In a decimal, the division begins at the decimal point, the periods of the integer being counted to the left and those of the decimal to the right of this point. The left-hand period may contain fewer figures than the index denotes; but the right-hand decimal period must always be completed, by adding ciphers, if necessry.

2. The root of a number will always contain as many figures as there are periods in the number, and the number of decimal figures of the root will be equal to the number of decimal periods of the number.

The Coal Age Pocket Book

Example—Find by trial the cube root of 35,208.25.

Solution— $^3\surd 35,208.25 = {}^3\surd 35,208.250$

Observe, each period of the number represents a figure of the root. Therefore, find the greatest cube contained in the first period on the left and its root will be the first figure of the required root; thus

$3 \times 3 \times 3 = 27$, low; and $4 \times 4 \times 4 = 64$, high.

Then the first figure of the root is 3. In the same manner, find the second figure, by considering the first two periods of the number and ascertaining the greatest cube contained therein. The root will evidently be a number between 30 and 40. Thus, by trial,

$33 \times 33 \times 33 = 35,937$, high;
$32 \times 32 \times 32 = 32,768$, low;

The first two figures of the root are therefore 32 and these form the integer of the root. In the same manner to find the third figure which is the first decimal figure of the root, consider the three periods of the number and proceed thus,

$32.8 \times 32.8 \times 32.8 = 35,287.552$, high;
$32.77 \times 32.77 \times 32.77 = 35,190.814$, low;
$32.78 \times 32.78 \times 32.78 = 35,223.040$, high.

Therefore, $^3\surd 35,208.25 = 32.77+$, which is correct to two decimal figures.

Square Root, Direct Method—

Rule—Beginning at units place, divide the number into periods of two figures each. Observe the greatest perfect square contained in the left-hand period, and write its root as the first figure of the required root. Subtract the square of this figure from the first period, and to the remainder annex the second period, for a dividend.

Divide this dividend exclusive of the last figure, by twice the root just found. Write the quotient for the second figure of the root, and annex the same figure to the trial divisor. Multiply the divisor so increased by the said second figure of the root and subtract the product from the last dividend. To this remainder annex the third period for a new dividend.

Again, double the root for a trial divisor and proceed as before till all the periods are brought down. If there is still a remainder, the process may be continued by writing a decimal point in the root and annexing two ciphers to the last remainder. The work may thus be carried to any degree of approximation desired.

Example—(a) $\surd 274,576$ (b) $\surd 1.4161$

Solution—

```
(a)    27 45 76(524          (b)     1.41 61(1.19
       25                             1
      ------                         ------
 10 2) 2 45                    2 1)   41
       2 04                           21
      ------                         ------
104 4) 41 76                   22 9) 20 61
       41 76                          20 61
```

Inquiries of General Interest

Electrical-Power Transmission

After a considerable discussion of the following question, which has given rise to different opinions in reference to the correct answer, it has been agreed by the parties interested to submit the question to COAL AGE for solution, and to be governed by its decision. The question is as follows:

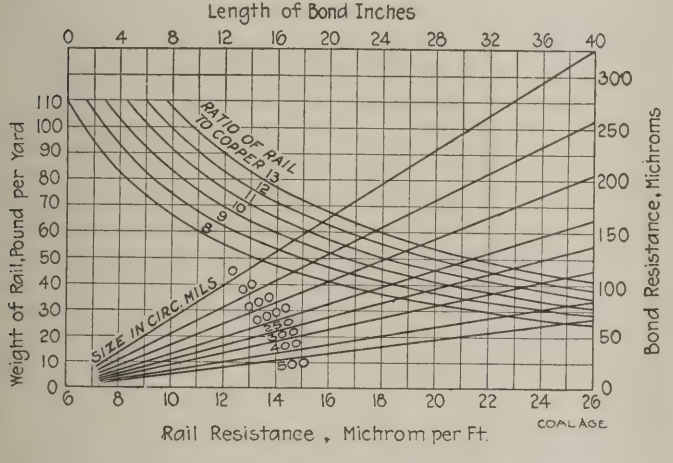
Ques.—A 50-hp. blowing fan, located one-half mile from the power house, is to be driven by a 250-volt motor. The generator at the power station delivers 275 volts. (a) What size of wire should be used to connect the motor and generator? (b) At 20c. per lb., what will be the cost of T. B. W. P. copper wire, for this job?

JOHN J. CRANE.

Connerton, Penn.

The electric power required to drive a 50-hp. fan is $50 \times 746 = 37{,}300$ watts. The current required to operate a 250-volt motor so as to supply this power is $37{,}300 \div 250 =$ say 150 amp. Since the generator at the station delivers 275 volts, and the motor requires only 250, there is a permissible line drop of $275 - 250 = 25$ volts.

The accompanying combined diagrams, adapted from the publications of the Ohio Brass Co., furnish a convenient method of determining the electrical resistances of steel rails of different weights per yard and of compressed-terminal bonds of different size and length. The lines curving downward from left to right are the resistance curves for different "rail-to-copper ratios."



RESISTANCE DIAGRAM FOR BONDED RAILS

In using this diagram to find the resistance per foot in microhms for any given weight of rail, follow the horizontal line corresponding to the given weight per yard of rail shown by the scale on the left of the diagram, until this line intersects the curved line of the proper rail-to-copper ratio. From this intersection, follow the vertical line downward to the scale at the bottom of the diagram, which gives the microhms of resistance per foot of rail. For example, assuming a 40-lb. rail having a rail-to-copper ratio of 12 : 1, the resistance per foot of rail, as found by the diagram, is 25 microhms, or 0.000025 ohm. If the rails are 30 ft. long, the resistance of each rail is $30 \times 0.000025 = 0.00075$ ohm.

Now, assuming a 24-in., 4-0 bond, follow the vertical line marked 24 on the scale at the top of the diagram downward to its intersection with the diagonal line marked 0000, and from this intersection follow the horizontal line to the scale on the right, which will give the required resistance of the bond in microhms. In the present case, the resistance of the 24-in., 4-0 bond is 100 microhms, or 0.0001 ohm.

Adding this resistance for a single bond to that for a single 30-ft. rail, the total resistance for a bonded rail is $0.00075 + 0.0001 = 0.00085$ ohm. The number of rails in ½ mile is $2640 \div 30 = 88$. The bonded rail resistance, in this distance, is then $88 \times 0.00085 = 0.0748$ ohm. This is the resistance for a single line of rail. The track resistance (two rails) for the same distance is one-half that for a single rail, or 0.0374 ohm.

Now, multiplying this resistance by the current (150 amp.), the voltage or pressure absorbed by the rails of the track, on the return end of the circuit, is

$$E = CR = 150 \times 0.0374 = 5.61 \text{ volts.}$$

Then, allowing for possible loss of pressure through imperfect connections at the rail joints, and assuming, say six volts on the return end of the circuit, the permissible drop of pressure in the trolley line is $25 - 6 = 19$ volts.

Finally, the size of trolley wire required to transmit a current of 150 amp., with a line-drop of 19 volts, is then calculated as follows:

$$\text{Circ. mils} = \frac{21.6 \times 2640 \times 150}{19} = \text{say } 450{,}200$$

The weight of a triple-braid, insulated copper wire of this capacity, as taken from manufacturers' tables, is 1724 lb. per 1000 ft., or 1.724 lb. per ft. At 20c. per lb., one-half mile of this trolley wire will cost $2640 \times 1.724 \times 0.20 = \$910.27$.

Wind Pressure

What is the best method of estimating the pressure exerted on a flat surface by a wind traveling at a certain velocity, say 60 miles per hour?

ENGINEER.

Denver, Colo.

From experiments performed by the U. S. Weather Bureau, for the purpose of determining, if possible, the exact relation existing between the velocity and pressure of straight, surface winds, it was found that this relation is best expressed by the formula

$$p = 0.004 \frac{B}{30} v^2$$

Thus, for a velocity of $v = 60$ mi. per hr., when the barometric pressure is $B =$ say 28 in., the pressure of a straight wind, normal to a flat surface, is

$$p = 0.004 \frac{28}{30} 60^2 = 13.44 \text{ lb. per sq.ft.}$$

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—In case of an explosion, at a shaft mine in your district, where many workmen are yet in the mine, and you were the first person on the ground after the accident, how would you organize and conduct the work of rescue?

Ans.—Until someone higher in authority underground than yourself arrives, call for volunteers; have the foremen and all firebosses notified at once; note the effect of the explosion by the indications observable at the upcast or downcast shafts, and inspect hurriedly the ventilating apparatus, which, if damaged, must be repaired as quickly as possible; arrange for the speedy equipment of rescuers with safety lamps, tools, supplies, etc.; and, having instructed the regular rescue and first-aid corps to proceed, if possible, into the mine by the most accessible opening, follow this with the organization of other rescuers chosen from among the most competent and experienced of the volunteers.

The entrance of the mine will depend wholly upon conditions, but, in general, must be effected through the intake openings, following the intake air current and making such hasty repairs as are possible and necessary to conduct the air current into the mine. The force of volunteers should be divided into two gangs, the more experienced men advancing to make the necessary exploration and repairs, while the others are employed to furnish the first party with any needed supplies and perform such other services as are desired. The mine should be explored thus in sections, taking special precaution to extinguish any fires that may exist after the explosion and to properly control the ventilating current until each section is reported safe.

Ques.—What are the advantages and disadvantages of the different kinds of mining machines, with respect to health, safety and economy?

Ans.—There are two general types of mining (coal-cutting) machines; namely, those driven by compressed air and electricity, respectively. Compressed-air machines have the advantage of furnishing a certain amount of fresh air at the working face, through the exhaust of the machines. They have the disadvantage of requiring a more permanent and less flexible installation of a pipe system to conduct the air to the working face. Electrical machines possess the advantage of having a light flexible installation through a system of wires by which the current is conducted to the working face. This system possesses the disadvantage, however, of possible danger to men and animals through contact with live wires or the ignition of gas when present, by the short-circuiting of wires or sparking of switches and other connections. Both of these systems possess the disadvantage of being interrupted by a possible fall of roof breaking the power line. In respect to economy, the question depends wholly on conditions in the field and whether a compressed air or electrical installation is already in use in the mine.

Ques.—If an air current of 20,000 cu.ft. per min. is circulated in an airway by 3.15 hp. and this current is increased to 40,000 cu.ft. per min., what will be the water-gage reading?

Ans.—The question is not complete, since it fails to state the cause of the increase of circulation from 20,000 to 40,000 cu.ft. per min. This increase in quantity may be due to an increase of *power*, in which case the pressure and water gage will vary as the square of the quantity; or, the power remaining the same (3.15 hp.), the increase in circulation may be due to the short-circuiting of the air current or the splitting of the air into two currents. We have, therefore, two cases, as follows:

1. When the power is increased to double the quantity, the water gage increases as the square of the quantity, and becomes four times the original water gage, for the same conditions in the mine.

2. If the power remains constant and the air current is short-circuited or split, the water gage varies inversely as the quantity of air in circulation. In this case, the air being doubled, the water gage will be reduced to one-half the original gage.

Ques.—What are the requirements of the law regarding measuring the ventilation, and how can the air current be measured? *Anthracite, Penn.*

Ans.—Once each week, the inside foreman, or his assistant, must measure the quantity of air in circulation with an anemometer or other efficient instrument, such measurement to be made at the inlet and outlet airways, also, at or near the face of each gangway and at the crosscutting nearest to the face of the inside and outside chamber or breast where men are employed. A report of these measurements must be sent to the inspector before the twelfth of each month, for the preceding month, together with a statement of the number of persons employed in each district of the mine.

The reading of the anemometer, divided by the number of minutes the instrument was exposed to the current, gives the velocity of the air in feet per minute. If care has been taken to obtain an average reading for the entire section of the airway, the area of this section multiplied by the indicated velocity of the current gives the quantity of air passing in feet per minute.

Ques.—Name two explosives in common use in blasting coal in gaseous mines.

Ans.—The permisible explosives as classified by the Federal Bureau of Mines will be found in Miner's Circular No. 6, pp. 15-16. Of these, perhaps the ones in most common use, are monobel, Nos. 2 and 3, and carbonite No. 1. Monobel No. 2 has about the same strength as a 40-per-cent. dynamite cartridge of the same size, but is much slower in its action, which feature adapts it to the mining of coal. This powder is practically without smoke or fumes and belongs to the ammonium-nitrate class of explosives. Carbonite No. 1 belongs to the nitroglycerin class of explosives and has about the same strength as monobel No. 2.

Book Reviews

PRACTICAL COAL MINING. By leading experts in mining and engineering under the editorship of W. S. Boulton, professor of geology, University College, Cardiff, Wales. 6 vol. In all 1197 pp. and 14 pp. of index. Well illustrated. 6¾x10⅛ in. Cloth bound. Also a booklet containing "manikin" of a winding engine 8x11¼ in. Paper bound. The Gresham Publishing Co., James Wolffsohn, controlling agent for U. S. sales, 11 Broadway, N. Y. Price, $12.

The reader will probably say when reading the above description: Why cannot we have a good book on coal mining published in America which will sell for a price equally reasonable? Unfortunately, so far no book of reasonable price has appeared from the press of this country, though in many ways a book published in America for Americans would better meet the demand of the market.

Yet we are far from denying that a foreign book has the advantage of a new viewpoint, and a man who is broad enough to comprehend the similarity of the problems and to differentiate them when they are unlike will be able to learn a great deal from this treatise. It must be acknowledged that while it is a foreign book, it is largely with such publications that it must compete, and for many years our mining libraries have contained at least as many English books as American.

The book has the merits of authority and modernity. The date 1913 on the title page is borne out in the text, though we think the remarks on the electric lamp by James Ashworth make no attempt to be abreast with the times. The reader will hardly recall the Trouvé, Sussmann, Bristol, Headland and Coad lamps which occupy the whole electrical field in Ashworth's treatment.

In Vol. I "The Geology of the Coal Measures" is acceptably treated by the editor himself. The illustrations are all from British examples, but most of the conclusions are broad enough to have a trans-Atlantic value. The account of the British fields is short and the author wastes no time in describing the continental coal measures. The "Composition and Analysis of Coal," by C. A. Seyler, public analyst for Glamorgan, Carmarthen, Pembroke and Swansea, follows.

BRITISH ANTHRACITE

His classification of coal is far more minute than is customary here. There are no less than 15 different divisions for coal varying from ortho-anthracite to lignitious coal. This first has from 3 to 8 per cent. of volatile matter, and Mr. Seyler says that the coal corresponds to the true anthracites of South Wales and America. The volatile matter in American anthracites roughly runs between 1.25 and 9 per cent., so it is clear that South Wales has coal which can be fairly designated as anthracite, according to even the narrowest interpretation of the term. The ortho-anthracite coals mentioned in the list are Capel Ifan, Trimsaran Green seam, Ynisgeinon, near Llanelly; Pwllfaron, near Neath; Cwmclick Upper or Penygraig seam; Pwllfaron 18-ft. seam, and the Trimsaran Gregog seam.

But while we, in America, agree with Mr. Seyler's definition of anthracite, we shall find it hard to call all pure coal containing less than 84 per cent. total carbon a lignitious coal. The Bruceton coal, according to this classification, would be bituminous, it is true, but the author would qualify it as per-para-bituminous. Not one analysis is given of either coal or ash. Nothing is said about sulphur. Most English books are incomplete in this regard as compared with American, but we cannot recall any as silent on this subject as is this one.

"Trial Borings" is well treated by H. F. Bulman, and "Shaft-Sinking," by Henry Louis, professor of mining, Armstrong College, Newcastle-on-Tyne, England. The latter is complete in all branches of the subject. "Breaking Ground" also falls to H. F. Bulman, and this subject covers explosives, shotfiring, drilling, the driving of rock headings and the mining of coal.

ENGLAND ALSO HAS SUBSIDENCE PROBLEMS

Methods of working and timbering are described by E. H. Robertson, professor of mining engineering, Calcutta, India. The description of roof strains is quite incomplete. However, we are glad to see the writer disagrees with the singularly ill-informed views of M. Fayol and M. Callon. It is interesting to note also that he states that: "Many towns in the United Kingdom have been undermined either wholly or partially. In Northumberland, on the west side of Newcastle-on-Tyne, 50 per cent. of the coal was extracted, while at Chorley, in Lancashire, 75 per cent. of the underlying coal at a depth of about 300 ft. has been worked. Many other instances, such as South Shields, Barnsley and Oldham, might be given."

"Haulage" is treated by G. R. Thompson, professor of mining, University of Leeds, and "Winding," that is, hoisting, by Charles Latham, professor of mining and mining engineering at Glasgow University. W. E. Lishman treats on "Pumping" and dams. Here are treated both rotary and air-lift pumps. "Ventilation" falls to the well known H. W. G. Halbaum, and he treats it in an historical and theoretical way. We are disappointed to see the Waddle, Walker, Shick and Capell fans alone treated and not in an adequate way. Nothing is said of the multiblade types. W. E. Lishman discusses "Transmission of Power in Electricity—Steam, Compressed Air and Hydraulics," and James Ashworth, whom our readers all know, the subject of "Lighting." While not strictly up to date, this department will be found fully as interesting as Mr. Ashworth's other writings.

No less a person than W. Galloway, formerly an inspector of mines, writes on "Colliery Explosions and Rescue Appliances." H. F. Bulman deals with mining law under the head of "Mineral Holdings," while "Mine Surveying" falls to L. H. Cooke, who treats the subject at considerable length. S. Warren Price, lecturer on mining at University College, Cardiff, discusses "Preparation of Coal for the Market," and some of the English methods of cleaning and screening are well worthy of investigation. W. Galloway takes up the consideration of "Coking and the Recovery of By-products." Nothing shows more clearly how much further British practice has advanced than ours than the fact that Mr. Galloway entirely ignores the beehive and belgian types of ovens, and nobody makes good his omission. H. Stanley Jevons, lecturer in economics and political science at University College, Cardiff, with David Evans, contributes "Economics of Coal," in which is treated supply and demand, opening of mines, profits, marginal productivity, size of operation, interest, wages, sliding scales, conciliation boards, wage scales, abnormal places, the strike of 1912, colliery legislation and its effects, housing, price regulation, marketing and shipping.

The chart we have called a manikin is a dissected illustration of a winding engine, prepared in a manner similar to the reproductions of the human body for studies in elementary physiology.

INTERNATIONAL CONFERENCE OF MINE-EXPERIMENT STATIONS. Compiled by Geo. S. Rice. Bulletin 82 of the Bureau of Mines. 5⅞x9⅛ in. Paper cover.

This report gives not only an account of the conference but several interesting and hitherto unpublished papers read before the meeting. For instance there is the statement of Horace C. Porter that "Experiments in which powdered coal was heated to 100 deg. C. (212 deg. Fahr.) in a current containing 50 per cent. oxygen have proved that the process of absorption of oxygen by coal (not producing carbon dioxide) is exothermic" that is heat giving. "Furthermore, the carbonaceous material absorbs oxygen more rapidly than does pyrite, this showing that oxidation of pyrite is not the principal factor in spontaneous combustion. Coal subjected to this action, the absorbing of oxygen without forming carbon dioxide, decreases in calorific value which is another evidence, as Taffanel has pointed out, that the action is exothermic."

He then goes on to show that coal artificially dried will rise rapidly in temperature when it takes up water. A few drops of water added to coal dried at 212 deg. Fahr. raised its temperature 23.4 deg. Fahr.

J. K. Clement stated that carbon dioxide deadened flame more than nitrogen. When 95 per cent. of the nitrogen of ordinary air is replaced by the dioxide of carbon, no mixture of such "air" and natural gas would explode in a gas pipette. This he ascribes to the greater specific heat of carbon dioxide which is 10.6, whereas that of nitrogen is only 7.2. There are several other interesting papers by G. S. Rice, L. M. Jones, J. K. Clement, H. C. Porter, J. W. Paul, H. H. Clark, A. C. Fieldner, G. A. Burrell, C. Hall and O. P. Hood.

Coal and Coke News

WASHINGTON, D. C.

The Interstate Commerce Commission has sent to the Senate during the past few days a reply to the resolution of some time ago in which Congress requested an investigation of the relation of common carriers to coal and oil and the transportation thereof. This particular report deals with the relations of trunk lines and their officials to coal operations in the State of Illinois and incidentally in the State of Indiana.

Answering the first element in the resolution, namely, whether and what carriers are interested in the coal they transport, the commission says that the Atchison, Topeka & Santa Fé owns the bonds of the Toluca Coal Co. which owns about 12,000 acres of coal lands and operates one mine with a daily capacity of about 1500 tons; that the Chicago & Northwestern Ry. owns the entire capital stock of the Superior Coal Co. and of various others producing about 2,000,000 tons of coal annually, the majority thereof being sold to the Northwestern.

The Chicago, Indianapolis & Louisville Ry. owns practically all of the capital stock of the Chicago & Indianapolis Coal Co. and is interested in various other coal concerns. The Missouri Pacific controls the capital stock of the Western Coal & Mining Co. which ships its coal over this same road. The Chicago, Milwaukee & St. Paul Co. owns the capital stock of the St. Paul Coal Co. which operates two mines yielding about 660,000 tons a year, the bulk of this being sold to the railway. The Illinois Central Railroad Co. indirectly owns the stock of the Madison Coal Corporation, which operates some six mines with a daily capacity of 10,400 tons.

Other railway companies and their coal ownership are described in like manner at great length.

In connection with the second part of the inquiry, namely, whether any of the officers of the roads or any persons charged with the duty of distributing cars to shippers are interested in coal operations, the commission finds that on the Toledo, St. Louis & Western, several officers were formerly interested in coal companies but that sundry of them have recently disposed of their stock. The Chicago Junction R.R. Co.'s president owns the stock of the Grant Coal Mining Co.

On the Missouri Pacific and St. Louis & Iron Mountain it was found that an indirect connection existed between the roads in question and the "Big Muddy" Coal & Iron Co. Three traffic officials of the Southern Railway Co. own small blocks of the securities of the Southern Coal & Mining Co. Possibly the most extensive treatment is given to the relations between the New York Central and the coal mines. On this the report says:

W. C. Brown and certain other officials of the New York Central lines were active in the promotion of two companies operating in Saline County—the Saline County Coal Co. and the O'Gara Coal Co.—and formerly owned large blocks of the securities of those firms; most of these persons, however, have now disposed of their holdings. The Saline County Coal Co. was incorporated in April, 1907, with a capital stock of $375,000. It later issued bonds to the amount of $300,000.

In October, 1908, the bonded indebtedness of the Saline County Coal Co. was increased to $1,000,000, of which there is said to be now outstanding $574,000. In July, 1910, the capital stock was increased to $1,250,000 of which there is said to be now outstanding $689,125. According to the record, the Saline County Coal Co. holds about 7000 acres of coal lands and mineral rights, about 80 per cent. of which is leased from the Cleveland, Cincinnati, Chicago & St. Louis Ry. Co. as indicated hereinbefore. The coal company owns three mines, one of which has been worked out and abandoned; the other two were constructed with the proceeds of the later issues of bonds and stocks and are located on property leased from the railway company and others.

The Saline County Coal Co.'s production for shipment is said to be from 80 to 100 cars of coal per day, part of which is sold to the New York Central Lines for locomotive fuel and the remainder commercially. It is understood that this company has recently acquired the control of the Harrisburg Southern Coal Co., operating a mine near Eldorado, in the State of Illinois.

The O'Gara Coal Co. was incorporated in July, 1905, and took over for development properties consisting of coal lands and mines which had been secured under options several months previously by Thomas J. O'Gara and others. The company was capitalized at $6,000,000 and later issued bonds to the amount of $3,000,000. It holds at present by lease and ownership more than 30,000 acres of coal lands and mineral rights in the Harrisburg district. It owns about 14 mines, 2 or 3 of which are now worked out and closed down. The company is said to produce for shipment from 200 to 300 cars of coal per day, a large part of which is sold to the New York Central Lines for locomotive purposes and the balance to other carriers and industries in Chicago, the West, and Northwest. In September, 1913, the O'Gara Coal Co. went into voluntary bankruptcy, and receivers in the persons of Thomas J. O'Gara and Fred A. Busse were appointed by the court to administer its affairs.

Additional Questions Discussed

The Commission goes on to discuss the various additional questions presented to it, such as the existence of contracts or conspiracies in restraint of trade to which coal carriers are parties and points out that the United States Steel Corporation controlled large mineral rights and railway communications therewith in Illinois.

As to the requirement that it report how the mines are treated in the distribution of cars the Commission says:

The problem of equitable car distribution is composed of two factors—(1) The ratings of the mines and (2) the actual distribution of equipment in accordance therewith. The purpose of a carrier in fixing ratings for mines on its lines is to determine the basis upon which each shall share in the equipment available for coal loading during the periods when the supply of cars is insufficient to meet all requirements. At such times it becomes necessary to place some restriction upon all the mines, and in order to do this impartially the practice of rating them and distributing the available equipment pro rata, on the basis of such ratings, has been adopted.

Many of the Illinois roads have published rules governing the ratings of mines and the distribution of cars among them, and practically all have some definite plan of handling car-shortage situations. These rules and plans, however, are not uniform on the several roads; on the contrary, each has endeavored to solve its own problem independently. A great deal of dissatisfaction has been felt by mine operators with the various systems of ratings and distribution, and numerous allegations of unfairness and discrimination have been made.

The result has been considerable litigation before this Commission and the courts. Generally speaking, Illinois roads rate the mines served by them on the basis of commercial capacities of the mines. If fair and correct methods of determining the relative capacities of mines are used, this may afford a reasonably equitable basis for rating, but, unfortunately, this has not always been the case.

A Radical Change in the Clayton Bill

In reporting the Clayton trust bill, on July 22, to the Senate, the Judiciary Committee of that body made, as the new draft of the measure shows, an important change in the form of the bill sent over by the House of Representaties, insofar as relates to mining. The Committee has left out of the bill entirely Section 3 which read as follows:

That it shall be unlawful for the owner, operator, or transporter of the product or products of any mine, oil or gas well, reduction works, refinery, or hydroelectric plant producing coal, oil, gas, or hydroelectric energy, or for any person controlling the products thereof, engaged in selling such product in commerce to refuse arbitrarily to sell such product to a responsible person, firm, or corporation who applies to purchase such product for use, consumption, or resale within the United States or any Territory thereof or the District of Columbia or any insular possession or other place under the jurisdiction of the United States, and any person violating this section shall be deemed guilty of a misdemeanor and shall be punished as provided in the preceding section.

Speaking of the reason for striking out this section, the Judiciary Committee says: "It would primarily deny freedom of contract to one of the parties, and consequently be of doubtful constitutional validity. Passing from this consideration, the Committee believes that such an enactment, which would practically compel owners of the product named to sell to anyone or else decline to do so at the peril of incurring heavy penalties, would project us into a field of legislation at once untried, complicated, and dangerous."

Little Progress in Investigation

In spite of continuous hearings during the past week, before the Senate Committee investigating the conditions of southern coal traffic with a view to ascertaining how far a so called trust exists in that trade, comparatively little progress has been made.

B. L. Dulaney, an independent coal operator of Bristol, Va., has made a long series of charges regarding the alleged policy of the Southern Ry. in connection with the handling of coal originating in the Southwestern and Appalachia fields. These charges have been answered by various persons, including Fairfax Harrison, president of the Southern Ry. and others, it being a claim that the Southern has not had any hand in driving individuals out of business or in

hampering one set of coal dealers in order to promote the interests of another.

One of the main points made by witnesses against the Southern Ry. was that directors of that road were also directors in other enterprises which did business with the road, particularly in coal enterprises of various kinds. This relationship has not been denied, but the claim has been strongly urged that none of the persons named have exerted an undue or improper influence in regard to the Southern's treatment of shippers and that all of them without exception have carefully recognized the line of division between their functions in connection with the road and their interests in other directions.

The whole investigation has had a tendency to drag and prediction is now made that little will come of it except the usual formal report with some reference to the undesirability of interlocking directorates and possibly criticism upon which the investigation seems to have disclosed some sidelight.

PENNSYLVANIA

Anthracite

Dunmore—Residents of the Green Ridge section of Dunmore are assured of surface support through an amicable settlement on July 23 of the appeal of Colonel George Sanderson and others, owners of the coal, from the assessment placed upon the mineral by the county commissioners. With counsel agreeing, Judge Newcomb made an order reducing valuation from about $60,000 to the nominal figure of $25,000. The order reads that the coal now in the tract is not to be disturbed, and that if in later years it is removed, those taking it from the ground must provide sufficient artificial support for the surface.

A petition was recently filed asking for the dissolution of the Nay Aug No. 4 Coal Co. This firm was organized in March, 1908, with offices in Dunmore. The petition states that the company has no debts, liabilities, or assets, and has all state taxes fully paid.

Carbondale—Estimating that at least 100 tons of coal is stolen daily and determining to put a stop to this practice, officials of the Delaware & Hudson Co. have issued orders for the road detectives to keep close watch on persons who pick coal from cars stored in yards along the line. It is said that the company is not opposed to coal picking from the ground, but of late inroads have been made on loaded cars, and this the officials are determined to stop.

Pottsville—The Philadelphia & Reading Coal & Iron Co. has caused great surprise by raising the price of coal in this part of the anthracite region 11 cents per ton, with a statement that another raise may be made shortly. As this region has never been allowed the spring reduction of 50 cents per ton, it has never heretofore figured on the monthly increase of 10 cents. The public is unable to understand the attitude of the mining company. It is believed, however, that the Reading is making this advance in price at the mines, anticipating a decision favoring lower freight rates on anthracite to Philadelphia.

Bituminous

Pittsburgh—Coal companies which have been making shipments to the lakes for Northwest markets under a reduced rate for some weeks past were recently notified that the last of the large coal storage docks on the upper lakes have been filled up, and further shipments to that point would have to cease until the congestion diminishes. According to reports, this change will not be possible before the middle of August when the grain movement from the Northwest starts.

Somerset—The second annual Somerset County Miners first aid meet under the direction of the industrial committee of the state Young Men's Christian Association was held July 25, in charge of George B. Landis, of Harrisburg, and A. W. Harris, of the U. S. Bureau of Mines. Prizes for the various events were as follows:

One-man event, Ralphton team of the Quemahoning Coal Co. Two-man and three-man event, Myersdale team, No. 1 of the Consolidation Coal Co. Team event, first prize, Orenda No. 2 team, of Somerset Smokeless Coal Co. Second prize, Jerome No. 2 team, of the Jenner Quemahoning Coal Co.

Ralphton—The contest between the Jenner Brewing Co. and the Quemahoning Coal Co. over the selling of beer in this town, which is owned by the coal company, is to be taken to court. A mine foreman was arrested several days ago while carrying out the company orders to prevent the delivery of the brewing company's product in the town. It is claimed that a similar case has already been decided in favor of the seller in a contest between a merchant of Fayette County and a coal company which owned a town there. It is said that this case, if it goes against the coal company, will have the effect of opening all the coal towns in Somerset County to merchants, brewers or others who may desire to sell articles, regardless of the fact that the coal companies may own the land, streets, houses and industries of the community. The case will be watched with considerable interest because of the issue involved.

Du Bois—A meeting of mine foremen, assistant mine foremen and fire bosses has been called for July 28, at which time endeavors will be made to organize a Mine Officials' Beneficial Corporation. The object is mutual benefit through sick, accident and death payments to its members. Only mine officials will be eligible for membership. At present mine officials are without benefits, other than those provided by the coal companies.

Ache Junction—The new plant of James H. Hoover will consist of 100 beehive ovens of the large pattern equipped with mechanical drawers and loaders. His present plant, which is known as Hoover, consists of 74 ovens.

Rockwood—The big wooden frame tipple of the Bradenburg Coal Co. was totally destroyed by fire on the morning of July 20, entailing a loss of several thousand dollars. The cause of the fire has not been ascertained.

WEST VIRGINIA

Matewan—The Stone Mountain Coal Corporation with headquarters at Roanoke is installing at its Marvin mines Nos. 1 and 2 the weigh check system, which will be in operation in the course of a short time. These will be the only mines in this part of the state using the mine scales, and operators are much interested to know what the final outcome will be.

Charleston—After being idle since June 1, the Winifrede Coal Co. has resumed operations. Since the strike was settled throughout the Kanawha field about two weeks ago, there has been a shut-down at the Winifrede mines on account of failure to have sufficient orders to justify operations. About 400 men will be employed at Winifrede.

Kingwood—Mine No. 4 of the Elkins Coal & Coke Co. recently resumed operations after a shut-down of several months. The resumption of work at this mine is an indication of the picking up of the coal market, which has been on a bad slump for several months past. A gradual increase is expected from now on. When running full No. 4 mine gives employment to about 200 men, approximately half of which are at present employed in this operation.

ALABAMA

Birmingham—Thirty-three out of 59 miners standing examination the past week for first and second class certificates and for fire boss positions passed. J. F. Young of Palos, Ala., won the highest mark, this being 97. He was standing examination for fire boss. E. M. Owens of Pratt City received the highest mark for first class certificate ,receiving a grade of 92½. Mr. Owens is at present an engineer of the Tennesee Coal, Iron & R.R. Co. The class was the largest ever handled by the Examining Board.

KENTUCKY

Barbourville—Full time operations are the rule at most of the mining plants in the southeastern section of Kentucky, according to the leading operators hereabouts, and it is expected that the next few weeks will see operations active. Harlan County has advanced to a front rank in the list of coal producing localities as a result of numerous prosperous mining plants. The largely increased output of the Harlan mines is taxing the facilities of the Louisville & Nashville R.R. to handle the coal turned over to it for transportation.

OHIO

Zanesville—A $2,000,000 merger in the coal, sand and brick business was completed here recently, the companies in the deal being the Northern Coal Co., the Monitor Coal Co., the T. B. Townsend Brick & Contracting Co., and the L. K. Brown Sand Co. The new concern will be known as the Burton-Townsend Co. The capacity of the operating plants will be quadrupled. The company owns 300 acres of coal lands and has options on several thousand more.

Columbus—Although the Lloyd conservation bill, passed in the recent one-day session of the legislature, gives the state exclusive ownership and control of all minerals on school lands, it is announced by State Auditor A. V. Donahey that there is no intention to attempt to operate oil or coal properties. The enactment of the law was followed by rumors that the state would take possession of and operate coal and oil lands, but this is not to be done. Instead, matters will be adjusted with persons now operating on state land on a royalty basis, which is expected to prove mutually satisfactory.

INDIANA

Linton—Eighty men at Vandalia mine No. 9 recently went on strike and the mine closed down. The company desired to put two men in entries and the miners refused to allow more than one.

Terre Haute—The Fauvre Coal Co., Indianapolis, has leased its mining property west of this city to the recently incorporated Sunbeam Mining Co., owned by the Harder and Hafer interests of Chicago and James McClellan, the veteran operator of Brazil. The lease covers 823 acres and a mine. It runs for ten years. The Fauvre company will receive a royalty of 3 cents per ton on mine-run and 5 cents on 1¼-inch and above, its royalty not to amount to less than $3000 a year.

ILLINOIS

Virden—Mine No. 2 of the Montour Coal Co., located at Virden, has been closed for repairs.

Andrews—The Cora Coal Co. has resumed operation at its mine located at Andrews, near Springfield. The top works of this mine were burned March 17 last and an up-to-the-minute steel equipment with shaker screens has been erected capable of loading five sizes at the same time.

Springfield—The Springfield Mining Co. has opened up the No. 5 mine, which has been idle since last winter, when the above named company went into the hands of a receiver. There are rumors that a new escapement shaft will be put down in the near future.

Mines throughout this district are working a little better, business having been poor for some time.

Belleville—It is rumored that a deal involving the transfer of more than $5,000,000 worth of coal lands including 30 mines on the Illinois Central R.R. between Belleville and Coulterville, Ill., will be consummated within the next 30 days. It is said that already options on 25 mines in the Belleville district have been given a French syndicate which is seeking a strong foothold in this region. The list includes among the larger mines Marissa, Coulterville, Freeburg, and New Athens.

MISSOURI

Kansas City—The chief stumbling block between the Southwestern Interstate Coal Operators' Association and the mine workers of Missouri, Kansas, Arkansas and Oklahoma was removed recently when a method of conducting future arbitrations was adopted. The new plan is modeled after that in effect in Illinois and one or two other states. It does away with the one-man board of arbitration, and provides for a board of six men in each district. Three operators and three representatives of the U. M. W. of A. will constitute the board. John Steel, of Pittsburg, Kan., has heretofore held the office of arbitrator. Many of the miners are anxious for him to finish his term. The wage scale and other matters are now being taken up by the association and miners.

ARKANSAS

Fort Smith—Franklin Bache, head of the Bache-Denman Coal Co., was appointed receiver for nine companies on July 25, following a voluntary petition filed in the United States District Court at Fort Smith. The companies affected are: Coronado Coal Co., Mammoth Vein Coal Co., Mammoth Vein Coal & Mining Co., Prairie Creek Coal & Mining Co., Hartford Coal Co., Bache-Denman Coal Co., Sebastian County Coal Co., Denman Coal Co. and Kali-Inla Coal Co. Five of the companies lost their surface plants in a riot on July 17. As a result of this destruction of property, 71 indictments have been returned by the Sebastian County grand jury. At least two employees of the coal companies were killed.

TEXAS

Fort Worth—The old wage scale existing between District No. 21, U. M. W. of A., and Texas operators, was renewed at Fort Worth on July 24. A new arbitration plan was adopted, providing that an arbitrator shall act at the scene of the trouble and that either side can appeal from his decision to the general arbitration board of three miners and three operators.

FOREIGN NEWS

Berlin, Germany—The Kaiser Wilhelm Institute for coal mining research will shortly be opened in Mülheim-im-Ruhr. This institute is a branch of the Kaiser Wilhelm Society for Scientific Research, of Berlin, but its scope is so important that it has been established as an independent concern. The municipality of Mülheim-im-Ruhr which is in the heart of Germany's richest coal belt has provided $175,000 for erecting the institute building.

PERSONALS

J. P. Crutsinger, manager of the Exchange Coal Mining Co. of Wellington, Mo., has resigned to locate in Mexico. He has been succeeded by Henry Mignery.

Charles K. Scull, a prominent coal merchant and secretary of the Philadelphia Coal Exchange, was elected Imperial Modoc, the highest ranking office, at a recent meeting of the Order of Kokoal.

J. D. Cain, of Pineville, Ky., has been appointed Assistant State Inspector of Mines for a term of four years, beginning Aug. 1. Mr. Cain succeeds Perry V. Cole, also of Pineville, and who has held the office for some time.

A. W. Hesse, formerly assistant chief engineer with the Consolidation Coal Co. of Fairmont, W. Va., has accepted the position of manager with the Lincoln Coal Mining Corp., a new concern with mines located at Big Creek, W. Va.

John O'Conner, who for 10 or more years has been identified with the office of the Rochester & Pittsburgh Coal Co., at Punxsutawney, Penn., has gone with the Brush Creek Coal Co., at Aultman, Indiana County. His new position will be auditor and assistant treasurer.

Hywel Davies, of Louisville, formerly one of the best known coal operators in the state, now business manager of the Kentucky State University, recently underwent an operation for appendicitis at the Good Samaritan Hospital, at Lexington. He is reported to be progressing favorably. He was one of the mediators selected to try to bring about a settlement of the recent Colorado mine troubles and formerly was president of the Kentucky Mine Operators' Association.

RECENT COAL AND COKE PATENTS

Boiler. A. C. Wood, Philadelphia, Penn. 1,097,599. May 19, 1914. Filed May 14, 1913. Serial No. 767,511.

Mine Door Closer. T. Ramsey, Roslyn, Wash., 1,100,690, June 16, 1914. Filed July 17, 1913. Serial No. 779,643.

Gas Producer. C. Whitfield, London, Eng. 1,096,774. May 12, 1914. Filed Feb. 3, 1914. Serial No. 816,163.

Ash Pit Dumper. T. E. McCall, Wilmington, Del., 1,100,982, June 23, 1914. Filed Oct. 31, 1913. Serial No. 798,417.

Mining and Loading Apparatus. F. Billings, Cleveland, Ohio. 1,095,786. May 5, 1914. Filed Jan. 17, 1910. Serial No. 538,408.

Coal Washer. Henry Cory, Dormont Borough, Penn. 1,095,817. May 5, 1914. Filed Mar. 25, 1913. Serial No. 756,691.

Automatic Stoker. W. C. A. Henry, Columbus, Ohio. 1,096,106. May 12, 1914. Filed Aug. 7, 1912. Serial No. 713,924

Apparatus for Cleaning Smoke. J. D. Jackson, Kensington, Australia, 1,100,307, June 16, 1914. Filed Aug. 26, 1913. Serial No. 786,763.

Coal Washer. H. Shannon, assignor to Link-Belt Co., Chicago, Ill., 1,100,921, June 23, 1914. Filed Sept. 7, 1907. Serial No. 391, 762.

Drying Coal Slimes. H. Brune and H. Horst, Neustadt-on-the Hardt, Germany, 1,100,710, June 23, 1914. Filed Oct. 28, 1912. Serial No. 728,272.

Mining Machine. A. H. Gibson, assignor to Ingersoll-Rand Co., New York, N. Y. 1,096,031. May 12, 1914. Filed Sept. 7, 1912. Serial No. 719,186.

Device for Emptying Upright Coking Chambers. A. Gohmann, Stettin, Germany. 1,095,725. May 5, 1914. Filed Jan. 17, 1913. Serial No. 742,548.

Apparatus for Consuming Smoke in Locomotive Furnaces. G. de Grahl, Zehlendorf, Germany. 1,095,629. May 5, 1914. Filed July 22, 1912. Serial No. 710,971.

Gas or Smoke Washer. O. M. Foster, assignor to American Smoke Washing Co., Cleveland, Ohio. 1,096,501. May 12, 1914. Filed July 8, 1912. Serial No. 708,133.

Means for Utilizing the Residual Heat of Coke Produced in Vertical Gas Retorts. H. J. Toogood, Elland, England. 1,101,477, June 23, 1914. Filed June 25, 1912. Serial No. 705,766.

CONSTRUCTION NEWS

Macdonaldton, Penn.—The Brothers Valley Coal Co. has placed a contract with the Roberts & Schaefer Co. for the building of a second Marcus patent coal tipple, which will be installed at Macdonalton, Penn.

Pottsville, Penn.—It has been unofficially stated that the Philadelphia & Reading Coal & Iron Co. will in the future plan to erect a large power house at Pottsville, which will supply power to all parts of the Schuylkill Valley, and down as far as Philadelphia.

Huntington, W. Va.—Three large coal mines will shortly be opened on the Main Island Creek branch of the Chesapeake & Ohio R.R. Hunt & Forbes, the wellknown firm of contractors have closed contracts with the mining companies to lay side tracks to the new mines.

Baltimore, Md.—The city is now preparing a plan for harbor dredging that will enable deeper draught vessels to come into the inner harbor. This will permit some of the larger vessels to coal at the Locust Point pier of the B. & O. instead of lightering fuel or going to Curtis Bay.

Herrin, Ill.—The Chicago & Carterville Coal Co. has awarded a contract to the Roberts & Schaefer Co. for the rebuilding of its complete coal mining plant, recently destroyed by fire (the original plant having been built by the same company), at an approximate contract price of $20,000.

Sparrows Point, Md.—The efficiency of the plant of the Maryland Steel Co. is expected to be materially increased by the addition of 120 coke ovens, to its already large equipment. One-half of these ovens were recently completed and placed in operation, the output being estimated at 500 tons daily.

Paducah, Ky.—The West Kentucky Coal Co. has been given a contract to build six barges at its plant here for the Paducah & Illinois R.R. Co., which is building the bridge at Metropolis, Ill., 12 miles below here. The cost will be $12,000. Aside from these barges, which will be used in building the bridge, the railroad company has bought three others.

NEW INCORPORATIONS

Covington, Ky.—The Pittsburgh Mining Co. has increased its capital stock from $24,000 to $30,000.

Hazard, Ky.—The Middle Fork Coal Co. has been incorporated here by B. P. Wooten, C. G. Bowman and Jesse Morgan.

Prestonburg, Ky.—The Big Sandy Consolidation Fuel Co. has been incorporated with a capital of $250,000. The incorporators are, B. F. Friend, C. R. Brown and D. C. Outcalt.

Welch, W. Va.—The Pocahontas Engineering, Mining & Construction Co. has been organized for the purpose of engaging in mine construction work. The capital stock is fixed at $25,000.

Foxholm, N. Dak.—The Foxholm Coal Co. has been organized with a capital stock of $10,000. The incorporators are J. A. Kann, R. W. Kann and John P. O'Leary, of Foxholm, N. Dak.

Athens, Ohio—The Del Carbon Coal and Coke Co., of Buffalo Creek, W. Va., has been sold to Alexander Cunningham and Charles R. Neidlinger, of New York City. The consideration is not given.

Sesser, Ill.—The Jesse Dimond Coal Co. has been organized with a capital stock of $100,000 for the purpose of mining coal, manufacturing coke, brick, etc. The incorporators are, E. N. Rea, H. M. Rea, and Jesse Dimond.

Charleston, W. Va.—The Kanawha Valley Coal Co. was recently incorporated with a capital stock of $25,000, to engage in coal mining. Those interested are Otto J. Cox, Roy Cox, John A. Field and S. P. Richmond, all of Charleston.

Esserville, Va.—The J. A. Esser Coke Co. has been incorporated with a capital of from $50,000 to $100,000, the purpose of the organization being coal mining and coke manufacturing. The officers are, John A. Esser, pres., George H. Esser, vice-president and Esther F. Esser, secy., all of Norton, Va.

INDUSTRIAL NEWS

Washington, D. C.—The Navy Department recently awarded to S. F. Hayward & Co., of New York City, an order for 30 sets of Westfalia rescue helmets for use on government colliers.

Ottawa, Ont.—The number of people in Canada affected by industrial accidents during June were 593. Of that number 299 were killed, and 294 seriously injured. Owing to the Hillcrest disaster, the mining industry heads the list with 200 killed and 27 injured.

Pittsburgh, Penn.—With coal operators assembling large tows in the local harbors preparatory to a shipping stage, it is estimated that at least 18,500,000 tons of coal will be ready to be moved as soon as sufficient water arrives. Little immediate change in the rivers is, however, anticipated.

Whitesburg, Ky.—Stone, a new mining town in Pike county, is to have a national bank with a capital of $50,000, according to information available here. This institution is expected to begin business before the end of August and will give Pike county its fifth bank. The four others are all doing a flourishing business.

New Florence, Penn.—Several hundred acres of valuable coal land have been transferred recently in this vicinity to interests believed to be from Bolivar. It is said that a number of new openings are to be made in the near future which will mean a decided boom in business and population. Most of the coal involved lies under what is known as the old Graham farm.

Rockport, Ind.—Residents of the Ohio Valley near here are digging quantities of coal out of the bed of the Ohio river. The coal is part of 15 barge loads which were in tow of the "Sprague" several years ago and which were swamped during a severe storm. This summer for the first time since the tow was wrecked has the river been low enough to get at the coal.

Columbus, Ohio—The Ohio Utilities Commission has approved the application of the Chesapeake & Ohio Northern R.R. Co. to issue stock to the amount of $50,000 for the purpose of securing a right of way for the new line to be built by the Chesapeake & Ohio from Portsmouth to Columbus. It is expected that the contracts for the construction of the line will be awarded within the coming month.

Birmingham, Ala.—A foreclosure deed transfering the properties of the Markley Coal Co. to the State of Alabama was recently filed in the Probate Court. The state bought in the property for the use of the Alabama Girls Technical Institute. The price paid was $135,645.89 and the property involved includes 9514 acres of land located in Jefferson and Tuscaloosa Counties. The mortgage under which the property was sold was for $148,763.24.

Trenton, N. J.—Upon the application of Edward D. Fox, Vice Chancellor Beckes on July 21, named Frank D. Schroth, of Trenton receiver for the Eggette Coal Co., of Trenton and Camden. The concern was incorporated with a capital of $100,000 for the purpose of manufacturing artificial fuel. Fox charges that the company has practically suspended business, and that for some time preceding this suspension business was conducted at a loss.

St. Louis, Mo.—Contracts for 80,000 tons of coal for the City Water Works and the City Sanitarium were recently let, at a total cost of $117,156, a saving over last year's prices of $4150. There were eight bidders. Donk Bros. got 50,000 tons of coal for the City Water Works at Bissell's Point at $1.39 f.o.b. cars Bissell's Point. The freight rate on this is 52c. per ton. They also got 10,000 tons of washed coal for the City Sanitarium, at $1.56½ per ton delivered. The Bald Eagle Mining Co. got 20,000 tons of nut coal at $1.60 per ton, as compared with a price of $1.62 last year.

Bristol, Tenn.—The Virginia & Southwestern Ry., one of the important coal carrying lines reaching the southwest Virginia coal fields, has received its first consignment of 600 modern steel coal cars, which will be put into service immediately. The new equipment will be used in hauling coal from the mines of Virginia, particularly from Lee and Wise counties. R. Loyall, who has general supervision over the middle district of the Southern, commenting on the new equipment, said that it would make the Virginia & Southwestern one of the best equipped coal carrying railroads in the country.

Coal Trade Reviews

General Review

Anthracite trade touches the low point of the year. Firmer tone and improved sentiment in bituminous. Stocks exhausted and buyers finding they have overstayed the market.

Reports from some points indicate the dullest situation in the hard-coal trade for the past decade. The large companies are working on a heavily curtailed schedule, consumers are showing no disposition to stock up and the individuals are making deep cuts into the regular circular, in some cases even down to the April prices or better. A slight temporary activity prevailed during the past week in anticipation of the regular advance in the circular on Saturday, Aug. 1. Aside from this the situation has been most depressing and the increase in the circular will tend to discourage further buying for the time being.

Contradictory crosscurrents are developing in the Eastern bituminous situation which are strongly indicative of a change in sentiment. An easing off in the demand from the West has diverted more coal into the seaboard market which has been a depressing influence, but on the constructive side it is noticed that the heavy reserve stocks, which has been a constant menace to the market for so long, are completely exhausted. There is a growing belief that many consumers have overstayed the market. The rigid curtailment in operations has kept shipments well inside of market requirements, and there is little consignment coal reported at any of the large distributing centers, while generally stiffer prices are quoted on contracts.

The Pittsburgh district is showing a tendency to drag behind, there being no increase in mine operations although the reduced stocks in consumers hands has induced slightly better buying in the line trade. Prices are still subject to heavy cuts, but with the greater industrial activity and heavier Lake shipment through August, the outlook is more hopeful; tonnage will have to experience a big increase, however, before the improvement will be reflected in the prices. The improved sentiment still continues in Ohio. The trade his tightened up in excellent shape and there is a fairly good domestic business ready when the local mines get under operation. A fair sprinkling of idle factories are beginning to fire up while the railroads are placing additional orders.

The Southern railroads have also increased requisitions somewhat which has had a stimulating effect on the market as a whole although there is little improvement in the general industrial call. Prices continue steady so far with increases freely predicted for the near future.

The Middle Western market has taken another spurt and with normal conditions prevailing will show a steady and consistent increase from now on into the fall. The harvesting is on in full swing while prices are steadier and the improved sentiment is creating more buying in all lines. Substantial advances in quotations are anticipated during the next few weeks. The summer buying was considerably below the average and more than a normal tonnage will be required to make up the deficiency.

ATLANTIC SEABOARD

BOSTON

Price situation on Pocahontas and New River being corrected, but tonnage will be light for some time. Improvement in call for Pennsylvania grades continues. Georges Creek firm, with better trade conditions in sight. Anthracite dull and price shading on part of independents so far without result.

Bituminous—August promises some relief to the price situation, but the volume of Pocahontas and New River coming forward will probably be light. The operators are now apparently reconciled to the strictest kind of curtailment, and it is understood that cargoes will not be put afloat by the various agencies without firm orders in hand. Meanwhile, practically all of the distress coal at New England ports has been absorbed in one way or another and on car prices for inland delivery have been restored to the season-contract basis. For some weeks, therefore, there will probably be very little business aside from the large consumers, who are taking coal regularly in weekly proportions. It is gratifying to the trade generally that the bad July situation has been corrected, and all hands will now look forward to a better fall market than could have been forecasted a month ago.

The slight improvement noted last week in the demand for the better Pennsylvania grades continues to hold good. Buyers who have been awaiting developments and hoping for lower prices are now concluding to take on supplies, and the effect is already noticeable. The strengthening in the Hampton Roads coals will also have a favorable result on the market for Cambria and Somersets. Some of the operators report plenty of current business and it begins to look as if bituminous generally in a month or so would be over the hump.

There is no feature in the Georges Creek demand, although the shippers see signs of an increasing number of requisitions during August. Barges and steamers carrying this grade have been operating regularly and there is no change to report on prices.

Anthracite—The trade continues as dull as usual in the midsummer season. A rigid curtailment has been in force with most of the mining companies and shipments have been relatively few the past fortnight. Independent operators are circularizing this territory with offers of domestic sizes at concessions from the companies' lists, but so far they have made very little headway. This market has always been loyal to the interests that serve it best in times of stress, and the mere concession in dull times of 25c. or even 50c. does not interest more than a few of the dealers to the point of buying.

The Cape Cod ship canal was formally opened with appropriate exercises on Wednesday, July 29 ,a large party going from Boston to participate.

Current prices on bituminous at wholesale are about as follows:

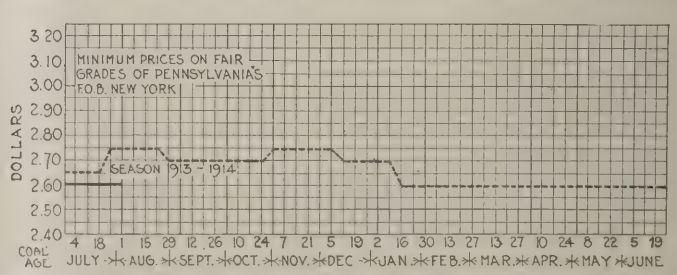
	Clearfields	Cambrias Somersets	Georges Creek	Pocahonta* New River
Mines*	$0.90@1.45	$1.20@1.65	$1.67@1.77	
Philadelphia*	2.15@2.70	2.4 @2.90	2.92@3.02	
New York*	2.45@3.00	2.7 @3.20	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.75@2.85
Boston†	.....	.....	.....	3.58@3.65
Providence†	.....	.....	.....	3.68@3.78

* F.o.b. †On cars.

NEW YORK

Indications of an improvement in bituminous. Calls on contracts picking up and reserve stocks generally exhausted. Usual month-end rush for anthracite creates some activity, but operations still heavily curtailed and trade slow.

Bituminous—Distinct evidences of an impending improvement are discernible in the local soft-coal trade. There is a growing belief that many consumers have overstayed the market and that a broad buying movement will be initiated shortly which will put the trade on a firm basis. The heavy reserve stocks accumulated early in the year, which have since



been a constantly depressing feature in the market, are now generally cleaned up; as a result requisitions on contracts are larger all along the line, and a few inquiries for prompt shipment are beginning to drift in.

A rigid curtailment policy on the part of the operators

has kept the movement down to actual requisition so that no demurrage coal is in evidence, and there is a healthy situation prevailing as regards the stocks at tidewater. Indications of an improvement in industrial conditions is also noted in the better demand on contracts which may be due in part, however, to the final cleaning up of surplus stocks. Although still quiet, the last half of July witnessed a generally accumulating strength which finds the current month opening with the trade even moderately active and indications of a further improvement later. Prices are somewhat steadier on the basis quoted for the past few weeks, which are as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The end of the month bringing with it the customary advance on the domestic grades, created the usual small rush of orders from consumers anxious to get in at the expiring low rate. Aside from this the market continues inactive. Nearly all the large companies reduced operations to little more than half capacity last week, the only important exception being the Lehigh Coal & Navigation Co., which continued at full time throughout the week. The independents, by forcing the market with heavy cuts on the company circulars, are doing much better. As a result of the regular monthly advance in the circular, effective on Saturday, a further restriction in the demand during the coming week is anticipated.

The shortage of stove coal continues the predominating feature in the market. The companies are still taking advantage of this deficiency to accelerate the movement of the heavier grades such as egg and chestnut, only recognizing orders for stove coal when accompanied by requisition for a certain proportion for other sizes. The output of the steam grades is so restricted, as a result of the curtailed mining operations, that the entire production is going into the market and practically none is being put back into storage now.

We quote the New York hard coal market with the company circular 10c. higer on the domestic grades, as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	$4.60@5.00	$4.95	$4.55@4.95
Egg	5.25	4.90@5.25	5.20	4.85@5.20
Stove	5.25	5.15@5.25	5.20	5.10@5.20
Chestnut	5.50	4.95@5.50	5.45	4.90@5.45
Pea	3.55	3.40@3.55	3.50	3.25@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.10@2.75
Rice	2.30	2.15@2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

PHILADELPHIA

Anthracite trade still dull and featureless with operations at only 50% capacity. Concessions freely made by individual operators. Bituminous shows better inquiry, but little doing in way of new business.

Anthracite—The first of August finds the anthracite trade passing through one of the dullest periods it has experienced for the last ten years. Inactivity in almost all sizes is noted, with the possible exception of broken and stove; the curtailed operations at the mines has made the market very short of the former, and it requires considerable jockeying to fill contract requisitions. Stove coal has its uses also, in that orders for it carries some of the other sizes, but the trade as whole is exceedingly dull. The slack demand for pea size, which is used to a great extent in this market for domestic purposes, still continue and it is understood, even with the half-time work at the mines, that considerable of it continues to go into stock. The circular price of $2.50 at the mines, is being cut right and left by the individual operators, who, however, are not confining their efforts to this one size. Concessions on egg and nut in some cases net the operator less than April circular, and this condition of affairs is not likely to change for the next six weeks. Dealers and operators generally in this vicinity are looking for an earlier fall demand than is usually the case.

Bituminous—There seems to be a better inquiry in the soft-coal market, but little is developing in the way of actual orders. Spot coal is not easy to dispose of, even at the prevailing low prices, but even in the face of this, inquiries for contracts are met with substantially higher quotations than those ruling at present. This is not likely to improve a condition now existing, when establishments can buy on the market at considerably less than they can contract. It is the feeling among the operators that late fall and winter will see substantial increases in the prices on all grades of bituminous.

BALTIMORE

Anthracite men complain that many customers are not covering. Bituminous market conditions continue highly unsatisfactory. Export trade holds up.

While the early weeks of the summer saw the anthracite men fairly cheerful under the belief that the light demand for coal for storage as well as for immediate use would soon see a change, a different spirit now prevails. It is undoubtedly a fact that far less coal has been placed in bins this year than for a number of years past. Neither is there much of a disposition on the part of consumers now to take advantage of the remaining low prices, and a rather dull August seems to be in prospect. There is no explanation as to why the household consumer, who is usually in at this time, is still holding off. Light manufacturing call is, of course, understood in the face of the poor industrial situation generally.

Highly unsatisfactory conditions prevail in soft coal. Call to the West has slackened somewhat, and little or no market exists East, outside of contract business. With this at low ebb there is not much satisfaction in it for the coal man. Prices are hard to fix in such a market, but prompt sales, not under pressure, are about on a level with the previous week. In West Virginia, steam coals sold around 90c.; three-quarter-gas sold variously at from 80 to 90c., and slack was disposed of in some cases at 65c. Pennsylvania coals range at from 95c. to $1.35. The market was poor for all. Bunker trade is about the most healthy business here just now.

HAMPTON ROADS

Dumpings for the week are light. Government takes 10,000 tons at Newport News. No change in prices. Improvement anticipated this week.

Coal movement from Hampton Roads during the last week has not been heavy; in fact there have been days during the week when all piers were practically idle. The largest cargo was taken by the collier "Orion' loaded at Newport News, and outside of several large cargoes to Naples and Genoa the foreign movement was light. In addition to the shipments to Italian ports, foreign cargoes went to Bridgetown, Coronel and St. Thomas.

The demand for all classes of coal still continues light and there is little inquiry in the market at this time for either coastwise or foreign spot business. The greater part of the cargoes moving coastwise went to Boston although there were some shipments to Providence and Portland and some small lots to one or two of the Southern ports.

There is no change in prices in any of the grades. Prospects are good, however, for some improvement in dumpings during the coming week, a fair number of vessels being due for shipments moving on contract. The U. S. Collier "Proteus" is due to load about 10,000 tons applying on the contract recently let by the government.

CHARTERS

Coal Charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tonnage	Rate
Oclande[2]	Norwegian	Philadelphia	Martinique	1874	.....
Venetiae[2]	British	Baltimore	Port Limon	2333	.....
Waltham[1]	.....	Norfolk	Jacksonville	449	.....
Lord Ormondee[2]	British	Atlantic Range	Barcelona	2533	$2.94
Frednese[2]	Norwegian	Baltimore	Guantanamo	998	.....
D. H. Riverse[1]	.....	Baltimore	Martinique	963	.....
Parkgatee[2]	British	Atlantic Range	Barcelona	2050	.....
Wm. B. Herricke[1]	.....	Philadelphia	Calais	475	1.10
Wm. H Yerkese[1]	.....	Norfolk	Providence	1211	.....
Fannie Palmere[1]	.....	Baltimore	Portsmouth	1726	.....

[1] Schooner [2] Steamer

LAKE MARKETS

PITTSBURGH

No recent change in production, which is running about 10% better than in June. Further increase expected in August. Prices on prompt coal still very irregular, but slack has slightly advanced.

There has been no change in the rate of mining in the Pittsburgh district in the past two or three weeks. As a general average, the mines are running at a trifle better rate than in June by perhaps 10%, and operations average between 60 and 65% of normal capacity. There has been an increase since June 1 of about 10% in the line trade, due to the reduction of consumers' stocks rather than to any increase in the rate of consumption, and there has been a slight increase in Lake shipments. Demand for coal is expected to be considerably better in August. Manufacturing operations are expected to increase, while the Lake trade should take a larger tonnage.

Prices on prompt lots are being deeply cut by the smaller shippers, as for many weeks past, and there is no established market. It may be stated that odd lots of mine-run

could be picked up at $1 to $1.10, and possibly at less. Slack, however, shows a slightly firmer position in the past ten days. A fortnight ago slack could be picked up in considerable quantities at 50c., but it is stated that at present nothing below 60c. could be done, and it would not require the buying of any considerable tonnage to exhaust all available at this figure, putting the market to 65c.

An indication of the improvement in the position of slack with respect to production and consumption is found in the experience of the Pittsburgh Coal Co. This interest never sells slack at cut prices in the summer, but stocks what is necessary during the Lake shipping season, to carry its contracts through the winter, when production of slack is decreased through the cessation of Lake shipments. For five or six weeks past this interest has not stocked any slack, but is able to dispose of its current production by shipments on its regular contracts. Circular prices remain as follows: Slack, 80@90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Movement a little better in bituminous, but anthracite as dull as ever. Expected that the fall crop movement will produce a stir, if only by creating a scarcity of cars. Mine shipments made only on specific orders. Short time operations the rule.

Bituminous—There are a few members of the bituminous trade who find their shipments on the increase. Prices are not affected, but that is to be expected, as the volume must increase very materially before this occurs. Still dealers are encouraged, for they believe that the fall situation, especially the crop movement, must help all sorts of business. Besides it will create a scarcity of cars and that alone will advance the price of coal. All members of the trade are carefully watching for the time when the railroads begin to buy. When that happens the worst will be over. Some difference of opinion exists as to the fuel supply of the roads, but it is the general idea that they are using more than they are buying.

The late improvement in slack has been ascribed to the light Lake movement of bituminous. This is likely to continue because of the small storage capacity at Upper-Lake ports. There is a close watch kept on shipments from all mines, for there have been too many losses on coal standing on track. Mines are running on short time and if there are no orders they shut down.

The state of the market is not well represented by quotations, as practically all coal would bring the full circular if business was brisk. When it is not, only the best sells on regular quotations, which are $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. The demand for slack is somewhat better than it was. Allegheny Valley sizes are about 25c. lower than Pittsburgh, slack being on a par with it. There is considerable low grade slack coming in from beyond Pittsburgh, which sells very cheap.

Anthracite—The trade is improving. Some shippers note that there is great surplus of egg, which embarass the mines considerably. Because of this or some other reason the mines have not furnished coal enough during the week to keep the docks busy and the Lake shipments have fallen off, though the July total still promises to be high. No prospect of improvement in the local rail-line trade appears at present.

Shipments by Lake for the week were 167,000 tons, practically all to principal Upper-Lake ports. The smaller ports have dropped off for awhile, probably till early fall, when they will return for their final cargoes. It is at present merely a matter of cheap Lake rates, with the leading shippers also quite aware that it is out of the question to get enough coal west of Lake Michigan by rail if the Lake docks are not well filled up during the season. The Lake fleet is so pushed for business that the coal shippers easily make their own rates and take their time in fulfilling charters.

COLUMBUS

Domestic consumers showing a disposition to stock up earlier than usual, and these grades are strong. Steam coals slower owing to high quotations on the Ohio product. Local producers still anticipate a big business in the Lake trade.

Domestic demand is the strongest feature of the trade. Dealers' stocks are generally short and they have experienced an exceptionally good call for this time of the year. Consumers are inclined to stock up earlier than usual and are only waiting for the resumption of work in the Ohio mines. Sales agents of the larger operating and shipping concerns are out in their territories taking orders for delivery as soon as possible. Dealers are selling a large amount of the fancy grades such as Pocahontas and re-screened varieties. Retail prices are firmer at the levels wich have prevailed since July 1.

There is some demand for steam grades, but users are generally getting a sufficient tonnage from West Virginia and Kentucky. Prices of these coals are lower than Ohio quotations up to date. The business depression still has its influence upon the steam trade and the consumption is not increasing very rapidly. Fine coal is rather low and some quotations on nut, pea and slack have been made as low as 50 cents.

Some help is expected in the Lake trade when coal is again produced. Although four months of the season have passed, Ohio operators are still looking to an active trade for the remainder.

Prices in the Ohio field are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07	$2.40@2.55	$2.12	
Steam lump	1.87@1.92		1.97	
Egg		2.40@2.55		$4.05
Mine run	1.87	2.15@2.25	1.87	3.30
Screenings	1.57@1.62	1.85@1.95	1.57@1.67	

TOLEDO

More inquiries and an improved sentiment in the trade. Idle factories going into operation and railroads are placing orders. Status of the labor trouble.

The market is showing a strong tendency toward improvement. Inquiries are coming in more freely and orders are more frequent. Prices remain the same but some dealers report encouraging signs of greater strength. The betterment in general business conditions seems to be coming from the West and is rapidly working Eastward. The idle factories are beginning to open up and there is every indication that the plants will soon be operating as usual. Railroads are also beginning to place orders.

The mine situation is looking better and operators generally are hopeful that affairs may soon reach an amicable adjustment. This has been strengthened by the fact that the United Mine Workers of America came to the rescue of the operators against the I. W. W.'s who were causing all kinds of trouble at the mines. The United Mine Workers have acted as special deputies and largely through their assistance the pumps and fans are again working at the mines and immense waste has been prevented.

CLEVELAND

Lake shipping still further reduced and production now even less. Prices holding wonderfully firm, with only occasional important concessions reported.

Coarse coals are, if anything, a little weaker than they were a week ago, while slack is slightly stronger. This is due entirely to further curtailment of lake coal shipments, which are smaller in some instances than a week ago. During the last week the Northwestern Fuel Co. reduced shipments to such a low point that not even vessels that are under charter are needed. With each reduction the mines are forced to cut down production and surplus coarse coal must be offered on the open market. The output of slack is still further reduced and the result is a stronger market with no great demand.

Youghiogheny operators are holding out for better prices on screened coal than other districts.The bargain prices reported are mostly for tonnages that must be moved quickly. There is very little local demand for domestic fuel. Sales of Pocahontas are being reported, but largely to the Chicago market. The Western demand is keeping the market up locally.

Quotations for shipment are as follows:

	Pocahontas	Youghiogheny	Fairmont	West Va., No. 8
Lump	$3.60			
Egg	3.60			
Lump, 1¼-in.		$2.50		
Lump, ¾-in.		2.20@1.25	$2.05	$2.05@2.10
Mine-run	2.60	2.15	1.95	2.00
Nut		2.20		
Slack	2.20@2.35	1.65@1.70	1.70	1.65@1.70

CINCINNATI

Better feeling prevails although immediate business has not improved. Price concessions have ceased. Strong market anticipated this fall.

There is an improvement in the general tone of the market, due largely to the fact that coal men are able to see signs of a revival in industrial activity. So far this has not manifested itself by any marked increase in the local consumption of the steam grades, although there seems to be a general opinion that a better market is not only in sight, but is actually beginning. The trade has consequently tightened up considerably and all talk of price concessions are past.

The domestic market continues in excellent shape, partly by reason of the restricted production due to the slow steam trade, and partly because the demand is steadily improving. When the steam market revives, as is expected at any time, a period of greater activity than at any time since the early part of last winter is confidently expected.

DETROIT

Market slow and quiet, but generally firm. Shortage of labor. Heavy business anticipated this fall.

Bituminous—The local market has been slow, yet not particularly bad; steam trade has been passibly good in the city, the smaller sizes being in a little better demand and prices steadier than for several weeks past. The domestic trade has fallen off, due to the inability of the dealers to secure labor to unload the cars as a result of the heavy demand along other lines that are now starting up. Operators and shippers expect that this will make an extra heavy demand later in the season and it will tax them and the railroads to deliver coal promptly when ordered. Pocahontas has shown marked improvement this week and shippers are exceedingly well pleased with the outlook.

Anthracite—Anthracite trade was good for the month of July and shippers are now somewhat behind in filling orders for egg and stove coal. Considerable increase in orders for immediate shipment is anticipated for the first part of this month.

COKE

CONNELLSVILLE

No demand and market softer. Producers ready to make special concessions. Consumers well supplied.

The market for furnace coke has softened, there being operators so anxious to dispose of additional tonnage that they are quoting on contract about 10c. less than 10 days ago. There is no demand for coke, the present consumers being well supplied. In two or three instances August coke may have to be bought, but several consumers are covered to Sept. 1 and others through the year. In the circumstances one prominent seller has been negotiating with three or four idle furnaces on the proposition that they blow in now, with cheap coke and ore, and accumulate some pig iron. It is understood that coke would be offered for the balance of the year at $1.75. Contracts were made in May at $1.85 and $1.90, and in June three contracts, for 27,000 tons a month, were made at $2 for a particularly desirable brand. Prompt coke could easily be had at $1.75. Foundry coke is offered at $2.25@2.35 for fairly good brands, while standard brands on contract are available at $2.35@2.50 per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended July 18 at 268,200 tons, an increase of 3595 tons, and shipments at 258,762 tons, an increase of 1655 tons. Production exceeded shipments in the week by 9438 tons, according to the report, while the accumulated surplus for 17 weeks is now 52,103 tons, according to the weekly figures published.

BIRMINGHAM

This week has brought about no change in either furnace or foundry coke. Although the foundry grade is moving slowly, sales are being made only in small lots, while there is no tonnage of furnace coke being sold.

BUFFALO

No dealer has of late pretended that there was any strength to the coke market, though it is hard to say why it should lag behind coal. One shipper reports that when he orders a car it is only a day or two before he gets the car numbers; another hears from the operator that though the ovens have been shut down a month there is still plenty to ship. Quotations remain weak on the basis of $4.25 for best 72-hr. foundry and $3.25 for stock coke.

DETROIT

This product has been in fair demand within the last two weeks. Foundries that have been entirely shut down are resuming work again and some of them are actually working over-time. This has had a tendency to advance Connellsville coke on this market from $2.75 to $3, and in some cases to $3.10 for spot shipment. Solvay is now quoted at $2.25 and gas house at $2.80 f.o.b. ovens.

NEW YORK

Coke is reported somewhat steadier, with a slightly better demand. Prices are showing a rising tendency and there is a more optimistic feeling.

SOUTHERN

BIRMINGHAM

Lump coal shows very little change while shipments of steam grades are somewhat larger than last week.

The market on lump coal remains about the same. Very few orders of any size are being received and shipments show only a small tonnage for the week. Steam grades show some improvement in tonnage sold and shipped. Due to several of the railroads increasing requisitions on contracts, shipments are heavier in this line, though the small business shows little improvement. Prices are holding up well and indications point to an increased activity in the steam lines soon.

LOUISVILLE

Market somewhat improved except on the steam sizes. Prices unchanged and operations remain on a half-time basis.

Except for steam sizes the Kentucky coal market is rather active at present, having picked up considerably over the week previous, when the frequency of cancelled orders rather discouraged the operators. General rains and the fact that the farmers had practically completed their harvesting operations, stimulated the demand for domestic coals in the interior and the requirements of this market served to take up the tonnages thrown back on the operators' hands.

The Eastern Kentucky field is having the best of the business, operations and the market in the western section not having picked up to any extent. The mines generally continue to work about half time with little demand for their output. Neither East nor West is there any demand of importance for nut and slack. Prices continue virtually unchanged.

MIDDLE WESTERN

INDIANAPOLIS

Slight improvement again felt, due to crop movement and buying for winter storing. Prices unchanged but this month may show an advance.

There is a more cheerful feeling in the coal industry of Indiana. The movement of the wheat crop is effecting the trade though not making any stir. Farmers have been marketing their wheat freely and spending the money received and this has put a little more ginger into commercial and industrial lines. Factories closed for the summer are reopening here and there, more employees are being taken on at Gary, and the farm implement manufacturers report increased orders, particularly for thrashing outfits. Harvesting is also causing some additional consumption of coal and buyers of domestic grades have begun their winter storing.

All these conditions show in the trade and are bringing July orders up to their normal level. Further increases this month and next will probably cause prices to advance to or near the winter schedule and there will be an effort now to take advantage of the lower quotations. Contracts that have been hanging back are being closed and other buyers are beginning to study the price prospect for their fall and winter buying. There is a slightly better movement of steam, as well as domestic grades and screenings are still hard to get, with prices holding firm near the top. Retail business, seems to be about the average and dealers are satisfied. Car troubles are not worrying the Indiana trade yet but operators like to get as prompt shipment as possible. There is much more wheat to move this season than usual with indications of a large corn crop also.

Prices are unchanged but the current month will probably bring an advance.

CHICAGO

More satisfactory tone due to prospects of an improvement in general business conditions. Harvesting is now in full swing and farmers are beginning to buy coal. Volume of trade in the rural districts steadily increasing.

Considerable improvement has been noted in the smokeless coal trade. The announcement a short time ago that the circular price on mine-run would be advanced Aug. 1 from $1.25 to $1.40 has had a stimulating effect on buying. More of this grade has been sold within the last ten days than during the preceding six weeks, and many retailers who have been taking only a little coal on their contracts are now specifying

more heavily. Although there has been a steady demand all summer for smokeless lump and egg, it is practically off the market now. The operators have not been producing it because they have had no demand for slack and it has been impossible to produce the lump-coal even at $2 a ton.

The anthracite situation remains stationary. Retailers are short of money and this will continue until consumers begin to send in their orders.

The market is bare of Hocking coal, as the mines are not yet in production. Orders for Hocking are piling up in large numbers and when business is resumed, it is believed, it will be remarkably active for several months.

Prevailing prices in Chicago are:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Rescreened lump	$1.60		$1.65	$1.50
1¼ inch	1.50		1.50	1.50
¾-inch	1.30	$1.20	1.35	1.30
Nut	1.25		1.35	1.20
Mine-run	1.10	1.05	1.15	1.10
Nut, pea and slack	0.70		0.75	0.65
Coarse slack	0.60	0.60	0.65	0.55

Harrisburg quotations are: Domestic lump and egg, $2.40; steam lump, $2.25; mine-run, $2.15@2.25; screenings, $1.85@1.95; No. 1 nut, $2.55; No. 2 nut, $2.40.

Carterville prices are: Lump and egg, $2.40; No. 1 washed, $2.55; No. 2 washed, $2.45.

ST. LOUIS

Domestic consumers coming into the market and the situation is much steadier. Substantial advances anticipated in the next few weeks. Summer buying has been light and must be made up.

The past week has seen a growing demand from the domestic trade for the higher-grade coals, both in the city and country, and prices are advancing slightly on the steam sizes. From the high-grade field there is a tendency to decline about 5 to 10c. a ton on the screenings, and the washed market is also weak. In a way, the same conditions exist in the Standard field, with the exception that there is no increasing demand for lump coal, although the price is up perhaps 5c. per ton, with chances of going 5c. better in the next week or ten days. On the other hand, screenings have dropped from 80c. to 70c., with indications that 65c. will be reached in the course of the next week.

Retailers advise that their usual July business is away behind this year. Up to the present, not more than one-half of the tonnage usually placed for July delivery has yet been ordered, and this will mean a call for coal in August and September that will tax the capacity of the dealers to take care of.

There was a little spurt during the past week in the demand for Pennsylvania anthracite, but smokeless is still dragging and domestic coke is picking up. It is generally understood that prices on all the high-grade coals will advance on the first of the month about 10 or 15c. a ton on the domestic sizes, these prices being good until Aug. 10. The increased production of Standard lump coal will bring a surplus of screenings into the market that will cause the price on that grade to slump, at the same time forcing the price of lump up.

The present circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.20	$0.80@0.85	$0.95
3-in. lump	.....	....	.....	.....	.....
6-in. lump	$1.15@ 1.35	....	1.30	0.90@1.00	1.15
Lump and egg	1.85@ 2.15	$2.00	.....	....	1.15
No. 1 nut	1.15@ 1.35	....	.....	.....	.....
Screenings	0.70@ 0.75	....	0.80@0.85	0.65@0.70	0.75@0.80
Mine-run	1.00@ 1.15	....	.....	0.75@0.80	.....
No. 1 washed nut	1.50@ 1.60	2.25	1.50	....	.....
No. 2 washed nut	1.30@ 1.40	....	1.35	....	.....
No. 3 washed nut	1.20@ 1.25	....	.....	....	.....
No. 4 washed nut	1.15@ 1.25	....	.....	....	.....
No. 5 washed nut	0.65@ 0.70	....	.....	....	.....

KANSAS CITY

Conditions normal with an upward tendency as the season advances.

Business is above normal in the Southwest, the only disturbing influence at present being the strike which has tied up the Joplin & Pittsburgh railway. However, miners who live several miles from the mines have in a good many cases formed camps near their work. Demand is unusually good for the season, bookings for later delivery being brisk. The market is steady, with an upward tendency as fall approaches. A summer basis is expected to be in evidence for several weeks, however. Coal men discount the recent announcement that the Standard Oil Co. will not sell fuel oil in tank cars in Kansas City after Sept. 1.

PRODUCTION AND TRANSPORTATION STATISTICS

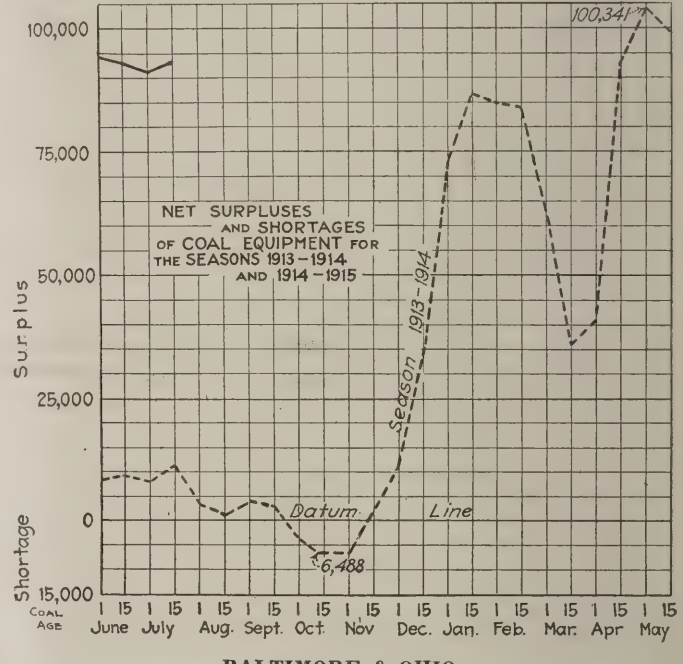
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended July 15, as follows:

	Surplus	Shortage	Net*
New England Lines	1,589	11	**1,579**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	23,189	0	**23,189**
Ohio; Indiana; Michigan; Western Pennsylvania	44,169	0	**44,169**
West Virginia, Virginia, North & South Carolina	6,563	0	**6,563**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	5,710	0	**5,810**
Iowa, Illinois, Wis., Minn.; North & South Dakota	5,933	5	**5,928**
Montana, Wyoming, Nebraska	723	0	**723**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	2,203	154	**2,049**
Texas, Louisiana, New Mexico	122	106	**16**
Oregon, Idaho, California, Arizona	2,858	16	**2,842**
Canadian Lines	0	0	**0**
Total	93,509	292	**93,509**

	Mar. 15	Apr. 1	Apr. 15	May 1	May 15	June 1	June 15	July 1
Surplus	39,133	41,055	92,139	100,370	99,664	94,770	93,520	91,280
Shortage	3,282	615	24	29	313	7	49	430
Net*	**63,428**	**35,851**	**40,440**	**92,115**	**100,341**	**99,351**	**94,763**	**90,850**

***Bold face** type indicates a surplus.



BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during April, May and June of this year and last year:

	April		May		June	
	1914	1913	1914	1913	1914	1913
Coal	2,131,812	2,516,367	2,995,812	2,357,119	2,380,795	3,061,929
Coke	343,862	400,317	301,163	434,898	298,237	396,920
Total	2,475,774	2,913,684	3,296,975	2,792,975	2,769,032	3,458,849

FOREIGN MARKETS

GREAT BRITAIN

July 17—There is no change of note since last reports. Markets continue relatively weak for prompt and firm for ahead.

Approximate quotations:

Best Welsh steam	$5.04@5.28	Best Monmouthshires	$4.08
Best seconds	4.56@4.80	Seconds	3.84@3.96
Seconds	4.20@4.32	Best Cardiff smalls	2.58
Best dry coals	4.20@4.32	Seconds	2.46

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those of Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 40 days.

Coke is quoted at: Special foundry, $6.36@6.72; good foundry, $5.52@6; furnace, $4.92@5.28.

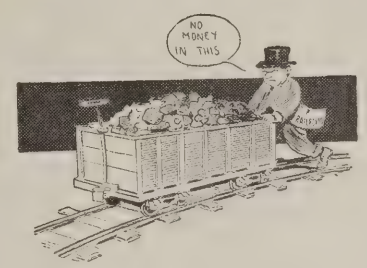
COAL AGE

Vol. 6 NEW YORK, AUGUST 8, 1914 No. 6

Who Gets It?

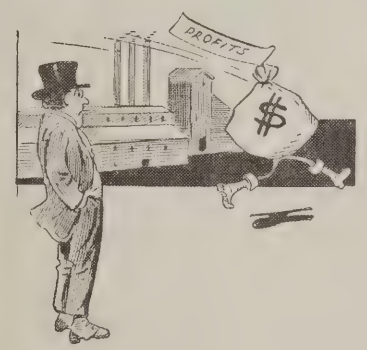
By Berton Braley

Written expressly for Coal Age



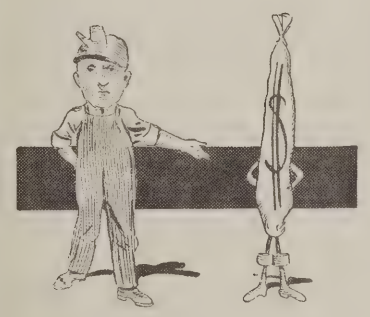
Says the Ultimate Consumer, "Hully Gee!
They are certainly a-soaking it to me!
It is truly most surprising,
How my coal bill's always rising,
There is Someone coining money, I can see!"

Says the Dealer, looking worried, "On my soul!
I'M not making ANY money on my coal,
What with freight and such expenses,
I have almost lost my senses,
And I'm really going deeper in the hole!"



Says the railroad, "All this beefing is a joke,
There's no profit hauling coal or hauling coke,
And if we don't raise our rate
For this special class of freight,
In a little while we'll certainly be broke!"

Says the Operator, "Listen—on the dead,
Though I try and try I cannot get ahead,
I don't like to be repining
But the profit's gone from mining
And it's years and years since I have made a red!"



Says the Miner, "I'M no bloomin' plutocrat,
And my wages never have been very fat,
There is Someone making dough,
Out of handling coal, I know,
But you bet it isn't me, I'll swear to that!"

So we listen to that universal cry,
As they clamor, " 'Tisn't me," or " 'Tisn't I!"
There's a profit, Someone nets it,
Yet, when people ask, "Who gets it?"
There is no one who will answer, "I'm the GUY!"

Ideas and Suggestions

Highest Efficiency—How Secured and Maintained

By E. C. Northover*

Competition in the mining industry has made a byword of the term "efficiency," and has caused the mining plant to become a school of economics. It is the desire of the operator to secure and maintain a maximum output at the lowest possible cost, consistent, of course, with safety and good operation.

For the operator to secure this high degree of efficiency, it is essential that the manager or superintendent in charge shall be a man whose integrity, ability and capacity should measure up to this standard. To maintain the highest efficiency, it is important that every official at the plant should have ample opportunity to do his best.

The superintendent should manifest special interest in the way of inviting suggestions from his subordinates, such as the mine foreman, assistant foreman and fire bosses, who are naturally closer to the problems that affect the results desired. He should establish a system that would enable him to keep a fair and intelligent record of each individual, at the same time affording himself a method of determining the strength and weakness of his company organization.

A Mine Official Is Paid for Something Other Than Physical Labor

The salary or wages paid the average mine official is, as a general thing, much higher than the wages paid the most expert workman; this is due to his superior education, training and executive ability, and it is only natural that much should be expected of him that does not come through purely physical exertion. In other words, if the mine official was paid only for such actual labor as he is expected to perform, from a physical standpoint, his rating would not be much if any above that of the ordinary laborer.

Since the results of his labor, therefore, do not come through physical exertion, but more particularly through mental effort, it is evident that the manager should adopt such a system as would enable him to determine whether or not he is getting all the fruits of the inventive minds in his employ. Unless this result is being attained, the manager is not justified in believing that he is getting the highest efficiency out of his subordinates, nor, consequently, out of his plant.

I believe it good policy for the management of a coal corporation to provide some sort of a stimulus that would in a sense set up a competition between the various officials, and thereby cause them to bring to their work the best that is in them.

This could be accomplished by providing a book at each mine; the title of the book and heading of the pages should be about as follows:

Efficiency—Suggestions and Remarks

To be used by the mine foreman, assistant foreman and fire bosses.

Suggestions or remarks shall be entered, in ink, by each official at least once each month, mentioning any new suggestion or whether his district or work supervised is up to the best practicable standard of efficiency. The column on the right shall be used exclusively by the mine foreman for remarks. All reports shall be signed by the person who makes the report.

The pages should be ruled and laid out in districts. The left side of the pages would be devoted to suggestions, while the right side, as above stated, should be used exclusively by the mine foreman for remarks. A line drawn down the middle of the page would separate the space containing the suggestions from that containing the remarks; the remarks, therefore, would appear in the space directly opposite the suggestions to which they relate.

The merits of a suggestion would be decided by the mine foreman or agreed on by joint conference with the officials at the plant. A sufficient number of pages in the back of the book should be reserved and each arranged in three columns to contain a summary of all the items for the year preceding; the third column should contain the actual results as far as research or investigation could determine.

The book would be subject to the scrutiny of the superintendent, who should also affix his signature occasionally in a proper place that could be designated at the bottom of the pages. The plan may be employed to advantage at any plant, but the idea would apply more particularly to large operations where numerous assistants and fire bosses are employed.

The superintendents at some of the larger operations do make it a practice to arrange a meeting of all officials at regular intervals for the purpose of exchanging ideas and making suggestions that might increase the efficiency at the different mines, and much good has resulted from such meetings, but never have they been as fruitful as we had hoped they would. The reason for this is because all mine officials are not orators and do not possess the ability to make an interesting talk before an audience; consequently, these men are generally handicapped in making even a simple suggestion.

Among some of the most ingenious, intelligent and successful managers we can find this class of men. It has been largely through a desire to suggest a way whereby these officials may serve still more efficiently that I have been prompted to submit this letter for publication.

*Johnstown, Penn.

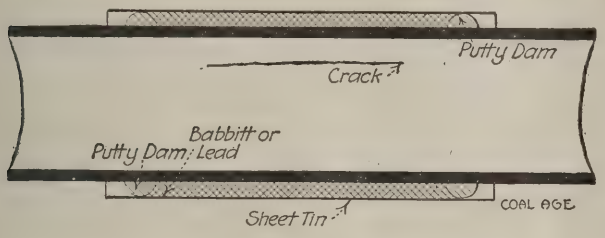
When buying retort-oven coke, it is advisable to stipulate that coking shall have been continuous for 24 hours, for often where the recovery of the byproduct is of more importance than the coke the ovens are drawn at a point of greatest economy, sometimes on as short a time as 14 or 15 hours, which produces poor coke.

Mending a Cracked or Broken Pipe

By M. G. Near

A quick and satisfactory way to mend a cracked or broken pipe, provided it is not subjected to too high a temperature or pressure, is to proceed as indicated in the accompanying sketch.

Make a couple of rings of putty around the pipe, one on each side of the crack. Wrap a piece of thin sheet tin



Cross-Section of Pipe, Mold and Babbitt Casing

around, being sure that there are no openings between the tin and putty for leakage of lead. Leave the opening on top. Pour in the lead or babbitt. After this soft metal is hardened, the mold is easily removed.

On cooling, soft metal like this usually contracts, thus drawing itself tightly around the pipe and making the repair secure.

Fire Prevention

The following excellent safety rules for fire prevention are taken from the Inland Steel Co.'s Book of Rules:

(1) Maintain order and cleanliness. Many fires are due to untidy conditions. Inspect premises daily and do not allow empty boxes, barrels, waste, etc., to accumulate, but dispose of them promptly.

(2) Ashes should never be emptied into other than metal receptacles, and should be kept away from frame buildings, etc.

(3) Oily waste, etc., oxidizes rapidly and should not be allowed to lie around, as spontaneous combustion may occur.

(4) Sawdust and other combustible material should not be used to catch oil drippings, or be placed in cuspidors. Use sand placed in metal pans.

(5) Wherever practicable, soap solution should be used as lubrication for cutting tools instead of oil.

(6) Use safety matches instead of parlor matches, as the heads of the latter often fly off when igniting.

(7) Kerosene lamps, lanterns, torches, etc., should be filled by daylight only, and never filled while burning.

(8) Do not allow incandescent lights to rest on combustible material, or anything combustible to be hung on electric lights. Paper shades should not be used. Extension lights having long wires which are hooked over rails, etc., are dangerous, as insulation is liable to wear off and cause short-circuiting.

(9) Never replace blown-out fuses with wire.

(10) Stove pipes should not be run through floors or partitions. Provide a chimney. Floors and woodwork near stoves should be protected by metal, brick or cement.

(11) Inspect chimneys at regular intervals and repair defects.

(12) So far as possible fireproof materials should be used in all construction work.

(13) Lumber piles, etc., in dry summer weather should be kept wet.

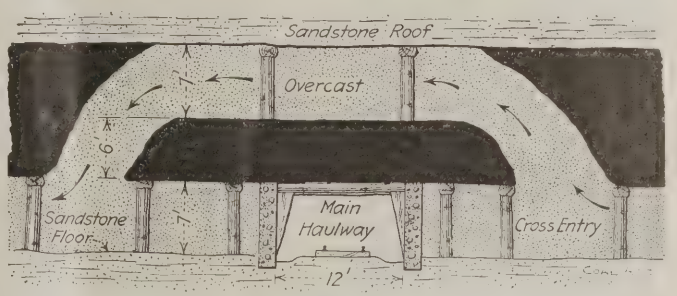
Overcasts in Thick Coal

Special Correspondence

A point of considerable interest in the working of a thick seam of coal is the advantage that may be taken of the thickness of the seam, in the matter of driving overcasts to conduct the air current across main roads.

The accompanying sketch illustrates the form of overcasts in use at the Black Hawk Coal Co.'s mine at Black Hawk, Utah. At the time the mine was opened, "Economy first" was the cry, instead of "Safety first," and this type of overcast was the result of the effort to *economize,* in every way possible, in the operation of the mine. It was the thickness of the coal seam, which in this case was 20 ft., that made this form of overcast possible. The coal is a hard, bituminous character, very cohesive, and has no pronounced face or butt cleats. This seam has a sandstone roof and floor.

In the working of the seam it has been customary to drive the entries 7 ft. high, leaving about 13 ft. of top coal, which is taken down in the rooms. It is readily seen that these conditions make it possible to drive an



General Style of Overcast in Use at a Utah Mine

overcast in the solid coal, as shown in the sketch, and that the adoption of this method of overcasting the air greatly reduced the cost as compared with the modern reinforced-concrete overcast. It was only necessary to build two concrete walls for stoppings, in the cross entries, on each side of the haulage road. The driving of the overcast represented only about 8 or 10 yd. of extra narrow work. This form of overcast presented the additional advantage of leaking less air and being more permanent.

In the working of the rooms in this mine the percentage of coal recovered in the first working is comparatively very small, as the rooms are driven up narrow, large pillars being left between them. The major portion of the coal in this seam is taken out in the second working, on the retreating system.

A good hoisting brake should be able to hold the loaded cage at any point in the shaft without the application of the pressure of steam against the engine. To give the best results hoisting brakes should act directly on the drum, for in case of accident to the engine, the brake on the drum will be able to control the loaded cage.

Substitutes for Wood Timbering in Mine Operations

By Howard I. Smith

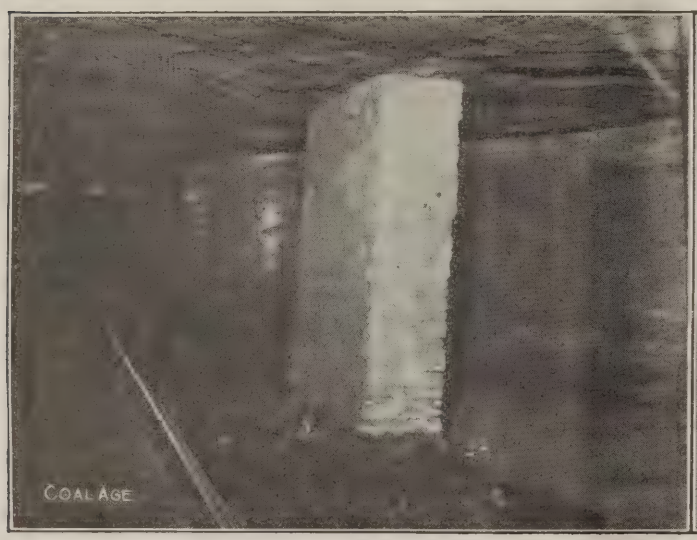
SYNOPSIS—Some notes and comments on the trend of conditions in the practice of mine timbering. The steady depletion of our forest reserves and a like increase in the requirements for mine timbers are rapidly forcing the issue to a head. Reforestation and preservation of the timber are coming into more common use, while steel and concrete substitutes are receiving a careful consideration.

In has been the practice from earliest times, in the mining of coal, ore or rock, to oppose the resulting pressure from the roof or sides of the excavated area by various types of wooden supports, such as props, timber sets, cribs, etc. Under certain conditions, pillars of coal, ore or rock are used in place of the wooden supports. This refers, of course, to excavations in ground that is not self-supporting.

In many places throughout the United States it is still the practice to leave pillars as permanent supports. However, on account of the value of the coal or ore, it has become the practice in many districts to remove these pillars as far as possible. This, together with the increase in mining operations, has created a greater demand for artificial roof supports. The result has been that the rapidly disappearing forests are now being depleted even more rapidly than in former years.

Until recent years no successful attempt has been made in the United States to introduce mine supports other than wood, as this has been the cheapest material available. Wood can be readily cut to meet the varying mining requirements, in many cases by an ordinary laborer equipped with a saw or handax. When loaded beyond its capacity, the resulting straining or cracking serves as a warning to the miner.

No longer can the mine operators send their timbermen to the woods surrounding the mine openings for their props. The incerase in the cost of mining, due to the ever increasing cost of timber, is a problem that has necessitated a great deal of study. The need of more systematic timbering has been discussed in many papers on accidents due to fall of roof and coal, on maximum recovery of coal, etc. While no direct remedy has been suggested, that could be adapted to all conditions, there can be no doubt but that much further relief will be afforded by continued work and study along the following lines: Reforestation, reducing loss by decay, timber economy in mines, adopting methods of mining which reduce the timber consumption for maximum recovery of coal, substituting other materials for wood.



Masonry Wall Laid in Mortar



Typical Application of Concrete to Mine Portals

Reforestation

To indicate what is being done to meet the ever increasing demand upon the forests of Pennsylvania, I have taken some figures from the address of Henry Drinker, president of the American Forestry Association, published in the *American Forester* for March, 1912.

Pennsylvania has a Department of Forestry, with a commissioner and a deputy commissioner; also a State Forestry Reservation Commission. It has the second largest state forest reserve in the United States (about 1,000,000 acres), with provision for the purchase of land not exceeding $5 per acre. There is a fine protective system. The state has taken the lead in the campaign against the spread of the chestnut blight by its generous appropriation of $275,000 for the work, and the effective measures taken thereunder. There is also under consideration the enactment of legislation taxing timber land at a small rate per acre, and there is one college and an academy in the state giving courses in forestry.

H. S. Graves, the United States Forester, gives full information of the splendid work being done by the U. S. Forest Service in his report for 1912. The report shows that on June 30 the national forest reserves covered a

Note—Paper read before Coal Mining Institute of America, Monongahela, Penn., June 16, 1914.

total of 187,406,376 acres. These contain a total of 600,000,000,000 ft. of merchantable timber.

It may be interesting to note that among the private interests engaged in the practice of forestry in 1911, the U. S. Department of Forestry reports ten coal companies with acreage distributed as follows: Ohio, 34,510 acres; Indiana, 100 acres; New York, 10,000 acres, and Pennsylvania, 43,308 acres, a total of 87,918 acres. Another company having both coal and railroad interests has 100,000 acres in addition to the above; this has no doubt been increased in the last three years.

Reducing Loss by Decay

The reports of the U. S. Department of Agriculture set forth that 45 per cent. of timber taken into the mines, decays. This statement has been given wide publicity in various periodicals. To reduce this large percentage of loss, several methods have been adopted. The simplest expedients are to peal the timber before use, and to use judgment as to when it should be cut. Timber cut during the summer months decays much more rapidly than that cut during the winter. Loblolly pines cut during the summer have been observed to show the first evidence of decay within six to eight weeks.[1] Timber after reaching the mine has been given the brush treatment with whitewash, cheap paint, creosote or carbolineum with effective and economical results. Timber has also been treated with creosote and zinc chloride at an additional cost of 20 and 12 per cent., respectively, with the result that its life has already been increased 300 per cent., and it is still in good condition.[2]

Several large coal-mining companies have found it necessary to install plants for the treatment of timber for use in mines. Treated timber would come into more general use if it could be more readily bought in the open market. The preserved timber on first thought, could be used to advantage only where permanent timbers are desired, but this is not necessarily true. Timber which is to be kept in the mine for one year would be of more value if treated, for this may be taken as the life of mine-timber in any except the best of atmospheric conditions. This time limit may seem rather low, but one would seldom reuse a timber after it had been under ground for a year; it may still look strong, but it has lost a great deal of its vitality.

One of the accompanying figures shows timber that has stood for 25 years. These timbers, at first glance, appeared to be in an excellent state of preservation (not a single prop had fallen out), although upon careful examination it was found that a penknife could easily be buried to the hilt in any of them. These props had been split from the center of white oak trees and contained little or no sap wood. Manifestly, there was no weight on these timbers, the roof being supported by the adjacent pillars.

The use of mine timber preserved with creosote or other oils has frequently been condemned on the ground that they increase the inflammability of the wood. Again, in case of fire, the irritating effect of the smoke produced is great. Some European experimenters claim that only a few drops of such preservatives, when burned in a room, make respiration impossible. I am advised by the superintendent of a preservation plant of one of the railroads that after treated timber has stood for two or three months it becomes very difficult to ignite it.

The necessity for protecting timber from the weather, the proper time to season and other interesting features are well illustrated and described in a paper by E. E. Ruter, Coal Age, Feb. 21, 1914, page 331.



Apparently Good Timber Rotted through



An Excellent Condition Where Pointed Posts Could Be Used

Timber Economy in Mines

Timber economy may be attempted in two ways: By the use of a portable sawmill to utilize broken or otherwise worthless timber, and by dressing the timber to most economical proportions and shapes.

Portable sawmills have been installed by a number of mining companies for the purpose of sawing up broken timbers and odd lengths into sprags, caps, lagging, and even into lumber. One company using a portable sawmill reports a large saving, which would make it appear that the amount of broken timber and odd lengths being

[1] Penna. Mine Inspector's Report—1912. Part I. Page 20.
[2] Penna. Mine Inspector's Report—1912. Part I. Page 20.

covered up daily in the many mines of our country is an appreciable item.

Decrease in the first cost of timber may be accomplished by reducing the freight bills. This may be done: (a) By removing the bark as soon as the timber is cut and allowing the water to dry out. At the same time this gives the timber a better opportunity to season, which adds strength and retards decay; (b) by slabbing the timbers where cut, thus eliminating the transportation of a large tonnage. The Department of Agriculture reports that slabbing a prop tends to increase its unit strength, probably the effect of improving its straightness. Conclusive results could be obtained only by comparing materials cut in the same area. The unit strength of a round post is much stronger than the same post split; likewise, the unit strength of round timbers used for beams is much less than when the beam is sawed in the correct proportions of height to breadth to give the best unit strength design.

Under favorable conditions of roof and floor, props may be made more serviceable, and at a considerable saving, by sharpening one end in the form of a wedge, or to a point, so that the prop will yield somewhat before the elastic limit has been reached. The results of some tests published by Emil Stens in *Gluckauf*, Apr. 29, 1911, are given in the following table. The props consisted of straight pine 10 c.m. (3.94 in.) in diameter and 1.4 m. (55.12 in.) long. Five props were used for each test:

		Pressure (Tons)	Compression (%)
1.	Props fastened at upper and lower end...	15.1	0.31
2.	Prop with a 4-in. wedge shaped cap on top	16.3	5.2
3.	Props with 4-in. wedge on both ends.....	14.1	8.7
4.	Prop with a 4-in. wedge shaped cap on top and beveled at bottom; length of bevel 1.5 times the diameter.....	16.8	17.5
5.	Same with bevel three times the diameter	15.3	18.2

The results of these tests show the yielding capacity of props can be increased from 0.3 per cent. to 18.2 per cent. without decreasing the carrying capacity of the timber. On account of the varying grain in the wood, it is always best to toe the bottom of the prop into the ground one or two inches. The best results are obtained by using a cap piece with some sap wood; this, being soft, allows the prop to adjust itself to more even pressures.

W. H. Hepplewhite, who was among the first to try out the pointed or tapered prop, conducted a test on props 6 ft. long and 6 in. in diameter with a 15-in. taper. At 15 tons, the prop began to blur out at the bottom, and at a pressure of 34 tons the prop began to buckle in the middle. This allowed a roof depression of 15 in. without damage to the bulk of the prop, whereas a prop with square ends would have broken and become useless when the roof had come down about 2 in. The former prop could have been redrawn and reset; the latter could not. Men using axes to cut their props instead of saws can taper a prop with a loss of but little time.

The use of pointed props for gob timbers is well worth serious consideration where the pillars are under considerable pressure and the floor is medium hard. A floor of this kind is shown in the accompanying figure, the cross-bar in this picture being level. This same effect is produced in a minor way by placing the wooden prop on a pile of soft dirt, but this does not seem so practicable since the compression at first is very rapid at low pressure and then quickly changes to a very slow rate of compression. Ideal places for the use of pointed or yielding props are shown in two of the accompanying figures.



TYPICAL HAND STOWING USED AS A ROOF SUPPORT



DRY WALL BUILT UP IN THE FORM OF A PIER

ADOPTING METHODS OF MINING WHICH REDUCE THE TIMBER CONSUMPTION FOR MAXIMUM RECOVERY OF COAL

The timbering problem is so closely related to mining methods that this phase must be considered sooner or later. The methods which undoubtedly give the least trouble from falls of roof are the strippings of Kansas or eastern Pennsylvania, about which we recently have had an opportunity to read so much. Beginning with this method, timber consumption increases until we consider the caving methods, which are undoubtedly among the greatest consumers of timber. Among other methods we can compare the room-and-pillar system, where so often no attempt is made to recover timber, and with the longwall method, where a large part of the timber is recovered.

In a class by itself is the system of hydraulic filling. Here the first excavations are filled or partly filled with loose material, which in time acts as a pillar to support

the roof while the coal is being removed; this will support the roof and stop squeezes where all other known methods have failed. I have observed pillars being extracted with the use of very little timber where a squeeze had heaved the bottom of an old entry tight up against the roof, which was almost entirely supporting it while the coal was being removed.

Substitutes for Wood

After the adoption of such of the preceding methods as may be practical, the mining industry may still be in need of more permanent, substantial or more economical mine props, especially as our mines become deeper and extend over more area, and where a large percentage of the coal is to be extracted. With this in view, we may consider what has already been done in securing substitutes for wood.

First, hydraulic filling; this has been of the greatest economic value from the standpoint of recovery of coal and saving of wood. No attempt will be made here to discuss the many phases of this important subject. The accompany figure shows the culm standing in a straight wall, requiring no lateral support, while the coal is being extracted.

Second, hand stowing of waste materials from the mine either along the main passages or in the working place or as pack walls in longwall work. A pack wall in an Illinois mine is shown in an accompanying figure.

Third, the building of piers or columns with mine rock without the use of cementing material, as shown in an accompanying illustration. Piers of this type when compressed about 30 per cent. will carry a load about equal to what coal will stand in the pillar. A pier of this type is very serviceable and costs about $1.25 per cu.yd. for construction.

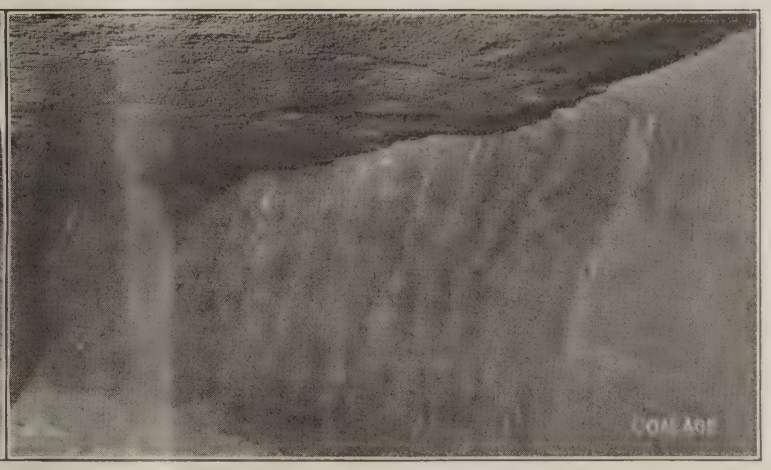
Fourth, the use of well constructed concrete, brick or stone piers or walls, either alone or in conjunction with steel or wood beams. A stone pier used at the junction of a butt entry aircourse and the face entry is shown herewith. Supports of this construction must be considered as perfectly rigid and are used to prevent the roof from bending and subsequently falling. After weight has been supplied to a support of this type greater than its compression strength it is of no more value. It is unlike a support of similar material which has been built without mortar, the latter having a greater supporting value with the increase in the compression.

The use of concrete or masonry arches and walls with steel beams are gradually eliminating the old-time prop with brush lagging, and the later use of large and more permanent timbering for mine portals, shaft bottoms, underground stables, pump houses and other similar places where it is very important that there will be no delays due to a fall of roof. In one mine recently visited approximately one mile of concrete and brick-lined entry had been installed. One of the accompanying figures shows the use of concrete for mine portals, steel ties imbedded in a concrete floor and a steel tipple.

A concrete or masonry wall built along the haulageway to support the cross beams not only acts as lagging, but should a trip of cars become badly wrecked there is no danger of the end supports of the cross-bars becoming dislodged and allowing the roof to fall. Where concrete or brick piers for end supports of beams are to be built, advantage should be taken of this practice and the wall built up solid to the top of the car. The pier for the beams may then be built on top of the wall.



Where Pointed Props Might Have Been Used to Advantage



Example of Culm Filling in the Anthracite Regions

Fifth, steel sets are frequently used in place of wood on important haulage or airways as a permanent mine roof support. Discussions on this phase of timbering have been so thoroughly covered in papers read before this institute by R. B. Woodworth, of the Carnegie Steel Co., and in later papers by him, in which he keeps this important topic uptodate and constantly before the attention of mining men, that it would be folly for me to attempt a lengthy discussion of this subject without the use of quotation marks.

Among the more important installations of steel timber sets, the Carnegie Steel Co. gives the names of 50 companies that are using steel in gangways and entries, pump houses, underground stables, etc. A complete list would probably include nearly all the large companies of the United States.

The first cost of steel timber, erected, is usually two to three times that of wood, but this is usually warranted by the increased life and the large expense sometimes necessary to clean up a fall. Another very important consideration is the reduced output caused by blocking a haulageway. One of the accompanying figures illustrates what often happens in case of a cave. This pic-

ture was taken after a test in the experimental mine of the Bureau of Mines at Bruceton, Penn. A very interesting comparison, showing the advantages of steel I-beams over steel rails, white oak, chestnut and white pine, is given in an article by A. W. Hess, COAL AGE, Feb. 28, 1914. One of the points brought out is that a 4-in. I-beam will do the work of an 8-in. round timber.

Sixth, the use of steel or iron props at the face. This practice is possible only where all the props can be recovered, or in that portion of the mine where it is possible to recover the props before they have become overstrained to such an extent that they must be straightened, repaired or sold for scrap.

Props are made to serve either one of two general purposes. The first type is the rigid prop, which fails upon a compression of a very small per cent. Such props are used to keep the roof in place and prevent it from starting, for instance, in the case of a tender shale above a flexible roof coal, the use of the rigid prop being to hold the roof coal up against the shale. The second type of prop is used to support the immediate roof where its movement is practically irresistible. This type of steel prop can be made yielding only in combination with wood or by allowing a part of the prop to rest in a cavity filled with peat or other loose materials. The yielding steel prop is probably used in Germany more than any other country.

In either case, the type of steel prop giving the best results from a structural standpoint is the pipe. This has been tried in the anthracite region where great supporting power was necessary. The pipe was cut to length and a flange placed on both ends to increase the bearing surface. Scrap pipes from old culm lines have been used in stables and such places after filling the pipe with concrete.

The most economical design of steel to withstand compression is the "H" section beam, where the radius of gyration is nearly equal about both axes. This design has been used in England since about 1890 and is now quite common. It has also found a market in the anthracite district to a limited extent. The chief drawback in both the pipe and "H" section is the inability to readily change the length to suit conditions. This has been overcome in several different ways.

A most ingenious design of a roof support is in the form of a pipe with a screw jack head; this was used in a bituminous mine of Pennsylvania about 1906 (see accompanying figure). These props were made to protect a coal conveyor in longwall work, but they would also be of advantage in many mines as temporary props under draw-slate, or for protection in taking down bad roof.

Another form of adjustable prop, manufactured by Herman Schwarz, of Essen, Germany, consists of a channel bar with a T-beam telescoping into the channel; the lower end of the beam is slightly wedge-shaped. The beam contains horizontal slots and it is raised to the proper height, then forced against the roof by iron wedges driven into slots and resting on the band on top of the channel bar. A wood wedge is then driven in between a movable ring and the wedge-shaped end of the T-beam. The iron wedges through the beam are then removed and used at the next post. An oval-shaped bolt is provided for use on the back side of the channel. When it is desired to remove the prop this bolt is given a one-quarter turn, which brings it to the flat side of the bolt and loosens the wood wedge on the front of the channel and allows the prop to collapse. The compression of the wedge allows the props to yield at a load of 15 tons, which is regulated somewhat by the kind of wood used for the wedge. This prop has found use in both Germany and Belgium.

The Mannesmann Mildless Steel prop consists of two pipes, one telescoping into the other so that they can be adjusted to the proper height. They are held in position by a clamp which is attached on the outside of the prop in such a manner that it cannot slide down. It is claimed that the clamp can be screwed to a resisting force of 15 tons, after which time the telescoping will proceed as that weight is being applied. Good results have been obtained by using these at gate ends and to the first waste conjointly with tapered props. These props, as the ones above, can be easily removed from a distance.



"JACK" USED AS A TEMPORARY SUPPORT

CONCLUSIONS

One of the most important means of obtaining economy in the use of props is to provide a method of mining whereby a maximum amount of timber may be recovered. While this change is being made, attention should be directed to more economical utilization of the timber now available and to increase the wood supply. The latter must be done by reforestation; the former by preventing loss due to decay, cutting beams so as to have the greatest unit-bearing value and pointing the props so they will yield to compression slightly under the breaking load.

Concrete, stone and brick piers and walls have proved

desirable, especially where steel beams are to be supported, but they are not recommended for permanent supports to withstand great pressure. These three materials are also used to great advantage for mine portals, shaft bottoms, underground offices, stables and pump houses. Dry pack walls or piers and hydraulic filling are the successful supports to irresistible pressures. The use of steel sets has been firmly established in the United States, and they are giving satisfaction both with regard to cost and efficiency. The use of cast-iron props has given way to later designs in steel. Steel props are gradually becoming more extensively used abroad, and before long we can look for their general adoption in the mines here.

Results of 48 Tests

The investigation of mine roof supports has been started by the Bureau of Mines for the purpose of determining what are the best materials to use for supporting the roof and how these different materials and appliances act under load. Forty-eight tests were made in coöperation with the Pennsylvania State Anthracite Mine Cave Commission during January, 1913. These tests and others made later, supplementing that work, are as follows:



Heavy Fall Blocking the Haulageway

Four tests were made to determine the bearing value of props placed in a vertical position.

Four tests were made on dry rubble masonry to determine the unit-bearing value at different percentages of compression.

Five tests were made to determine the unit bearing value at various percentages of compression on loading yellow pine, oak and spruce cogs unfilled and filled with loose mine rock.

Two tests were made to determine the unit bearing value at different percentages of compression for square mine rock cogs laid up in cement mortar, the interior hydraulically filled with culm, sand and ashes.

Seven tests were made to determine the unit bearing value at various percentages of compression of sand and anthracite ashes equal parts, broken mine rock and breaker refuse passing through 1½-in. screen. Placed in steel cylinders.

Twenty-one tests on concrete of various mixtures of sand, sand and gravel, anthracite ashes, sand and breaker refuse, sand and broken mine rock and culm to determine the unit bearing value. The first set of seven was tested at the age of seven days, second set at 34 days and the third set at 96 days.

Five tests consisting of loading reinforced concrete columns and brick piers to determine the unit bearing value at maximum load. These tests were constructed and tested by the U. S. Bureau of Standards and the results given to the Anthracite Mine Cave Commission.

One test was made on a support designed by George S. Rice. It consisted of a concrete cylinder filled with mine rock and sand. The object was to determine the advisability of using such a design around gas or oil wells. This type may be used to great advantage for a pack wall along haulageways in longwall work, in arresting a squeeze or in supporting valuable improved property on the surface.

Three tests were made on concrete blocks to determine the advisability of their use under valuable surface improvements.

Twenty-one tests were made on loosely packed materials from the anthracite region to obtain a comparison between the different materials when subjected to loads.

Eighty-four tests were made to determine the compressibility of different materials from the anthracite region that are available for dry and hydraulic filling.

Fifteen tests were made to determine the effect of settlement of the above materials due to shaking, spading and tamping.

Seventeen tests were made on bituminous coals from the experimental mine.

All of these tests were made to determine what different uses materials around the mines may be economically put to for the purpose of supporting the roof while getting out all the coal and at the same time causing as little damage to surface property as possible. Some of these tests were made on wood for the purpose of getting a comparison between the materials used and some material with which we are already familiar.

In Bulletin No. 25 of the U. S. Bureau of Mines are the results of 15 tests conducted under the direction of Messrs. Griffith and Conner, and in the appendix are the results of 416 tests on anthracite coal made for the Scranton Engineers' Club, in 1900.

With the exception of the latter, which is very complete, these tests must be considered only as a preliminary investigation, and each branch must be continued to duplicate the tests conducted before the results can be accepted as authentic.

In furthering these tests a large amount of work has been outlined, including tests on concrete and steel props, not so much to determine their strength as to determine their behavior and what is the best type that can be adapted to mining practices.

The best method of splicing differently layed ropes is to open the six strands of the long-layed rope to the full length of the intended splice, then open the six strands of the shorter-layed rope for about a yard, join the ropes to form a long and short strand. Then lay the long-layed strands into the place of the short-layed ones, then run the ends in, being sure to lap the strands that run inside for their full length, with a piece of string, so that the strands will be the same size as that taken from the middle of the rope. This method prevents the twisting out of splices and allows the splicing of any two different sizes of ropes together by means of laying the big rope into the smaller one.

Sanitation and Simple Ways of Making It Effective

By Dr. R. D. Roller, Jr.*

SYNOPSIS—The first step toward sanitation is fences. Water, sewage, garbage disposal, disinfection and the proper diligence in stable cleaning are all necessary to secure the health and efficiency of the individual workers.

Medicine is drawing nearer each day to its ideal—the prevention of disease—and sanitation is one of the great cornerstones on which prophylaxis is built. As prevention of disease is of more importance than the cure, so it is of more importance to keep a man's working ability at par, than to try to build it up after it has declined.

Sanitation and efficiency go hand in hand. The man who has a child at home, in bed with typhoid fever contracted from flies or bad water, cannot be 100 per cent. efficient at his work. The man who has to sleep with the odors of a pigpen in his room, with flies from the garbage pile swarming about him, with mosquitoes from a stagnant pool of water singing around his head, is not 100 per cent. efficient. These are a few of the things that sanitation takes note of, and, while striving to prevent disease, at the same time seeks to increase human productiveness.

The incorporated town superintends its own sanitation, however well or badly this may be done, but the mining town is under direct control of the mining company, and must depend upon that company for its sanitation, So, aside from the fact that sanitation makes for efficiency, and, therefore, that it "pays," it is also a moral obligation which should be assumed voluntarily and cheerfully.

I think the start in sanitation should be made with a hobby, a hobby that is so practical that it seems to be indisputable. This hobby is called "fences." Each house should be fenced.

This should be done when the house is built, so that the cost will not seem burdensome. Each yard must be cleaned of rubbish before occupancy and what is of more importance, each tenant must be told that that yard must positively be kept in that condition.

A sidewalk should be laid in front of the houses and the roads be kept passable. In summer no water should be allowed to stand in the roads and all holes should be carefully filled. These are places for the breeding of flies and mosquitoes, and, though malaria is not prevalent in West Virginia, still the mosquito is an annoying and useless insect.

Pigs Should Be Isolated

Pigs should not be allowed to roam at large, and none should be kept near any dwelling; certain parts of the property, at a distance from the houses, varying with the circumstances, can be allotted to those who wish to keep them.

Enclosures for chickens should be fenced, but these, of course, can be at the rear of the houses.

The closet is the greatest difficulty with which we have to contend. There are many ways of arranging these, from buckets which are to be removed every week, to pits which are deep enough to be practically permanent. The bucket is good, but the constant cost of removal eventually becomes a source of irritation and often neglect follows, resulting in the very condition which it is sought to avoid.

The best, cheapest and most satisfactory method is the old-fashioned pit. This should be dug 5 to 6 ft. deep. The sides should be lined with 1-in. plank to prevent caving. These should project a few inches above the surface with a strip of board nailed across their ends, practically forming a foundation.

The house should be small and light. A mistake is often made in making it so large and cumbersome that it is hard to handle. It should be built independently of the foundation, but should be fastended to it securely, and in such a manner that all light is excluded. No windows should be put in the house, but if thought necessary for ventilation, small holes can be cut near the eaves and covered with wire screening.

The door should have a spring and be thus kept closed at all times. In this way the pit is kept in darkness and is no longer a breeding place for flies. Nor can flies lodge here and board in the kitchen, a condition which too frequently exists.

The pits should be treated with crude carbolic acid, at least once every two weeks, and a supply of lime should be kept in the house for the convenience of the user. Once a year the house can be removed and the pit cleaned, or when it becomes too full it can be covered with earth and a new one made nearby.

A unique scheme has been used by one coal company, which is as effective as it is cleanly. A 10- or 12-in. pipe was laid under 20 or more houses, with an opening under each house. A nearby stream was diverted into the pipe, flushing it continually, thus answering all the purposes of a sewer without its expense.

I would like to have a plan I have had in mind for some years tried. The same general arrangement of pipes may be used, but should be connected to a common sewer. These pipes should be flushed automatically once a day from a tank built for that purpose. The sewer can be discharged into a river or large stream, or, lacking that, several large cesspools could be dug, or a septic tank might be used. I believe that this is an ideal system where the water supply is abundant.

Careful Garbage Disposal Is Important

The question of garbage disposal is a second serious matter. A box, made of wood, or, preferably, galvanized iron with a tight lid, should be placed for each house. It is better to use these boxes if possible for ashes, tin cans and other dry rubbish and have the tenants put their slop in covered buckets. This slop can be collected in a separate compartment or in a large covered box that can be carried in the garbage wagon.

By a special arrangement with the driver, the owners of pigs can have the slop hauled to their pens and thus

*Eccles, W. Va.

Note—Abstract from a paper read before the West Virginia Coal Mining Institute, at Cumberland Md., June 3, 1914.

make use of it to a considerable extent. A place should be selected in a secluded spot for the disposal of the rubbish and all slop not fed to pigs should be buried or burned.

A garbage box without a bottom has been used with success in some places. I believe it has the advantage of not getting dirty and foul smelling so quickly, and there is less danger of scattering the garbage when collected. The box can be easily turned on its side, the garbage shoveled up, and lime sprinkled on the ground before replacing the container. If, for any reason, water gets into the box, it drains out readily and does not make such a bad mess of débris to handle.

Every precaution must be taken by the driver to prevent the scattering of rubbish on the ground.

A rigid rule must be enforced requiring cleanliness and prohibiting the throwing of trash about yards, and upon any violation the latter should be cleaned and the cost charged to the tenants. This acts as a punitive measure, but is at the same time just and fair to all.

It will be of great advantage and soon pay the difference in cost to get a good man, who is thoroughly reliable and has some tact, to drive the wagon. The difference that 25c. a day makes will be recognizable in the amount and quality of the work done. Rounds must be made as often as necessary; once a week, at least.

The water supply must be given full consideration. A system of pure water should be furnished and hydrants placed at convenient points, if not at every house. After a central system is installed and water obtained from one large source there is not great danger of contamination, but if wells are used, an examination should be made frequently to see that no contamination has taken place.

Around each hydrant a base of concrete should be built to prevent washing of the earth and standing water. It would be best if a drain be put in and the water carried at least away from the roads and yards.

Before deciding upon the water that is to be used, a thorough bacteriological examination of any springs that are in use should be made for contamination, and any not absolutely pure should be sealed up.

The camp officer should be made the special sanitary officer provided the company is not large enough to afford the employment of a man for that special purpose. He should make a thorough inspection of the town at least once a month and report any conditions that need correction, calling special attention to flagrant violations of any rule.

Most People Like to Be Clean

The great majority of people like clean homes and surroundings, even though they do not realize it. They should be encouraged in keeping their premises in good condition. They should be assisted in making gardens. Front yards should have grass and flowers and back yards should produce vegetables.

In the same enclosure, one cannot have chickens and flowers, nor pigs and vegetables, and no garden can exist in a yard littered with garbage, ashes and old tin cans.

The children must be brought into any scheme of improvement and their cöoperation secured. The best place to teach them is in the school, and the teachers should be asked to give their aid by talking to the children a short time each week on general sanitation, and what it means.

Insistence must be made upon the fact that clean surroundings with a dirty house are unthinkable and every effort must be made to have clean homes within as well as without.

One great asset toward cleanliness is a central bath house. At each mine a bath house should be built with a system of lockers, each made of steel and well ventilated. There should be one locker for each man and a small rental can be charged for its use.

Adjoining this locker room, but not in it, showers should be built with concrete floors. These, of course, must be supplied with hot and cold water. Perfect ventilation must be provided, and when heated in the winter, care must be taken that the air in the locker room does not become too humid.

There are times when disinfection of a house becomes necessary even when there are no so called contagious diseases. A friend of mine told me of a mining camp, of which he had recently taken charge, in which there was such a prevalence of tuberculosis as to almost approach an epidemic. This called for disinfection of all houses, in which there were active tubercular patients or in which any had died recently, as thorough as after a release of a scarlet-fever patient. This is a point frequently overlooked.

The Care and Disinfection of Stables

In view of the fact that it is thought highly probable that infantile paralysis is transmitted by the fly, care should be taken to destroy all breeding places of this insect around the stable. Manure should be kept in a dark place and covered if possible. Kerosene poured on it will destroy the larvæ. The stable itself should be kept clean and occasionally disinfected by burning sulphur, after it has been tightly closed.

I would also like to suggest that that part of the store where meat is sold should be screened. One of the best ways to do this is to screen the counters, leaving small openings, with self-closing doors, through which the packages may be passed.

There has been a great deal discovered in the last few years in regard to hookworm, and its connection with so called laziness. I have found two or three cases in my practice. This disease exists practically everywhere south of the Potomac River, and though found more frequently among the country people, I believe it will develop to some extent among miners and others.

Hookworm ova develop in temperatures ranging from 77° to 95° F., but they have been known to mature in mines at a uniform temperature of 68° F. Lower than this there is probably no development of the ovum.

Infection occurs most frequently through the skin. For this reason country children are most liable to infection, as fecal matter is here more frequently scattered over the ground, the children getting the larvæ on their feet.

Hookworm causes symptoms varying from lassitude to complete debility. Where many men are infected there is a great decrease in the amount of work done by a given number and many more must be employed. I wish it were possible to give definite statistics; these, however, will be secured in the near future. And in the meantime, it will be well for the operator to bear in mind, and carefully consider, that the day may come when fighting the hookworm will be a part of mining sanitation.

Modern Collieries of Durham, England

By Samuel Dean*

SYNOPSIS—Brief description of a new field recently developed on the southeast coast of Durham. Four collieries are being developed, the oldest mine—that at Horden—having entailed a total expenditure of nearly three million dollars in its initial construction.

What has been called the wonderland of Durham is the southeastern part of the country, between Leaham Harbor and the Hartlepools served by the coast branch of the North Eastern Ry.

Twelve to fifteen years ago this part of the country through which the coast line runs was inhabited only by a few scattered agriculturists, and was the home of the fox and the hare. Occasional fox hunts took place, and the pitman was only seen there when he came over from the collieries farther east to attend the greyhound coursings, and as is his wont, he spent the evenings in song and merriment at the country taverns.

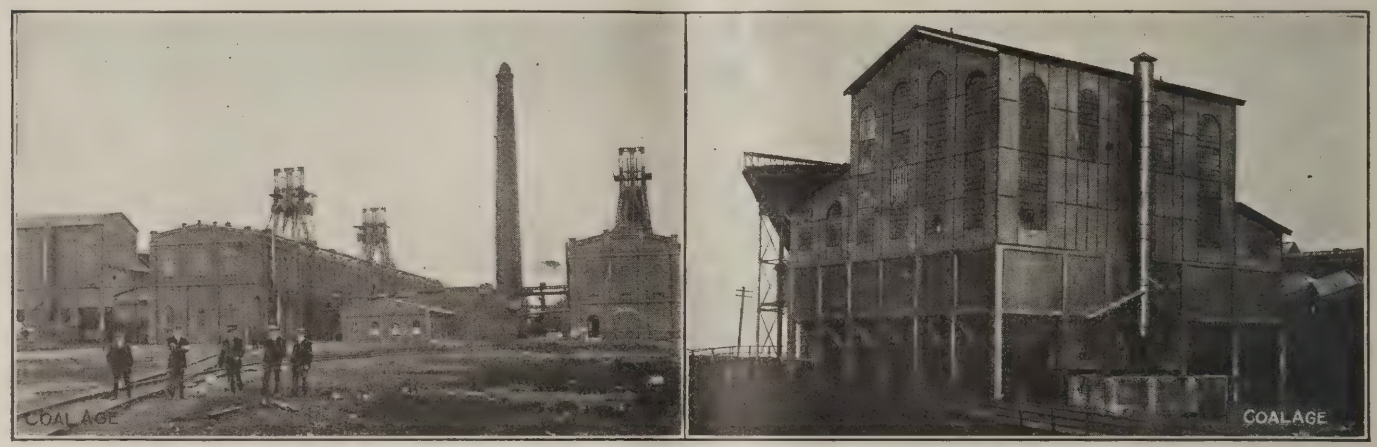
It may seem strange that in England, a rich portion of a coalfield should be without a railroad for so many years, but along the southeast coast of Durham the cliffs are high and numerous deep gorges intersect the land. It had long been realized that the construction of a railroad would be costly; many deep cuts and long, high bridges would be required.

Railroad Cost $150,000 Per Mile

Eventually, however, about the time of the Boer war, in 1900, a beginning was made. The undertaking was gigantic. Gorges 800 ft. wide and 100 ft. deep had to be spanned. One span is 120 ft.—the largest brick arch with one exception on any British railway. The total cost of the line was £30,000 ($150,000) per mile. It was opened for traffic in 1905.

In 1899 shaft sinking had started at Dawdon and Easington. There are now four collieries served by the line—Dawdon, Easington, Horden and Blackhalls. Tremendous quantities of water had to be dealt with in all of them before the coal measures were reached. The magnesian limestone, containing salt water, is approximately 650 ft. thick, and between the limestone and the coal measures there is 50 to 100 ft. of running sand.

Efforts to sink Dawdon and Easington by means of bucket-lift pumps were unsuccessful; over 10,000 gal. of water per minute, in one shaft, was encountered, and eventually after long delays the shafts were sunk with the aid of the freezing process. Dawdon did not com-



General View of Horden Colliery and a Near View of the Washery



The Episcopal Church and the Club House

*Victor-American Fuel Co., Delagua, Colo.

Note—Mr. Dean is now traveling through European coal fields, and is preparing a number of articles expressly for "Coal Age."





Carnival Groups, Representing the British Empire and African Types



Hospital Nurses and First-Aid Men in Carnival Parade



The First-Aid Corps at Horden Colliery

mence to hoist coal until 1907, and Easington was still later, beginning only in 1910. The cost of sinking has not been made public, but it was very great.

Town of 10,000 Inhabitants Quickly Springs Up

Coal was reached first at Horden, which was producing in 1905, and today there is the town of Horden, with a population of over 10,000, on land which was green fields when I first saw it in 1904. The output per day is 3000 tons, and there are about 3000 men and boys employed. This output of 3000 tons supports a town of over 10,000 men, women and children, with a church, several chapels, schools, picture palaces, clubhouses, three gorgeous public-houses or drinking palaces, coöperative store and over 20 shops. Building is by no means over, and the population is still growing.

The cost of sinking the three shafts at Horden, with 36-in. diamond bucket-lift pumps, down to a depth of 1150 ft. was £380,000 ($1,900,000), and the total amount of money spent at the colliery, including sinking the shafts, making pit bottoms and equipping the surface—including standage for empty and loaded railroad cars—was over £550,000 ($2,750,000).

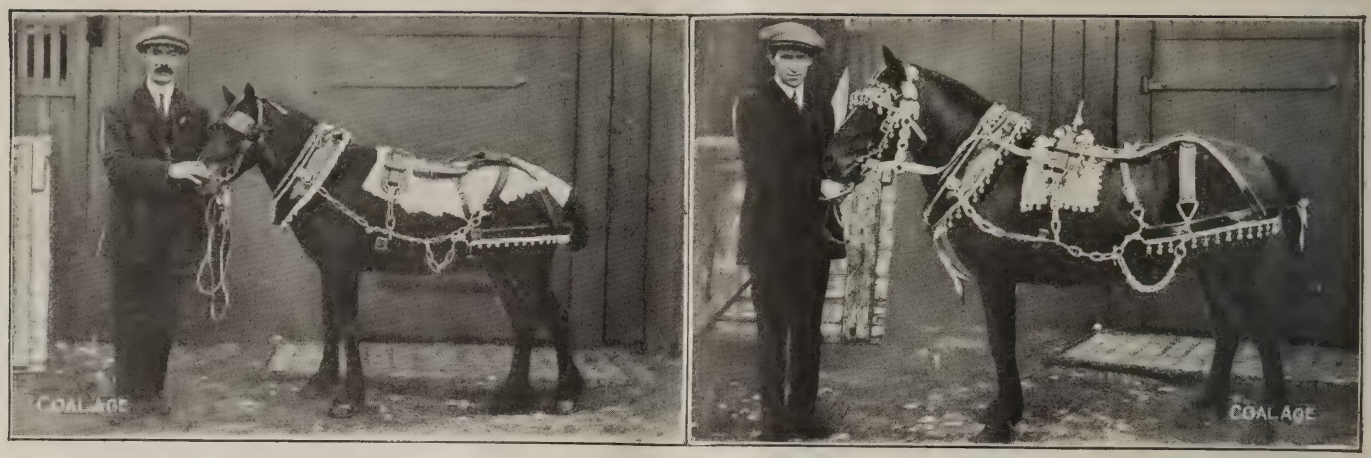
Easington now looks like it is going to challenge Horden, 2000 tons of coal a day are being raised, and what is most remarkable is the large new towns which these



Horden Colliery Foot-Ball Team



"Putter Boys" at Easington Colliery



Prize Pit Ponies at Horden Colliery Carnival

comparatively small outputs support. The architecture and construction is in every way fine, and money appears to have been as plentiful as the water in the shafts.

Four years ago sinking commenced at Blackhalls in the face of unparalleled difficulties. The limestone is 650 ft. thick and contains underground streams. Bucket-lift pumps were employed, and at one time 17,000 gal. of water per minute were handled before the cementation process was adopted, and this has proved quite successful. Two circular shafts, 20 ft. in diameter, have been sunk down to a depth of 1200 ft., and up to date over £350,000 ($1,750,000) have been spent.

Electric hoisting engines have been installed, and the company proposes to erect a garden village surrounding a public park and having a bandstand in the center.

The Carnival at Horden

A carnival or parade takes place at Horden every summer, for the purpose of raising funds for the local hospital. Prizes are given for the most original costumes or groups, and the pitmen's lassies, with collection boxes, pass around among the spectators.



The Youthful Pitman, First-Prize Winner in Cycle Parade, Horden Colliery Carnival

The mines are being worked on the three-shift system, and, as the Northern custom is, the first shift of hewers or diggers descend about 4 a.m. Diggers do not always have the same places, lots are cast every quarter, and a man takes his chance of getting either a hard or a soft place to work. This is called "cavilling." The boys who haul or push the coal from the coal faces to the partings are called either "pony putters" or "hand putters." In some thin seams the small ½-ton cars are still pushed by hand to the partings.

The officials and company men are numerous; there are deputies or firemen, back-overmen, fore overmen, master shifters, master wastemen, undermanagers and a general manager. The manager's position is similar to that of the superintendent at American mines, except that he must hold a first-class certificate, and generally his status is higher than that of a superintendent. Managers of the present day are, as a rule, mostly men with a high technical training; owners have evidently discovered that this type of man gives them the best results.

The Lake Freight Rates—The carriers in trunk-line territory north of the Ohio and east of the Mississippi Rivers, filed tariffs with the Interstate Commerce Commission on Oct. 15, 1913, to be effective after approval, advancing rates on all freight, including coal. This action, if made effective, would add 5c. per ton on Lake cargo coal to a rate fixed by decision of the Interstate Commerce Commission, Mar. 11, 1912, which, in its judgment, "from the point of view of the specific cost of doing this particular business, is still too high."

The reason the Lake cargo rate was protested was not for its amount, but that its relation to other competitive districts was not right. The rate fixed by the commission, Mar. 11, 1912, and especially the advance now asked by the carriers, continues that unfair relation.

Those interested are not concerned in the proposed advances on other commodity rates, nor do they object to profitable coal rates from all districts; but are taking the ground that the carriers must first establish a proper and equitable relation among the rates from all competitive districts, so that if additional revenues should be allowed to the carriers, and coal should supply any part, each district would bear its proper share of the burden

The 108th Meeting of the American Institute of Mining Engineers will be held in Salt Lake City, Aug. 10 to 14, 1914 inclusive, with headquarters at the Hotel Utah. Several coal papers will be read at the Thursday morning session. Bradley Stoughton, 29 W. 39th Street, New York, is secretary.

Plumbing the No. 5 Shaft of the Madison Coal Corporation in Illinois

By G. E. Lyman*

SYNOPSIS—Description of a particularly well executed shaft-plumbing operation, using the two-shaft method. Some original and valuable notes on the inaccuracies permissible in this class of work are also given.

In the early days of mining, when it generally required some unusual emergency to induce an operator to have a survey of the workings made, the inaccuracies of the maps were frequently only equalled by the startling crudities of the field method employed. To no part of the work did this apply more pointedly, perhaps, than to the connection of the underground and surface surveys.

The old-time surveyor, equipped with his Jacob-staff and link-chain, was well content to take sights above and below on the hoisting rope, or perhaps a corner of the shaft, and then carry his compass lines forward into the workings with a simple faith that at least did credit to his intentions. With the modern development of mining operations, however, and the necessity of maps in keeping therewith, the several methods of shaft plumbing now in use were gradually introduced until today we have means of handling this critical part of the work that are really astonishing in their accuracy; they also form a most fascinating piece of work for the engineer, as well as an interesting problem for the practical mathematician.

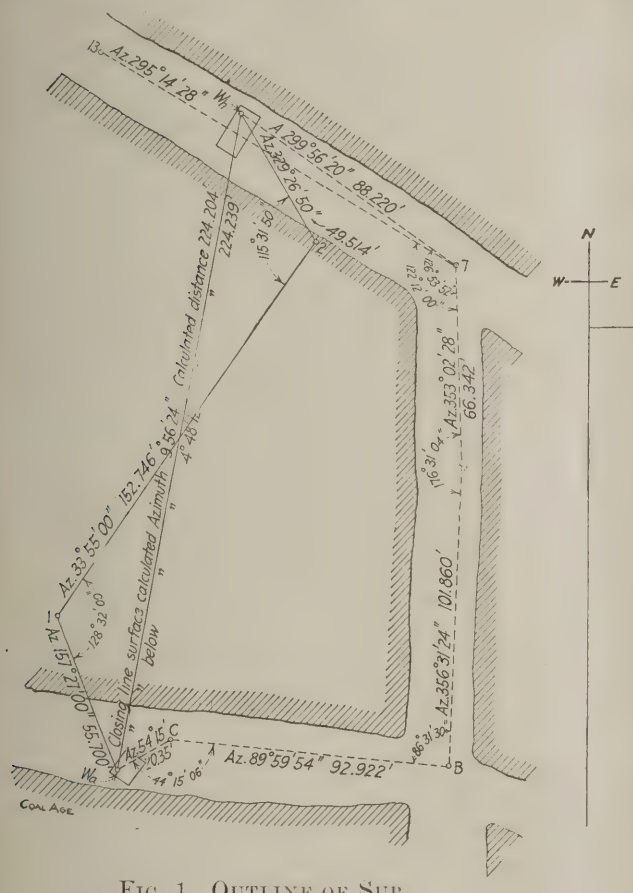


Fig. 1. Outline of Surface and Underground Traverse

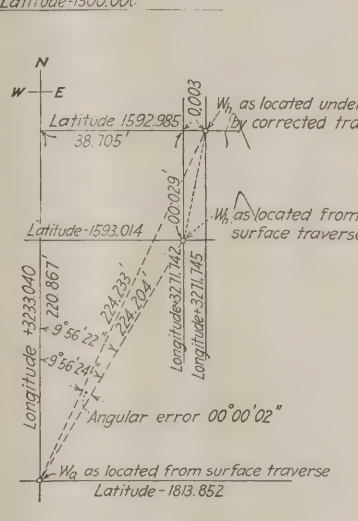


Fig. 2. Sketch Showing Angular and Coördinate Error

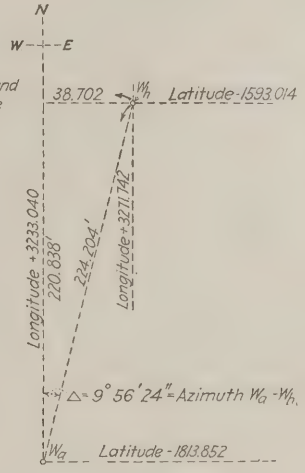


Fig. 3. Determination of Azimuth between Wires

Preliminary Considerations

It may be said, briefly, that all the more accurate methods of correlating the top and bottom surveys of shaft mines, have as their basis the determination of the underground coördinates of two temporary points on the surface survey, which are transferred below by means of plumb lines and carefully tied in to underground stations, so as to form a permanent base line for all future mine traverses. These two plumb lines may be in the same, or in different shafts. Contrary to a somewhat widespread belief it is no special advantage to have them both visible from a point on their line produced, since the old method of "jiggering" to get on line permits of a considerable angular error, which increases with the proximity of the transit to either wire. In fact, this method is not much used now, except to handle the limited amount of development work done before the shafts are connected below.

It is evident that the further apart the two plumb lines are placed, within reasonable limits, the more accurate will be the results. Consequently the usual arrangement of bituminous mines, with their separate shafts for hoisting and ventilation, offer extremely favorable conditions for this work.

It is the purpose of this article to outline briefly the entire operation, with the necessary computations, as performed at Mine No. 5 of the Madison Coal Corporation, at Mt. Olive, Ill., during the regular work of the engineering department. This mine has two shafts, hoisting and air, about 420 ft. deep. Surface obstructions prevent

*Mining engineer, Madison Coal Corporation, Glen Carbon, Ill.

sighting between the shafts on top, and the arrangement of the bottom also makes it impossible below.

General Scheme of Procedure

No. 18 steel wire was used for plumb lines, with 60-lb. boiler weights attached below and swinging in tubs of water covered with an inch of black oil. On top the wires were suspended from heavy timbers securely spiked in place. About an hour was required for all vibration and swinging of the wires to cease. It is absolutely necessary, of course, that all work below be suspended, and the fan stopped during the entire operation. Measurements were made with a steel tape 200 ft. long, under standard tension, and compensated for temperature.

Fig. 1 shows a general outline of the surface and underground surveys, the former being shown in solid and the latter dotted. Stations 1 and 2 are permanent surface monuments set in concrete, which have been carefully tied in to the surface traverse. The azimuth from 1 to 2 is 33° 55′ 00″, and the distance is 152.746 ft. From this base line the remainder of the work is carried forward. The wire in the hoisting shaft is designated as W_h, and in the air shaft as W_a; 7 and 13 are permanent mine stations, which are ultimately to form the underground base line.

For the sake of obtaining the greatest possible accuracy, all angles were measured direct from foresights and the azimuths calculated therefrom. Each angle was repeated five times, one-fifth of the final result being taken as the correct value.

The cumulative repetition of an angle is an operation familiar to engineers, but for the information of the student it may be stated that it is necessary to use a transit graduated in azimuth from zero to 360 deg. Then, with the vernier set at zero, a foresight is taken on one line of the angle, the upper motion released and a foresight taken on the other line of the angle being measured. The lower motion is then released, a sight taken on the first point again, the upper motion released and turned to the second, and the process repeated as often as desired. In the measurement of the angle at C underground, for instance, after five repetitions in the manner just described, the vernier traversed the entire circle twice and read 1° 15′ 30″, making the total angle turned $(2 \times 360°) + 1° 15' 30''$, or 721° 15′ 30″, one-fifth of which, or 144° 15′ 06″ is the correct value of the angle.

Computations

The measurements of the angles at Stations 1 and 2 gives us the data on which the following computations are based, resulting in the accurate determination of the surface coördinates.

Fig. 3 shows the right triangle which is formed by the coördinate relation of the wires, with legs 38.702 ft. and 220.838 ft. long, from which the following is derived:

$$\textit{tangent of angle at } W_a = \frac{38.702}{220.838} = 9° 56' 24''$$

$$= \textit{azimuth of } W_a - W_h$$

$$\sqrt{220.838^2 + 38.702^2} = 224.204 = \textit{distance } W_a - W_h$$

The net result of the above is the accurate determination of the azimuth and length of the imaginary line connecting the two wires on the surface.

Returning to the underground work, reference to Fig. 1 shows that a somewhat more extensive traverse is required to connect the wires below. The surface instrument is accordingly set up at C, and the graduated plate brought approximately to azimuth by means of the needle. It is not necessary to do this, however, as any azimuth may be assumed to start with, but the method indicated has the advantage of keeping the subsequent correction within more reasonable limits. The angles are measured, as shown in the figure, by the same cumulative repetition as used in the surface work. At Station 7 an angle is read to Station 13, and the line between the two permanent stations eventually forms the base line for all subsequent underground work.

It should be noted that although this part of the work is referred to an assumed azimuth, the angular relations of the traverse between the wires are as precise as though we already knew the correct azimuth and were working from it.

The accompanying table shows the result of this work, the coördinates of W_a having been taken the same below as previously determined for it on the surface.

Applying the same computations as described for the surface work, we obtain the azimuth for the closing line underground, W_a to W_h, as 4° 48′ 12″, with a distance of 224.233 ft. Obviously we secure exactly the same result here, regardless of the azimuth assumed, or the coördinates taken for W_a below, as the only requisite is that the angular relation of the underground traverse shall be correct in itself.

Our surface and underground work now compares thus:

	Azimuth	Distance
Surface, Wa to Wh	9° 56′ 24″	224.204 ft.
Underground, Wa to Wh	4° 48′ 12″	224.233 ft.
Difference	5° 8′ 12″	0.029 ft.

We find, therefore, that our calculated azimuth for the line connecting the wires below is 5° 08′ 12″ less than the calculated azimuth of the same line on the surface. Consequently it is only necessary to make this correction in the azimuths of the underground traverse between the wires to bring it in precise agreement with the true

SURFACE TRAVERSE

Line	Distance	Azimuth	Bearing	L. Sine	L. Cosine	Longitude	Latitude	Station	Remarks
						+3211.680	—1762.410	1	Permanent surface monument
1-Wa	55.700	157° 27′ 00″	S 22° 33′ 00″E	+ 21.360	— 51.442	+3233.040	—1813.852	Wa	Wire in air shaft
1-2	152.746	33° 55′ 00″	N 33° 55′ 00″E	+ 85.231	+126.756	+3296.911	—1635.654	2	Permanent surface monument
2-Wh	49.514	329° 26′ 50″	N 30° 33′ 10″W	— 25.169	+ 42.639	+3271.742	—1593.014	Wh	Wire in hoisting shaft

UNDERGROUND TRAVERSE WITH ASSUMED AZIMUTH

Line	Distance	Azimuth	Bearing	L. Sine	L. Cosine	Longitude	Lattitude	Station	Remarks
						+3233.040	—1813.852	Wa	Location from surface traverse
Wa-C	20.350	54° 15′ 00″	N 54° 15′ 00″E	+ 16.516	+ 11.889	+3249.556	—1801.963	C	
C-B	92.922	89° 59′ 54″	N 89° 59′ 54″E	+ 92.922	+ 0.003	+3342.478	—1801.960	B	
B-A	101.860	356° 31′ 24″	N 3° 28′ 36″W	— 6.177	+101.673	+3336.301	—1700.287	A	
A-7	66.342	353° 2′ 28″	N 6° 57′ 32″W	— 8.037	+ 65.853	+3328.264	—1634.434	7	Permanent underground station
7-Wh	88.220	299° 56′ 20″	N 60° 3′ 40″W	— 76.448	+ 44.028	+3251.816	—1590.406	Wh	
7-13	245.300	295° 14′ 28″	N 64° 45′ 32″W	—221.879	+104.603	+3106.385	—1529.831	13	Permanent underground station

azimuth as used on the surface work. The azimuth of the permanent underground base line, 7 to 13, was found to be 295° 14′ 28″ as run with the assumed azimuth, and adding our correction we obtain 300° 22′ 40″.

This is the true azimuth of the line 7 to 13, and from it the surveys can be carried out into the workings. The azimuth W_h to 7 may now be corrected, and the true coördinates of 7 thereby calculated, using for this the surface coördinates of W_h. While this completes the connection of the surface and underground surveys, a further study of the figures is interesting.

UNDERGROUND TRAVERSE WITH CORRECTED AZIMUTH

Line	Distance	Azimuth	Bearing	L. Sine	L. Cosine	Longitude	Lattitude	Station	Remarks
						+3233.040	—1813.852	W_a	Location from surface traverse
W_a-C	20.350	59° 23′ 12″	N 59° 23′ 12″E	+ 17.513	+ 10.363	+3250.553	—1803.489	C	
C-B	92.922	95° 8′ 6″	S 84° 51′ 54″E	+ 92.549	— 8.317	+3343.102	—1811.806	B	
B-A	101.860	1° 39′ 36″	N 1° 39′ 36″E	+ 2.951	+101.817	+3346.053	—1709.989	A	
A-7	66.342	358° 10′ 40″	N 1° 49′ 20″W	— 2.109	+ 66.308	+3343.944	—1643.681	7	
7-W_h	88.220	305° 4′ 32″	N 54° 55′ 28″W	— 72.199	+ 50.696	+3271.745	—1592.985	W_h	
7-13	245.300	300° 22′ 40″	N 59° 37′ 20″W	—211.623	+124.048	+3132.321	—1519.633	13	

Checks

The calculated distance between the wires underground is 0.029 ft. longer than on the surface. Practically these distances should be the same; theoretically they should be almost infinitesimally closer together at the bottom, on account of the convergence toward the center of the earth. The calculation and comparison of these distances offers a convenient means of checking the entire work, and the discrepancy in lengths is frequently referred to as the error of the operation, which in the case under consideration would be in the ratio of 0.029 ft. to 224.204 ft., or as one in 7731, approximately. Sometimes the angular error is established by considering its tangent as 0.029 ÷ 224.204, which would indicate that it amounted to 00° 00′ 28″.

However, while satisfactory approximations from a practical standpoint, neither of these assumptions are correct; the accurate determination of the amount of error can only be made by correcting the entire underground traverse, and starting with the surface coördinates of one wire, figure the underground coördinates of the other wire and compare them with the surface location of same. The accompanying table shows this computation in full.

Fig. 2 shows, by means of a distorted sketch, the coordinate relation of W_a to W_h as located from the surface traverse, and W_h as located underground from corrected traverse below. The coördinates of W_h should, of course, be the same below as on the surface, but we find an error of 0.003 ft. in longitude and 0.029 ft. in latitude. This error is a fixed quantity, and will exist in all future underground work.

The azimuth of the closing line underground, as calculated from the coördinates of the corrected traverse, is 9° 56′ 22″ (Fig. 2) showing an actual error of 00°00′ 02″ as compared with the true surface azimuth of the same line. This insignificant error, at first sight, appears to be absurdly small, but a little study of Fig. 2 will show that there could be a considerable coördinate error and yet have absolutely no angular error which could be detected by computation, in which case W_a and the two locations of W_h would lie on the same straight line.

The distance between W_a and W_h figures exactly the same on the corrected underground traverse as it did with the assumed azimuth originally used, which is as it should be, since both results were obtained by purely mathematical processes, into which any error of field work could not enter.

Even the determinations of error given above cannot be said to be precise further than that they represent the total errors of the entire operation concentrated at the wire W_h. It is impossible to take account of any interior compensating error which may have occurred.

It is evident that a modification of this method may be readily applied to two wires in a single shaft, yet the advantage of using two shafts is readily apparent when it is considered that the effective base line (distance between wires) regulates the accuracy obtainable.

High-Production Records

The mines of the Superior Coal Co. have maintained their producing power for the year ending June 30, 1914. These mines, three in number, located in Macoupin County, in the central part of the state, produced, for the year just closed, an average of 11,383 tons per day worked.

The individual records of production for these mines were as follows:

Mine No. 1, produced 754,993 tons, hoisting 217⅞ days, and made an average hoist of 3565 tons per day.

Mine No. 2, produced 887,863 tons, hoisting 225⅛ days, and averaged 3944 tons per day.

Mine No. 3, produced 891,457 tons, hoisting 224$\frac{15}{16}$ days, and averaged 3961 tons per day.

From these figures, it would be fair to say that, had there been no labor troubles in Illinois during 1914, these mines would have produced 3,000,000 tons of coal. This is a good record; but the record for production is not the only thing to commend in the operation of these mines. The records for fatal and nonfatal accidents were equally good, there being three fatal and 23 nonfatal accidents, for the year ending June 30, 1914. The nonfatal accidents were only those that caused the loss of thirty or more days. No. 2 mine has not had a fatal accident for nearly two years; and, in that time, has produced nearly 2,000,000 tons of coal.

The production per fatal accident, for the year just closed, for these mines, was 844,820 tons, as compared with 782,591 tons for the year 1913, the Coal Report for Illinois, 1913, showed 352,407 tons mined, for each life lost. The production of these three mines, per nonfatal accident, was 110,194, as compared with 60,338 tons mined in the state per nonfatal accident.

The mines of the Superior Coal Co. have made a good record since they were opened up, and it would not be surprising if the year 1915 surpassed all previous records. Under the able management of John P. Reese, general superintendent, and John Ross, his assistant, at Gillespie, records have and will be broken. Both men are active in the safety-first movement, and sincere in their efforts to bring about a new order of things whereby mine accidents will be reduced to the minimum and suffering decreased.

Extracts from a Superintendent's Diary

Occasionally, when the pressure from the big bosses' office threatens my nerves, I pull down the roll top and make a trip into the mines. These trips being largely the promptings of impulse, I have no definite route mapped out, but wander about pretty much as the spirit moves me.

Very often I run into groups of men at the mouth of a room, discussing subjects of vital interest to themselves and myself as well, while at other times, I meet men singly and in pairs, at the working face and, because the meeting is free and easy, learn much about their personal affairs as well as their likes and dislikes.

Sometimes on these wanderings, a morning slips by so quickly that I run into a man eating out of a dinner pail without realizing that it is even near noon and, for fear of offending, I sit down and share the contents of the bucket. In this manner I have come to know much about the cooking accomplishments of many of our miners' wives and, incidentally, something about the feeling existing between the woman who prepares the bucket and the man for whom it is prepared.

For example; if the host is a young man from the boarding house, his standing with the landlady's daughter is evidenced by the trimmings in the bucket. Likewise the newlyweds are given to garnishments and other reminders of thoughtfulness.

Old man "Steady" who neither drinks nor beats his woman on pay days, finds no fancy work in his basket, but the delicious jellies and cakes and relishes assure him of the welcome that is awaiting him at the day's end. Possibly when I get him to talking I find that he was born in Scotland, and worked in the mines there when a young man. He remembers his dinner bucket of those days very distinctly; no jellies and pies and cakes (they have no money for such luxuries in the old country) but good plain food and plenty of it.

Then there is old man "Never-do-well." Some of the crumbs and leavings from his bucket are so unpalatable that even the mine rats refuse to keep him company while he is lunching. Of course, he is married to a Mrs. "Never-do-well" or such things could not happen.

Sometimes the Character of the Miner's Lunch Indicates Conditions at Home

Sometimes a scanty, poorly prepared lunch is an indication that back home some great misfortune is being met heroically. Today I learned of such an instance: Our boss driver is married to a girl who has not been able to use either one of her hands for two years. Six months before her marriage she picked up a dynamite cap that her father had dropped at home and in some manner exploded it while holding it; she went to the altar a hopeless cripple just as she is today.

Her own father advised Bruce against the marriage, after the accident, because of the girl's helplessness, but Bruce had only one answer: What's that got to do with her soul? And now, early in the morning and late at night Bruce does the work that those poor maimed hands would have done so willingly, if fate had willed otherwise: Hired help with boss driver's wages are beyond planning.

I learned all this from Bruce himself. I came upon him just as he was finishing his lunch and when I noticed the shape of the biscuits in his pail, I, as tactfully as possible, suggested that he send his wife to the cooking school that some of our ladies have arranged for, next week. This apparent misjudgment on my part, as to his wife's ability, cut deep and so the poor fellow told me the whole pitiful story that I might not misjudge her. Not once during the recital did he intimate that he was deserving of praise or sympathy.

Numbers or Skill in First Aid

By a First-Aid Man

First-aid work has done much during the last few years to relieve suffering and to prevent relatively simple injuries from developing into those of a more serious character. Among mining men, in particular, the influence of first-aid classes has been tremendously helpful in creating a better spirit of understanding between bosses and men, for it is scarcely possible that any man can work alongside his boss trying to learn to be useful in case of an accident without both becoming more friendly. Finally, there comes an immense satisfaction to the man equipped with some knowledge of first aid in knowing that if he does witness an accident, he is capable of being of some intelligent service and is not required to stand by, wishing he knew what to do and yet unable to ease the condition of the injured person.

It would be ideal if all persons were trained in the elements of first aid. In order to promote greater interest in the subject, many very interesting and instructive demonstrations are held each year, and these cannot fail to awaken the interest of the public. However, it is well to call attention at this point to the fact that these demonstrations may fall short of their real purpose.

First aid is not a means for producing a show or a pageant; it is, on the other hand, a splendid movement in the direction of the betterment of all mankind. There is then a certain danger in trying to organize a large demonstration, because it is human nature to seek to emphasize the number of participants rather than the excellence of their work.

It is certainly far better at any place to have a small corps of well trained first-aid men, fully equipped and thoroughly reliable, rather than a large number of men, poorly or only partially trained, rushed through a certain amount of instruction to make them available for some spectacular occasion, and whose very lack of sound training is likely to cause them to look upon the whole first-aid movement as of no permanent consequence.

Before a demonstration, *all* the men, not only the leaders or captains, who are to take part ought to be proficient in all the work to be demonstrated. This can only be guaranteed when proper classes have been conducted, under competent supervision, for a sufficient time to give each man an opportunity to become thoroughly familiar with the work, followed by examinations and practical demonstration by each individual of his ability to treat all the most common cases to which first aid is applicable.

Among the best of the good ideas that have been initiated in recent years, first aid may well be grouped. Its interests, however, like those of the other movements, ought to be well guarded.

The Labor Situation

SYNOPSIS—The Union has gained a victory in the anthracite region, this time over its recalcitrant members who desired to strike in violation of a contract. In Central Pennsylvania, the operators are preparing to sue the Union for permitting those things to be done which the Union has just successfully averted in the anthracite region. In Ohio, some progress toward settlement and a large advance toward peace have been made. At the Bache properties in Arkansas there is the peace which comes when everything combustible is burned or burning. The Bache-Denman Co. and its allies are bankrupt and the coal is burning in two of the mines.

Last week, we stated that the men working at the mines of the Delaware, Lackawanna and Western Coal Mining Department, rejecting the features in the wage scale requiring arbitration, were preparing for a strike. But the Union ultimately got the upper hand and held the men to their agreement. The men from 15 local unions had asked that certain alleged grievances be adjusted. If these grievances could be regarded from any point of view as scale violations, the men were justified in protest and acted within their right. The redresses desired were abolition of the patrol system and an adjustment of the machine-mining rate and to this is now added the recognition of the general committee in any new conditions that may arise at the mines.

REALLY NOT A NEGOTIABLE MATTER

While it was certain that the complaints made by the workmen did not on their face allege violations of the mining agreement, and one demand, at least, was such as could not be conceded by the company still Colonel R. A. Phillips, the vice-president and general manager consented to discuss the questions. In fact there was no other way open. It would not do for one of the parties to an agreement to decide whether the matter at issue did or did not offend against the agreement or was or was not within the bounds of reason and therefore insubmissible to negotiation, and moreover, the agreement seems to anticipate modifications in working conditions not to be classified as violations of the contract and to leave them open to the regulation of the conciliation board.

There were 57 representatives of the locals and the number was soon found unmanageable, so six men were appointed to act for all 15 unions. It was alleged this change was recommended by Colonel Phillips.

Thus far, all was almost regular though strictly speaking the pourparlers should have been between the district officials of union and company. But as Colonel Phillips had agreed to meet representatives of the miners at any time he had no just cause of complaint; nor did he make any but conceded many matters desired of him.

But the grievance committee backed up 18,000 employees believed that it could lay aside the agreement of 1912 and compel Colonel Phillips to grant its demands, without bringing the matter before any conciliation board. To this end the miners voted to give the grievance committee the right to call a strike. Now strikes and lockouts are forbidden under the agreement. If the employees' representatives and their employer cannot agree ,the issue must be taken before a conciliation board, and Colonel Phillips' willingness to hear the grievance of all the unions through their unofficial spokesmen did not compel him to sweep aside the appointed method of adjudicating disputes. In fact the men were at fault in not acting through their district officers as provided. They were disloyal to them, as well as to the agreement. Colonel Phillips therefore refused as was his right to argue the case any more with his men, except before the proper authority.

REALLY THE POVERTY OF THE UNION NOT ITS PRIDE RESTRAINED IT

The union officials, meanwhile, held back. They did not desire, as District President John Dempsey tersely stated, to cross any bridges till they came to them, a habit of caution which has been distressingly frequent with the union at all times. Its duty, too often evaded, is from the first to control the men, preventing all breaches of the agreement.

But even the final pacification of the would-be strikers is perhaps hardly to be credited to the good faith of the union officials. Perhaps it was nothing but the depleted condition of the union funds which really prevented a strike. True the local union had, on June 30, $75,643.67 in the treasury but after all this was only $4.20 for each probable striker should the trouble be strictly confined to the 18,000 in the D. L. & W. employ. As the grievance committee talked of calling out 8,000 more, it is easy to see that $3 would have been the total relief the men could have expected from funds on hand, as the main organization and the American Federation of Labor are practically without a reserve.

The position of the company was further strengthened by the fact that the coal business is so quiet that there is no anxiety relative to the possible idleness of the mines. Prudence therefore was powerful enough in itself to dictate an observance of the agreement. A personal letter was sent however by the D. L. & W. July 29, to all its employees but strange to say this rendered them hostile rather than conciliatory, so unwilling were they to consider the company's side of the argument.

There has been at all times a body of men in favor of an amicable settlement without a strike. These men recognized Colonel Phillips' fairness. Still they believed the new conditions justified the general committee in its independent action and they felt that machine mining and the patrol which were new matters should not be left to the conciliation board. Many of these men failed to vote when the referendum on the proposed strike was taken.

When, on July 31, the district president spoke against a strike as a violation of the agreement, and Colonel Phillips on being interviewed, promised to adhere to all promises made to the general committee, the strike was voted off and arrangements made for the leaving of the whole matter to the company and the district officers. In fact nothing could be more seemly than the declaration of the subcommittee as given to the press. A new atmosphere pervaded the whole dispute.

NESQUEHONING AND NOTTINGHAM

There are two other centers of unrest in the anthracite region, the Nesquehoning colliery of the Lehigh Coal & Navigation Co., and the Nottingham colliery of the Lehigh & Wilkes-Barre Coal Co. In the first the grievance of the "consideration men" is being discussed. When a man used to reach a place in the mine where he could not make money or where the material taken out was not measured, the company paid him $3.34 per day. Recently an effort has been made to pay him by the cars loaded. While some men working "by car work" were satisfied, when a vote was taken some weeks ago, it was found that 90 per cent. of the men were opposed to it.

The men at the colliery have taken up the matter with the company officials in due order and it now goes to the conciliation board at Hazleton Aug. 3. It is a pity that a similar disposition was not made of the D. L. & W. dispute in the earliest stages, before feelings grew so strong as to urge a strike and to suggest a practically new agreement to that already in force.

At Nottingham, the company has supplied, it is stated, a powder of less strength than that formerly employed. As the miners have to pay for their powder, this involves greater expense. There is no reason to believe that this directly assures the company greater profit, but it does probably result in the production of larger coal. The miners talk about carrying the case to court and testing whether the company can restrict the miners to purchasing their powder supplies from the company. Both these issues are important but the action in each case is in accord with the agreement and so creditable to the miners.

SUIT AGAINST UNION IN CENTRAL PENNSYLVANIA

In Central Pennsylvania, the policy of the union of permitting the members to violate the agreement at will has caused the Association of Bituminous Mine Operators of Western Pennsylvania to bring suit against the union. The companies claim an aggregate loss of $200,000. On July 21, the committee of the Association met in Clearfield and decided to move headquarters from Philadelphia to that town.

"PADDY" GILDAY TO JOIN THE OTHER UNION MEN AT WASHINGTON

It is stated that Patrick Gilday of Morrisdale Mines, Penn., is about to accept an office from President Wilson. It will be remembered that Gilday is president of the second district of the United Mine Workers of America and was one of the commissioners of conciliation in the Kanawha strike. While he does not have the magnetic qualities of the other mine

leaders, there is evidence that, at least of late, Patrick Gilday has been a credit to the body to which he belongs. He believes that the contract between miners and operators should not be violated and that any one so doing should be penalized. Only recently, we spoke highly of his attitude and we shall be truly sorry if he resigns.

It is said that Thomas Haggerty of Reynoldsville, Penn., who also figured in the Kanawha strike and who lives in the district, may be chosen as his successor. He is now a member of the National Executive Board representing District No. 2. James Purcell is also seeking the office.

HOCKING VALLEY RESUMES AUG. 3

After being in continuous conference at Columbus for more than a week the scale committee of operators and miners in the Hocking Valley district came to an agreement late Wednesday evening July 29. The question as to which method should be used in weighing coal under the new mine-run law was the cause of the deadlock and the matter in debate was left to the individual corporations and their miners to decide separately. The miners strenuously opposed the plan of weighing the lump and slack separately and since the tipples were old-fashioned that was the only plan that could be suggested by the operators. In some cases the miners have agreed, until the tipples are rebuilt, to estimate that the slack would add 28 per cent. to the weight of the lump coal. In other cases temporary weighing apparatus will be installed. As a result of the agreement practically all mines in the Hocking Valley district will resume operations Aug. 3. The Hocking Valley district mines about 9,000,000 tons per annum, employs about 12,000 men and produces about one-fourth of the whole output of Ohio.

Several minor changes were made in the working conditions of the previous year. Trappers, when they are superannuated miners are to be paid $1.50 instead of $1.25 per day and firemen's wages are to be based on an 8-hr. day.

It is estimated that it will cost in the neighborhood of $12,000 to $15,000 to rebuild each and every tipple in the Hocking and Jackson districts to conform to the requirements of the new law. This will mean an outlay of many thousands of dollars. In some cases where the mines are about worked out the tipples will not be rebuilt and the operations will be abandoned.

POMEROY DISTRICT RESUMES BUT MASSILLON AND CROOKSVILLE HAVE A DEADLOCK

In the Pomeroy district working conditions were adjusted with little trouble and mines are scheduled to start operations at once. The tipple question did not arise in these negotiations as practically all the tipples had been rebuilt during the suspension.

The conference in New Philadelphia of the scale committees of the Massillon district ended in a deadlock and an adjournment was taken until Aug. 4. The Crooksville district also had trouble in settling working conditions. Up to Aug. 1 no agreement had been reached. It is also stated that the Bergholz agreement has been signed.

It is believed that in eastern Ohio trouble with the Industrial Workers of the World is about over. Practically all the pumps and engines are manned and the parades of agitators have ceased, owing to the efforts of the sheriffs in Jefferson and Belmont county who arrested the ring leaders. The sheriffs succeeded in swearing in a large number of deputies to preserve order.

The coal operators mining the No. 8 or Pittsburg seam in Ohio have agreed to meet the miners in joint conference at Wheeling, W. Va., Wednesday afternoon at 2 o'clock. President Albasin, of the subdistrict union, called upon operators in Bellaire Sunday and asked if they could meet the miners. They arranged to enter into conference with them Wednesday morning, Aug. 5, but changed to the afternoon at the request of the miners. Concessions are expected and a settlement is expected to be made before next week.

The agreements in other sections being based on the promise that no concession would be made to eastern Ohio operators, the Union, it would appear, should make an equal concession to the other Ohio mine owners should it permit the eastern Ohio operators to make a more favorable scale. In fact this would be wise, promise or no promise, for the man who sets his price above the market watches the seller pass up the street and makes no sales.

A CONSTABLE CHARGED WITH COMPLICITY TO MURDER

The injunction proved itself unable to save the properties of the Bache-Denman interests because of a deplorable weakness of everyone from the U. S. attorney-general down. There has been too much terrorism on the side of the disorderly and too much maudlinism on the part of the law-abiding. The judge of the court who showed as much courage as any one failed to pass promptly on the contempt-of-court charge against Stewart, Slankard and others.

Now there are further complaints and the contempt case may be reopened or a new case filed. James Slankard, the constable of Hartford, Ark., already charged with contempt is now under indictment for complicity in the alleged cold blooded murder of the two mine guards at Prairie Creek. An employee of the Bache-Denman Coal Co. recently made affidavit that Slankard stood guard over a log house, where the union miners are said to have executed I. Sylesberry and J. Baskin after the all-night fight at Prairie Creek.

FOUR DAYS' RIOT ENDS IN RECEIVERSHIP

Franklin Bache was made receiver of the Mammoth Vein Coal Mining Co., the Coronado Coal Co., West Virginia corporations, the Bache-Denman Coal Co., an Oklahoma corporation, the Hartford Coal Co., the Sebastian County Coal Co., the Denman Coal Co., the Bache & Denman Coal Co., the Mammoth Vein Coal Co., the Mammoth Vein Royalty Co., and the Prairie Creek Coal Mining Co., all Arkansas corporations.

The combined capital of the interests is said to be $1,500,000 and the petition declares the value of the property $700,000. Necessary payments of royalty to T. W. M. Boone, are declared to be the cause for throwing the companies into bankruptcy.

In reciting the reasons for the appointment of a receiver it alleges that on Friday July 17, three of the companies' mines were destroyed in a riot of striking miners. On the next night the Hartford company's Dallas mine, near Hartford was destroyed while on July 20, the Coronado's plant at Arkoal was maliciously fired. It may be added that while the fire in No. 1 has now probably burned itself out, that in No. 3 is still burning and it has probably extended to Mine No. 4, as the mines join underground .

THE SOUTHWEST NEAR SETTLEMENT

On July 21 a joint session of the Southwest Coal Operators' Association and representatives of United Mine Workers of America from Arkansas, Oklahoma, Texas, Kansas and Missouri decided to abolish the existing Arbitration Board of one member and substitute a board to consist of three miners and three operators. The latter board will settle all disputes between employees and employers which are brought before them, without further appeal, though a deputy on the ground will try the case first and adjudicate the matter whose decision will be binding only if both sides assent. This bone of contention being removed, the wage agreement will be taken up by districts.

But great speed cannot be expected in the settlement as there are 3 separate districts; No. 21 comprising Oklahoma, Arkansas and Texas, No. 14, Kansas and No. 25, Missouri.

The Texas understanding is already complete, however, and secures the check-off and the 8-hr. day. The old wage scale is reaffirmed.

STATES OF WASHINGTON AND COLORADO

The miners' representatives in District No. 10 assembled at Seattle, Wash., according to Martin J. Flyzick, their president expect to ask for an increase in wages when the scale is renewed.

The Western Federation of Miners is meeting in Denver, Colo., and on July 27 a special committee reported in favor of a referendum calling for an amalgamation between the W. F. of M. and the U. M. W. of A. The recommendation was for a complete merging of the former in the latter or for a supreme control, the Western Federation being merely a metal-mining department of the larger organization. The Federation adopted this motion on July 31. Committeemen from each body are to meet and propose the merging terms, which will then be submitted to a referendum vote. At the present moment, amalgamation seems assured. Mother Jones is attending the convention.

McDONALD BELIEVES MINERS AND OPERATORS HAVE COMMON NEED

From an unexpected quarter comes a strong adherent of solidarity within the industry. Who would imagine that Duncan McDonald, the hot-headed leader of the Illinois miners, secretary of District No. 12, would argue for operators' profits, and would realize that juice could not be drawn from a squeezed lemon? Addressing the U. S. Industrial Relations Committee he stated that 40,000 of the 90,000 members of the United Mine Workers in Illinois were idle because too many mines had been opened.

These miners were, he alleged, on the verge of starvation, and he stated that the mine workers did not have enough money in their relief fund to meet the emergency. He stated that 18 mining companies failed last year and that there should be a law in the United States which would restrict the opening of new mines. Mr. McDonald did not add, however, that the unions had permitted some of the members to work in coöperative mines for two-thirds of the mining scale,

thus forcing non-coöperative coal-mining operations into bankruptcy.

Equally notable were Edward T. Bent's remarks about the union. Mr. Bent is a member of the Executive Board of the First District in the Illinois Coal Operators' Association and general manager of the Oglesby Coal Co., with an output of about a quarter million of tons per annum. Mr. Bent declared that conditions were better for miners in Illinois than in Colorado or Michigan "because they licked us in 1896."

Mr. Bent desired the centralization of power in the officers of the union believing that while the leaders should be chosen by the miners they should be free to exercise their discretion because their larger viewpoint made them more competent to determine all the issues in a labor dispute.

VANCOUVER ISLAND

The general strike threatened in Nanaimo seems wholly unlikely. The Provincial Federation of Labor declared for it only because the large number of miners overbalanced the judgment of those engaged in other trades. The sentiment is strongly against such a strike. Meantime the strikers have been told that the United Mine Workers will furnish them with no further pecuniary assistance. The union has spent $584,000 in Vancouver but cannot continue such liberality in view of its troubles elsewhere and its present lack of money. There is only $278,000 in the treasury.

Here and There in the Mining Field

There are two districts in Illinois where a combination of explosive gas and coal dust in the mines render mining operations dangerous. One of these is District V, comprising 33 mines in Saline and Gallatin Counties. Most recent statistics for this field indicate that explosions caused 32.1 per cent. of the fatal accidents, which compares with 2.9 per cent. for the state as a whole. Each employee produces an average of 5.1 tons of coal per working day, while the average daily production per employee for Illinois is 4.5 tons. This high rate production per capita is due to the extensive use of mining machines, 90.2 per cent. of the tonnage being mined by their aid.

Nearly all of the coal produced in the United States is mined by the room-and-pillar system, or some modification of it. The longwall method of mining, so well adapted to many thin seams, is neither understood nor appreciated in this country. The only field where longwall mining produces any considerable tonnage is in northern Illinois, in Will, Woodford, Putnam, Marshall, La Salle, Grundy and Bureau Counties. Longwall mines in this district produce over five million tons of coal annually, which amount is about 9 per cent. of the production of Illinois. The production of this tonnage is attended by 24.5 per cent. of the nonfatal accidents in coal mines in the state. The per capita production per employee is only 2.1 tons, as compared with 4.5 tons for the state as a whole. The longwall method of mining makes an almost complete extraction of the coal in the bed, and produces about 15 per cent. more lump coal over a 1¼-in. screen than is produced in Illinois room-and-pillar mines.

Editor Silliman of the "Pottsville Journal" has the following to say concerning government tax on hard coal companies: "The persecution of the anthracite companies by the government has materially retarded prosperity in the anthracite fields. All the companies are kept in a constant state of apprehension, for they know not what move the government may make next, or how radical and untoward it may be. An official of a large coal company a short time ago made the statement that he firmly believed that fully fifty per cent. of his time was taken up with government suits or government investigations.

"The administration seems to believe that there is a popular antipathy against what is colloquially known as the 'coal trust,' and in order to cater to this antipathy the administration believes it to be its duty, from the viewpoint of political exploitation, to make it clear to the public that it is intent upon either destroying the anthracite coal companies, or driving them out of business.

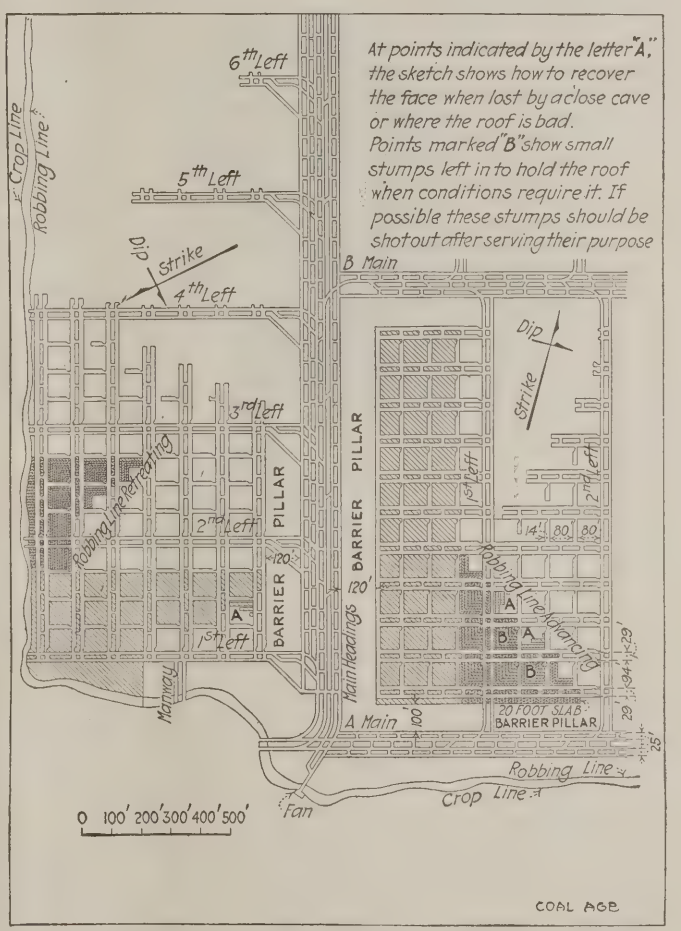
"The American citizen was told at one time that the anthracite companies represented an 'unholy combination operating in restraint of trade.' He has seen the companies go into court and refute these charges. He has seen them set forth that they are doing only what other decent business men do; nothing more or nothing less."

The Hillcrest Explosion

The jury investigating the Hillcrest disaster declared that death was occasioned by an explosion caused by gas and dust. A rider was added by the jury in which they declared that they believed the company had infringed the Mines' Act. They further suggested that the government enforce a monthly inspection of all men working in mines to see that no matches are carried into the mine and that a sufficient supply of life-saving apparatus is kept as near the mouth of the mine as possible.

A System of Mining in Kentucky

The Mineral Fuel Co. has designed a system of mining calculated to meet conditions as they exist in the district where this company operates. On the left-hand side of the accompanying illustration, robbing work commenced at the back end of the first and second left headings. This plan was possible because a development head-



PROPOSED METHOD OF MINING A KENTUCKY COAL SEAM

ing was driven from the manway. If the first left heading had been driven from the main heading, the rooms would have been widened to the left and a slab taken from the barrier, as is shown on the right-hand side of the illustration, where all the work is done advancing.

The model plan shown here is not designed for a single mine, but is a correlation for the conditions in this entire Kentucky field.

Who's Who in Coal Mining

Peter Kooi

The life of Peter Kooi is a fine example of what grit and determination will accomplish for a fellow when he has nothing more material to fall back upon. Losing his parents at the age of seven and starting to work as an errand boy in a Chicago grocery store at the age of eleven, was the inauspicious start of the subject of this sketch. At the age of fourteen Mr. Kooi became a clerk in the store where he was employed, continuing in this capacity for some years until the opportunity presented itself for him to purchase a railroad ticket brokerage business in Chicago.

In 1904, when 38 years of age, Mr. Kooi closed out his ticket business to become interested in a coal-mining property at Monarch, Wyo. He traveled out to this western



Peter Kooi

state to accept the job of secretary, treasurer and general manager of the Wyoming Coal Mining Co. at Monarch. Two other men with himself owned all the stock of this corporation.

In 1906 Mr. Kooi sold his interest in the Wyoming Coal Mining Co. and in the early spring of 1907 opened up his present property at Kooi, Wyo. Here he has developed a mine with 1800 tons daily output, and having a capacity of nearly double this present production. He owns the town bearing his name and supporting a population of about 400, and is also sole proprietor of the general store, catering to the wants of all these people.

Mr. Kooi never participated in politics, his entire time having been devoted to the particular line of work in which he has been engaged. He is not a hard man to get along with, as is evidenced by the fact that he has never been plaintiff or defendant in a lawsuit.

At one time he was president of the American Ticket Brokers' Association, and is ex-president of the Northern Wyoming Coal Operators' Association. He is a Mason, member and past-potentate of Kalif Temple Mystic Shrine, Sheridan, Wyo., member B. P. O. E., Sheridan, and member of the Rocky Mountain Coal Mining Institute.

Mr. Kooi possesses many admirable traits of character, but no quality in the man is more noteworthy than his ability to attend strictly to his own business, never meddling with affairs that are not his concern. He is the sort of man who must be boss where his interests lie, but he is not ambitious to dictate the policy his competitors, neighbors or friends must follow.

Handling Explosives

Among the recommendations of the Inland Steel Co.'s Book of Rules, relative to the handling of explosives, are the following, slightly modified to suit coal-mining conditions. With other changes and additions, such as the individual needs of each plant readily suggest, they will be found useful for posting around almost any mining operation.

(1) No one shall be allowed to handle or assist in handling high explosives in any way until he has received instructions satisfactory to the superintendent or mining foreman.

(2) Great care should be taken in handling and opening boxes of dynamite. Use a wooden mallet and a wooden wedge. Avoid friction and blows as much as possible and never open the box in a storage house or magazine.

(3) Suitable carrying boxes to hold not over 50 lb. of dynamite, and to have a self-closing cover should be provided for all men handling dynamite. The words, "For Dynamite Only" should be plainly stenciled on each box.

(4) Dynamite carrying boxes for open-pit work should be made as near frost proof as possible.

(5) No explosive should be taken into any mine except in a securely covered case. Explosives and caps should not be transported together.

(6) No explosives should be carried in electrically operated cars.

(7) Dynamite, fuse or caps should not be left in a wet place, or permitted to lie around loose in working places.

(8) Do not smoke or carry a paraffin or oil lamp in your hat when handling dynamite or caps, or when making up cartridges, as hot grease or oil may drop on the caps or powder and cause an explosion. Place your lamp 2 or 3 ft. to one side.

(9) Skewers are furnished for the use of all miners handling explosives and no other instrument should be used for inserting the fuse.

(10) Caps are extremely sensitive to heat, friction or blows. Do not drop them or strike them against any hard body. Do not lay them where they may be stepped on and do not carry them in your pocket.

(11) Place caps on fuse at the place where they are stored, and never near dynamite or powder.

(12) When crimping caps the greatest care should be taken not to squeeze the explosive composition. They should never be crimped with the teeth; there is enough composition in one of these small capsules to blow off a man's head. Cap crimpers must be used in all cases.

Editorials

Plenty to Sell But No Way to Deliver

One of the most important effects the European war will have on the American coal industry will be the opening of the markets of South America to United States coal. Never before have we had brought home to us so forcibly the need of a merchant marine. With our mines, our farms and our factories able to supply the world with fuel, food and clothes, we are seemingly unable to send our products abroad and profit by the fortunate position we occupy in this unfortunate affair. We trust the present Congress will relieve this situation at once and provide the money and authority to purchase ships and solve the greatest problem that now confronts us as a nation.

The Rate Decision

The long awaited decision of the Interstate Commerce Commission in the railroad rate case, has been handed down. The decision is favorable to the railroads in tone, contains some good advice and holds forth much hope for the future, but as to its immediate effect, the findings of the commission are not likely to benefit the roads in any very substantial way. Whereas the railroads asked for increases that would have yielded them $50,000,000, annually, the decision promises only about $14,000,000 a year increase.

Railroad men generally were disappointed in the decision. They say that if they cannot raise rates, they cannot increase wages, nor continue extensive improvements. One thing is sure, the Eastern roads will not find it easy to materially increase their capital because they will not be able to increase their earning capacity.

As for coal and coke, the ruling of the commission expressly forbids any increase in rates on these two commodities, and since these minerals with iron ore furnish more than 50 per cent. of the tonnage on some roads, the 5 per cent. increase, even in the central territory, is allowed on only a part of the freight tonnage.

The best thing about the decision is the commission's mere recognition that the railroads need relief.

Hydraulic Stowing

American coal operators would benefit greatly if they would adopt some of the ideas of European colliery managers concerning the hydraulic filling of worked-out areas underground. The chief advantage of this method of mining lies in the fact that it entails no new danger (so often found in new departures), and it can be employed to considerable advantage in most mines working thick, or moderately thick, seams, under a surface that must be preserved.

In hand-stowing as hitherto practiced, the rooms and entries can be packed only up to 45 per cent. of the space, while by hydraulic stowing, 90 per cent. of the space is filled. From this fact it follows that hydraulic stowing requires more than double the material used in packing by hand.

The time is not far off when all culm piles and waste dumps will have disappeared, because they will serve as feeding material for the hydraulic filling. After all these available piles are utilized, the question of how to obtain sufficient material for stowing will arise. If a blast furnace is near, the problem will be partly solved, for granulated slag is an excellent stowing material. If no furnace is nearby, the mining company may have to bring in its material by rail (perhaps in conjunction with other adjacent companies).

As to the kind of piping best suited for flushing material into mine workings, opinion is divided. Unlined mild-iron pipe is perhaps best suited where the flushing material is small and the consequent wear triffling. This type of pipe has a longer life for this work than that of steel. At a German colliery where different types of piping were used, the mild-iron pipe carried 60,000 tons of blast-furnace slag with the least wear. This style of pipe is generally manufactured with loose flanges, so that it can be turned several times before it is quite worn out.

Wrought-iron pipe with porcelain lining is also used successfully at several continental collieries. The porcelain used is of the very best, with a degree of hardness of 8, so that it can stand the roughest material.

In Germany, about 100 mines have introduced hydraulic stowing. In Belgium, about 10 mines use this same system, while in France a number of mines in the black-coal field have adopted the flushing system.

Hydraulic filling is therefore no longer in the experimental stages, and should be carefully investigated by all coal companies whose mines are subject to gob fires, or where there are excessive losses of coal and timber under present methods. Of course, this system finds its greatest use in thickly populated districts, where surface subsidence must be prevented.

With regard to the cost per cubic meter of stowing, or per ton (which is almost the same), it has been found that this amounts to about 29c.

The Duty of the Buyer

The coal buyer is gradually realizing that on him partly rests the burden of economy in mining. He cannot be brought too soon to realize that coal is a mineral which cannot be pried loose from its bed without breakage, and which is mixed with impurity so that it cannot be purchased as free from admixture of undesirable constituents as can an artificial article.

The buyer has been disposed to accept nothing but a No. 1 product. It would be better if he would frankly meet the situation, especially as regards the condition of the coal as received. All coal will probably be sold eventually in one of two forms, either pulverized or as slack. When all coal goes to market in one of these two conditions the whole problem of mining will be changed.

The operator today is endeavoring to keep his fuel in a lumpy condition and is wasting much money to that end. It is a manifest folly, and a stop should be put to that endeavor by changing the demand of the market before too much money is needlessly wasted.

The marketing of coal for domestic uses should entirely cease, for it places an entirely unnecessary burden on householders, involves great expense to the middleman and much delay to the city in the collection of ashes. It would be better for all houses to be heated by gas distributed under a pressure at least 10 times as high as that now customary. In this way smokeless combustion could be assured. The difficulty is that the present-day gas producer is only really successful where the best of fuel is used. There is evidence, however, that in the future, finer coal and less pure will be used in the gas producer.

The electrification of railroads will also favor the greater use of slack or pulverized coal. It is remarkable how the railroads have failed to take advantage of electrical train traction and to put themselves abreast of the times. To their credit, be it said that, though keen bargainers in a coal trade, they have deplored rather than condemned the price of coal. But they have done a great deal to make coal mining unprofitable by continued demand for a high grade of mine-run and an unwillingness to accept slack.

Advances in the coal industry are quite liable to be along the wrong lines if the coal buyer does not speedily arrive at his ultimate demand. If it is slack or dust which is really needed, why equip a mine with undercutting machines and use such precautions as having cars with low side boards, so that large lumps must be saved for building up the sides if a full load is to be secured? If fine coal is needed, the ingenuity of manufacturers should rather follow Gen. Edward O'Toole's lead, and the pneumatic transportation which he has put in execution is the natural sequence.

And when the railroad is reached, if dust is to be shipped, tank cars, loaded and unloaded pneumatically, are the natural *desiderata*. The labor and cost of unloading will thus be minimized. And when fine coal is the end sought, probably a pneumatic separation will replace washing and gravity methods. The effect of this change on the cost and facility of bunkering vessels at the dock and in the high seas would be revolutionary.

In fact, to know what is ultimately sought makes true efficiency possible and saves intermediate journeyings to that goal. If we are approaching a time when there will be as little need for nut and lump bituminous coal as there is now for broken anthracite, we should speedily realize it and hurry the day along, for every step to accommodate mining to present inefficient conditions is mere lost motion. The duty of the buyer is clear, but will be plainer yet if the seller points it out to him.

The Storage of Coal

In view of the immense demands of industries such as gas-making, etc., where one works will use from 1000 to 2000 tons of coal a day, the question of a proper method of storage is important.

It is generally conceded that no air-stacked heap—whether under cover or in the open—should be piled to a greater height than 20 ft. When this rule is violated, dust pockets are likely to occur, resulting in ignition or spontaneous combustion. For this reason, when 20 ft. is to be the maximum height of the stack, the storage capacity is limited to about 20,000 tons per acre of ground space.

By adopting the wet-storage method, that is, storing under water, the capacity per unit of ground area can be more than doubled. It is likewise true that when submerged, coal does not vary much in temperature and does not deteriorate greatly, due to the gases being more or less confined, thus preventing general oxidation.

Another consideration in wet storage is the prevention of breakage, the pulverization being reduced by the water forming a cushion between the various lumps.

Submerged storage, of course, is not without some disadvantages. The system entails a considerable initial expense, due to the necessity of constructing a substantial reinforced-concrete reservoir. A further consideration is the cost of pumping machinery for emptying and filling purposes. It is furthermore a fact that coal subjected to storage is usually found to be brittle and somewhat dull in appearance. The latter effect is superficial, and on drying in the sun rapidly disappears.

Probably the best method of storage is that known as the "mixed method," where a supply of coal is stacked in the open and an emergency supply is stored under water. The latter supply may stand for 5 or 10 years, and will be found to have deteriorated to only a very slight extent.

Much depends on the locality where the coal is to be stored. If the neighborhood is congested and the price of land high, submerged storage will afford relief by increasing the capacity per unit of ground. If the coal is to be used for gas-making purposes, arrangement should be made as far as possible to set the coal aside for drying before using. This is not so essential when the fuel is used for steam-raising or for firing purposes.

Many engineers believe it is better to carbonize a wet coal giving a slightly increased yield of impurities, than an air-stacked coal which has lost perhaps 10 per cent. of its gas-making value.

Our Export Trade in Coal Negligible

The gross annual export of bituminous coal from the United States (to countries other than Canada), including that used for bunkering purposes, aggregates only 13 million tons. This is not a very important volume of trade when viewed in the light of our total production of 570,000,000 tons annually. Therefore, if we were to lose our entire export trade, the American coal industry would suffer but little. On the other hand, the doubling of our present foreign coal business would hardly be felt by the industry at large. The chief possibility our coal companies have to fear is the general slackening of business throughout the nation, that may result from such a general conflict in Europe.

The imports of goods into the United States aggregate a billion dollars annually. This business nets this country approximately $200,000,000 each year. It is evident therefore that if the war blocks our foreign trade, United States revenues will be curtailed so greatly that our government will probably have to issue bonds to pay current expenses.

Legal Department

Coal Dealer's Remedy against Defamation

By A. L. H. Street*

There is an interesting court decision sustaining the right of a coal dealer to recover damages for libel or slander affecting his business. It is an opinion of the Wisconsin Supreme Court, reported at page 225, Vol. 105, *Northwestern Reporter,* in which the court upheld the right of a retail coal company to recover damages against the mayor of a city, if he falsely stated in a public address that the company not only charged extortionate prices for fuel, but refused to sell at all to persons suffering from illness. This decision reads as follows:

"A corporation may sue for a slander or libel upon it in the way of its business or trade. There can be no doubt that the published letter, which forms the basis of the second cause of action, was libelous per se under the circumstances set forth in the complaint. It charged, in substance, that at a time when there was a coal famine, and people were suffering for fuel, the plaintiff, though engaged in the business of selling coal, not only charged extortionate prices for its coal, but actually refused to sell coal, even at these prices, to people suffering from sickness. Such a charge is libelous, because imputing mean and abhorrent conduct to the plaintiff in the conduct of its business, and thus tending necessarily to injure it in such business.

"It is claimed, however, that, while the words may be libelous when written and published, the same words do not constitute slander per se when spoken, and that there is no sufficient allegation or special damage—hence that the first cause of action is subject to demurrer. This contention also must fall. Words spoken of a person in direct reference to his business or trade, which charge him with incapacity, fraud, trickery, dishonorable or mean conduct in the transaction of his business, thereby necessarily tending to injure him in such business, are actionable without proof of special damage. There seems to be no need of further discussion of the subject."

In this connection it is to be noted that there is abundant judicial authority for saying that any false statements written, printed or spoken of a coal dealer, which on their face tend to injure him in his trade or business, are actionable without proof of special damage if they accuse him of fraud, dishonesty, insolvency, refusal to pay his just debts, the commission of a public offence or any thing tending to destroy his business.

Recent Judicial Decisions

Miner's Duty to Remove or Prop Rock—In removing coal from the side of an entry from beneath a rock, a miner is bound to either first remove the rock or prop it, and cannot recover for injury resulting from his failure to do so. (Kentucky Court of Appeals, Wallsend Coal & Coke Co. vs. Shields' Administrator, 167 "Southwestern Reporter," 918.)

Risk of Injury Not Assumed by Employee—A miner does not assume the risk of injury growing out of negligent failure of his employer to keep appliances in proper condition, unless the danger is known to him or is obvious to a person of ordinary intelligence. (Kentucky Court of Appeals, Ohio Valley & Coal Mining Co. vs. Heine, 167 "Southwestern Reporter," 873.)

Proof of Agency to Buy Coal—In a suit to recover the price of coal, defended on the ground that the person to whom the coal was delivered was not defendant's agent, as claimed by plaintiff, mere declarations by the supposed agent are not admissible to establish his agency for defendant. (Texas Court of Civil Appeals, Kohlberg vs. Awbrey & Semple, 167 "Southwestern Reporter," 828.)

Damages Recoverable for Wrongful, but Innocent, Removal of Coal—When a coal operator wrongfully, but innocently, removes coal from the land of another, the damages recoverable against him are to be measured by the fair value of the coal in place at the time of taking, as determined by its royalty value. (Pennsylvania Supreme Court, Stark vs. Pennsylvania Coal Co., 88 "Atlantic Reporter," 770.)

Mine Driver's Duty to Discover Obstructions—That a mine driver failed to discover an obstruction in an air course does not show that he was guilty of such negligence as bars his right to recover damages for personal injuries sustained by him in consequence of such obstruction, in the absence of a showing that he would have discovered the obstruction had he maintained a reasonable lookout. (Alabama Supreme Court, Sloss-Sheffield Steel & Iron Co. vs. Russell, 65 "Southern Reporter," 137.)

Duty to Provide Props for Miners—The fact that a miner remains at work after failure of his employer to furnish props as promised, does not preclude the right to recover for consequent injury to him, unless the danger of continuing work was so apparent that a person of ordinary prudence would not have encountered the danger. Nor does the fact that he might have safely worked at other places than where roof fell upon him conclusively establish his guilt of contributory negligence. (Kentucky Court of Appeals, Continental Coal Corporation vs. York's Administrator, 167 Southwestern Reporter, 131.)

Commodities Clause of Interstate Commerce Act—The commodities clause of the Hepburn Act cannot be construed to prohibit a railway company to carry coal for a coal company organized by it to buy the product of its miners at the breakers, where it owns no stock in the coal company, having sold the greater part thereof to its stockholders, by whom much of the stock has been resold to outsiders. (United States District Court, District of New Jersey; United States vs. Delaware, Lackawanna & Western Railroad Co., 213 Federal Reporter 240.)

Amounts Recoverable for Injury to Mining Employees—Eight hundred and fifty dollars was not excessive recovery for injury to a coal mine driver where he was confined to his bed for three weeks, and the muscles of one of his legs were permanently impaired, although the leg was not broken. (Kentucky Court of Appeals, Kentucky Midland Coal Co. vs. Vincent, 166 "Southwestern Reporter," 800.) And it is held by the same court that $1000 was not too large recovery for injury to a miner in another case where his leg was broken and rendered shorter than the other. (Big Branch Coal Co. vs. Sanders, 166 "Southwestern Reporter," 813.)

Requirements of Missouri Law Concerning Hoisting Apparatus—Although the Missouri Mining Statutes require the operators of coal mines to provide as safe means as possible for hoisting miners, they do not make an operator an insurer of the safety of employees while being hoisted, the duty being merely to use a reasonable degree of care to maintain the equipment in reasonably safe condition. Negligence on an operator's part is not to be inferred from the mere fact that injury resulted to an employee from a defective condition of a cage; it must also appear that the operator had actual or constructive notice of the defect. (Kansas City Court of Appeals, Ronchetts vs. Northern Central Coal Co., 166 "Southwestern Reporter," 876.)

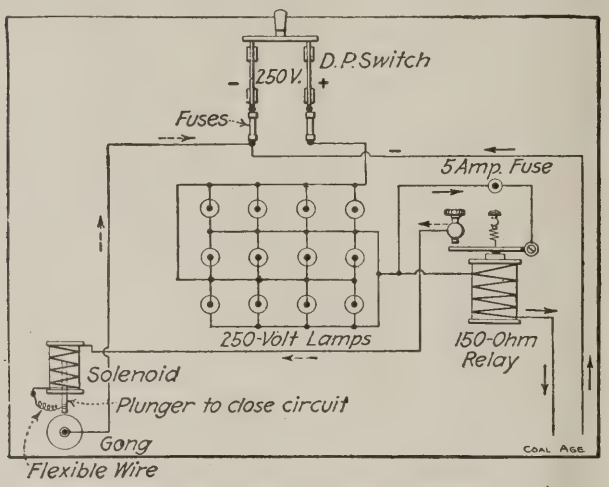
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Discussion By Readers

Mine Signaling

Referring to the mine-signal system described by Mr. McCune, COAL AGE, July 25, p. 149, permit me to suggest that the use of relay No. 2 and the mercury cup are unnecessary for the successful working of the system he suggests. While this system is not new in mining practice, its advantages are obvious. The installation of such a system, however, should be marked with all the simplicity possible.

The accompanying diagram shows the arrangement of the switchboard for the operation of the same system,



IMPROVED ARRANGEMENT OF SWITCHBOARD IN AUTOMATIC SIGNAL SYSTEM

with the elimination, however, of relay No. 2 and the mercury cup. In this diagram, as long as the main circuit remains closed, the branch circuit designed to operate the solenoid and ring the gong will be open. Should anything now occur in the mine to break the main circuit, relay No. 1 is rendered thereby inactive, and, the vibrator being released, flies up and closes the branch circuit operating the gong through the solenoid. This very much simplifies the system and reduces the expense of equipment and upkeep.

ELECTRICIAN.

Pittsburgh, Penn.

The Chemist in Coal Mining

I read the article, "The Chemical Laboratory in Coal-Mining Work," by R. E. Rightmire, COAL AGE, July 18, p. 110, with more than usual interest. The ideas he has expressed agree with mine in every particular. As chemical work in connection with the coal industry is of growing importance, I beg to add a few remarks drawing attention to what constitutes a good coal chemist and what he may be expected to accomplish that will prove of practical importance in the industry.

There are a comparatively few men engaged in the coal industry who thoroughly understand and appreciate the necessity of the services of a good chemist, in any of the operations where coal is mined for domestic consumption, gas or coke making, or even in the preparation of coal for the market. Too often is the work of the chemist, in this line, regarded with suspicion and incredulity; while a more intimate knowledge of the matters in his control, on the part of the operator, would prevent many of the blunders that continually reduce dividends.

Briefly, then, the requirements of a good coal chemist, aside from a general chemical training, are that he must have made a specialty of coal and have studied its geological and physical properties in connection with its chemical analysis. Besides making the ordinary chemical analyses of coal samples and determining the heat values of different coals, the coal chemist must be able to apply his knowledge in such a way that it will prove of practical benefit from a commercial standpoint, as, for instance, in the drawing up of specifications and contracts for the purchase of coal. He must understand the action and deleterious effect of every constituent of the coals offered in the market, so as to discriminate intelligently in respect to their relative economy for the purpose intended. In municipal-contract work, the coal chemist should be the supreme judge.

In respect to a gas-coal proposition, the chemist estimates the practical yield of gas in cubic feet per ton, as well as the B.t.u. of the gas generated per pound of coal, and the same item per cubic foot of gas. He must also determine and report the composition of the volatile matter, and especially the percentages of hydrogen sulphide and carbon dioxide, explaining the effect of these constituents when present in gas intended for fuel or lighting purposes.

In respect to a coking proposition, the chemist determines within reasonable limits the yield in coke per ton of coal, the volume of gas produced, pounds of ammonium sulphate, pounds of crude benzol and gallons of tar per ton of coal, in the modern byproduct coke-oven system. In this respect, the chemist is often able to give much important information based upon the analysis and test of a diamond-drill core; although, as is well understood, the quality and character of the coal may vary in different parts of the seam; and, for that reason, such samples should be taken from different prospect holes. While it is freely admitted that the results of many laboratory tests are not fully realized in practice, such results may be taken as a standard of the efficient yield of the coal in question.

In the preparation of coal for the market, either by washing or by the dry process, the chemist can, by a sink-and-float test and a careful analysis, determine the efficiency of the operation. It often happens that, in washing coal, much good coal is lost that should have been saved and utilized by further treatment for the production of gas or other purpose. The tailings or refuse may contain valuable minerals. It may not be necessary to wash all the coal; certain sizes may pass some specifications without washing. It may surprise an

operator to find that 50 or 60 per cent. of the coal mined does not require to pass through the washery. When it is necessary to remove the sulphur from coal, it is generally important to know whether this exists in combination with iron, as FeS_2, as a sulphate, or as organic or free sulphur. This information will also make known the best means to be adopted for its removal.

A competent coal chemist should be well posted on the coals of the world and be able to classify them. He should be informed, in respect to tonnage, quality and price of coals in different markets, so as to be able to advise intelligently on export business. I firmly believe that a chemist having the qualifications I have mentioned could make himself valuable, on a commercial basis, in any operation where coal is produced or consumed in large quantities.

A COAL AGE READER.

Joliet, Ill.

Magnifying Supposed Evils

Pessimism is a bad habit, and, while it is well to consider a matter from all sides, it is a great advantage to be able to regard, first and foremost, the bright side of every proposition. Coal mining is no exception to this rule. When trouble arises it is, of course, much easier to magnify the difficulties than to say "It might have been worse," and set oneself vigorously to the task of making the best of a difficult situation.

In reading the article entitled "Effect of the Mine-Run Law, COAL AGE, July 25, p. 155, I was forcibly impressed with the fact that the writer of the article greatly magnified the supposed evils of such a law. From his account, one would be led to suppose that there was an utter lack of mine discipline and regulations; and that, instead, the men were turned loose in the mine to shoot and dig coal when and where they saw fit and to load whatever material came first to hand.

Under such conditions, one might expect coal to be shot off the ribs, whereby creep and mine caves would result in much damage both to the mine and the surface, together with the loss of much valuable coal. Mine accidents would be increased, and the records would tell of mine explosions. Calamities are bad enough when they occur, without imagining evils that should be avoided by maintaining suitable discipline and taking necessary precautions in the operation of the mine.

After reading the article of our friend from Kansas, I feel like reassuring him by the statement that all of *our* coal in this district is "run-of-mine." While I cannot say anything in regard to the price the company receives for this coal, I *am* in a position to state fully the conditions that exist in the mine, as a result of employing this method of mining. I would say that fully 90 per cent. of our miners are foreign-speaking men, and while some are fairly good workmen others are very poor. However, we maintain discipline in the mine and suitable regulations are enforced to make the operations of mining the coal quite safe. The headings are driven and rooms turned according to a regular plan, and all pillars and stumps are removed as the work is finished.

Although the conditions in many of our mines are as bad as those that exist in other mines, and although the roof is at times as bad as any I have seen in my 30 years of experience in mines, and although we have clay veins and bony coal and other impurities in the seam, the men do not load an excessive amount of dirty coal. In this district, thousands of acres of coal have been taken out, and yet, with the exception of the draining of a few springs, the surface looks just as good as before the coal was mined.

Though I do not pretend to know much about the new mine law to which correspondent refers, I feel that much of the evil he fears will come to pass can be mitigated and the difficulties avoided, if proper attention is given to enforcing the balance of the law regulating mines.

THOS. HOGARTH.

Heilwood, Penn.

Co-operation in Mining

There has been much discussion recently in reference to the qualifications of a mine foreman. Of the various arguments advanced, about the same number favor the *technical* man as the *practical* man, for this position. One advocate will warmly commend the college man and state good reasons why such a man should be chosen for the position of mine foreman, instead of a practical man with no technical knowledge of mining. Others, again, condemn the practice of giving a position of responsibility in the mine to any other than a practical and experienced man.

Personally, I believe that a mine foreman should possess both practical and technical training. This is especially necessary in order that a man shall succeed as foreman of a *small* mine, where his duties will include not only the handling of the men but the performance of work requiring some technical knowledge. In a larger mine, the foreman is relieved of many of these duties, which devolve on specially trained men who are placed in charge of the different departments. *A little technical knowledge is as essential to the success of a practical man as practical knowledge is to the success of a technical man.* Indeed, theory and practice are a good combination.

But men are not made to order, and the operator must generally choose from the best at hand, who represent two classes. Compare, for example, the man who has set for himself a high standard of achievement and worked manfully and sacrificed much to obtain a college education, in order to better his condition—compare such a one with the man who has continued to work faithfully in the mines, plodding along day after day, and been slowly promoted from one position to another, until there is scarcely a branch of work connected with mining with which he is not familiar. Both of these men have noble qualities and high ambitions. Is it possible for an operator to choose between these two classes of men without doing one or the other of them an injustice? Would it not be better to so arrange their work and duties that they can coöperate by *pooling their resources* and abilities. To illustrate my meaning, I will recite one or two instances.

I recall the case of a contractor who bid on small jobs of carpentering, stonework, bricklaying, excavation, etc. While not eminently successful, he made a good living; but later, desiring to take a larger contract, which included concrete work, of which he knew little, he formed a partnership with a man who had little experience in practical work but who had made a study

of concrete construction. This man knew the strength of concrete; he knew the proper proportion of gravel and cement for various classes of such work. In other words, he was well posted on the theory of concreting. The partnership succeeded because these two men POOLED THEIR RESOURCES.

I remember a man who worked in a street-paving gang. He knew more about paving than his employers; he figured their estimates, laid out their work, which was done in a workmanlike manner. He could not undertake such work himself alone, for lack of capital. Later he went into business with a man who had the capital but not the experience, and together they succeeded, because they POOLED THEIR RESOURCES.

Again, in the same brickyard, there were two foremen, both having equal authority. One of these men knew clay; he knew its nature and how to make it into bricks; he knew how to burn the bricks; but he was no judge of the bricks after they were burned. The other man knew little or nothing of clay and less of the burning of bricks; but he *did* know a well burnt brick when he saw one. He knew the quality and strength of burnt bricks. He could judge of these from their appearance, color and ring. He knew how bricks should be handled, stored and transported, and he had complete charge of this end of the work. These two men succeeded, also, because they POOLED THEIR RESOURCES.

In the same way, the practical man and the technical man can succeed in the mine, if they learn to coöperate. The mining industry has much to learn in this respect. By keeping our eyes open, our minds unprejudiced and profiting by observation, one can improve his own methods. Coal mining needs both the practical and the technical man, provided they are willing and able to POOL THEIR RESOURCES.

GEO. N. LANTZ.

New Straitsville, Ohio.

Borderland Coal Co.'s Plant No. 2

We respectfully call attention to the article entitled "Plant of the Borderland Coal Co.," July 25, p. 141, and beg to advise that, with the exception of the scraper conveyor recently installed by the Webster Mfg. Co. to bring coal from the middle seam to the main conveyor, we designed and constructed the No. 2 plant of the Borderland Coal Co., complete, including the foundations.

PITTSBURGH COAL WASHER CO.,
per Lee Lewellyn, Chief Engineer.

Pittsburgh, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

MATTER

Definition—Matter is the tangible substance occupying space and endowed with properties that give to it form, motion and other distinguishing characteristics, by virtue of an all-pervading or impressed subtle force generally described as electrical.

Divisions of Matter—Until recently, the ultimate or smallest conceivable division of matter was assumed to be the **atom** (Dalton, 1808). Later researches of radio-active substances have developed the infinitely smaller particles which have been termed **"electrons"** (Stoney, 1891) and **"corpuscles"** (Thomson, 1897). The electron is assumed to be a minute particle of matter having a negative charge of electricity; and its mass is variously estimated at from $^1/_{1700}$ to $^1/_{2000}$ of the mass of the atom of hydrogen.

The chemical divisions of matter are the familiar **atoms** and **molecules.**

Properties of Matter—The universal attribute of all matter is that described as **"mass,"** which may be simply defined as amount of matter. By virtue of its assumed electrical state or condition, all matter is endowed with certain tangible and measurable qualities or properties, such as **weight, inertia, density, elasticity, cohesion, divisibility, impenetrability, expansion, contraction.**

Matter undergoes many changes but is absolutely indestructible.

Law of Attraction—The universal law of attraction is that every particle of matter attracts every other particle of matter, the force of attraction varying inversely as the square of the distance between the particles.

Terrestrial Attraction is the attraction that the mass of the earth exerts on the mass of a body. This is commonly called **"gravitation"** and the attractive force, the **"force of gravity"** or simply **"gravity."**

Form or State of Matter—All matter exists in one of three different forms, namely, **solid, liquid,** or **gaseous.** The same matter may pass from one form or state to another owing to a change in density.

Molecular State—The molecular theory assumes that all matter, solid, liquid or gaseous, in respect to its physical condition, is composed of molecules, each complete in itself. It is assumed that these molecules are subject to two opposite or opposing forces known as the **"molecular forces"** of attraction and repulsion.

Molecular Attraction, acting to bind the molecules of matter together, is in obedience to the common law of attraction in all matter.

Molecular Repulsion, acting to drive the molecules of matter apart, is the result of a state of incessant molecular vibration, which produces the effect called "heat."

The Coal Age Pocket Book

Solids—Matter in the solid state is characterized by a greater or less rigidity of its molecules. The force of molecular attraction is here stronger than that of repulsion, and the molecules are held in a firmer grasp.

Liquids—In the liquid state, the forces of attraction and repulsion are about evenly balanced, and the molecules move freely amongst each other.

Gases—In the gaseous state, the repulsive forces are in the ascendency and the molecules are driven so far apart that the density of the matter is reduced to that of a gas.

Liquids and gases are both **fluids,** which is a general term applied to any form of matter other than a solid.

Illustration—Ice, water and steam furnish a good illustration of how the same matter can pass successively from the solid to the liquid and gaseous states. In the passage from one state to another, there is no change in the matter itself, the difference being due to the heat condition of the mass.

In the passage from solid to liquid, or from liquid to gas or vapor, heat is given out; and, vice versa, heat is absorbed when a gas or vapor becomes a liquid, or a liquid becomes a solid. The change is thus a heat condition only.

Vapors and Gases—The term **vapor** properly describes the gaseous condition of most substances that, at ordinary temperatures, exist as liquid or solid; or a gas at or near its point of liquefaction. The term thus has a suggestive meaning of the possible liquid or solid state of the substance now in the gaseous state.

The term **gas,** on the other hand, is a general term that relates solely to the gaseous condition of matter; and is thus more properly applied to those substances that, at ordinary temperatures, exist as gas; although they may be liquefied or solidified by a decrease of temperature and an increase of pressure.

Thus, we speak of air, oxygen, hydrogen, nitrogen, carbon dioxide, methane, etc., as "gases," in contrast to steam (water vapor) and the vapors of such volatile liquids and solids as naphtha, benzine, camphor, and other similar substances.

Vaporization takes place at all temperatures; and, in many instances, a substance will pass directly from the solid to the gaseous condition, without becoming liquid.

Mass, Volume, Density—Since mass is amount of matter, the mass (M) of a body is the quantity of matter it contains, which is determined by the volume (V) of the body and the density (D) of the matter. The relation of these elements is expressed by the formula

$$M = VD$$

Then, considering a unit volume (V = 1), it is evident that the **"unit of mass"** is equal to the **"unit of density."** In other words, whatever is taken as the accepted unit or standard of density is also the unit and standard for the measurement of mass, which is the ultimate unit.

Inquiries of General Interest

Ignition of Firedamp by Signal Wires

My attention was drawn to the item on the ignition of firedamp by sparks from an electric bell, which appears in COAL AGE, June 13, p. 977. The article stated that a fatal accident in South Wales had been traced to the ignition of firedamp by sparks from an electric bell in use for signaling purposes.

The bell was described as an ordinary one of the trembler pattern, operated by an induction coil and a battery of eight Leclanché cells, which, when tested after the accident, gave a pressure of 11½ volts. The same item states that it was proved experimentally that sparks from the bell operated with current from the same battery would ignite an explosive mixture of coal gas and air, and that this mixture was later fired by sparks caused by rubbing a file across two wires connected to a pair of cells giving only 4 volts pressure.

The use of an induction coil with a battery of eight Leclanché cells for the operation of a trembler bell is a curious combination. Granting, however, that the circuit is to be opened at the bell, it would be gratifying to know what were the voltage and amperage delivered by the secondary current of this particular coil, under the working conditions, which must, of course, include the leakage of the wiring system and the inductive resistance of the circuit. It may be remarked, incidentally, that the pressure and strength of the current delivered at the point where the circuit was opened and necessary to produce an arc at that point, would depend on local conditions.

It would also be of interest to know if the statement at the close of the item, that an explosive mixture of coal gas and air was fired by the sparking of a current of 4-volts pressure from a pair of Leclanché cells, can be verified. It would be of the greatest interest to know if there are conditions under which mine gas and air, in any explosive mixture, can be ignited, that would seem to call in question the results of the tests made by the Federal Bureau of Mines.

I might add that *it is not possible to get discharges from Leclanché cells, at 4 volts, that will approximate the discharges at this voltage that are now recognized as being safe in the presence of mine gas.* It will be generally agreed that this subject bears an important part in determining the safety of electric mine lamps of all makes. Its thorough investigation would be of the greatest benefit to all concerned.

FRANCIS A. POCOCK.

Philadelphia, Penn.

In this connection, the article entitled "Gas Ignition by Electric Sparks," by W. M. Thornton, published in COAL AGE, Vol. 2, pp. 685, 722 and 796, will be of interest. Mr. Thornton, who is professor of electrical engineering, Armstrong College, Newcastle-upon-Tyne, England, has given much attention to this subject. In his article, Mr. Thornton shows that for the higher voltages, say 100 volts or greater, a current of a single ampere or less will suffice for the ignition of explosive mixtures of marsh gas and air; for lesser voltages, the current necessary for ignition of firedamp rapidly increases. He states: As the voltages are decreased below 50 volts, the current necessary to insure ignition, on the breaking of the circuit, increases very rapidly. Attention is also drawn to the fact that the metal of the terminals, whether iron, nickel or copper, varies the results.

Mr. Thornton adds: "It would appear to be impossible to ignite even the most explosive mixture of methane and air, by single-break sparks from a signaling circuit, at the maximum pressure of 20 volts allowed by the British Coal Mines Act. At these low voltages, electrical signaling may be used with safety in any part of a coal mine, provided that care is taken to prevent wires from remaining in contact and thus forming a short-circuit. Such a contact would cause the wires to become red-hot where they touch, but this is unlikely to occur." We shall be glad to receive further information on this subject. The subject of the influence of electrical currents, conducted into the mine, for power, lighting or for signaling purposes, upon explosive mixtures of gas or dust and air, is one of growing importance and should receive immediate and careful investigation.

A Surveying Problem

Will you kindly give the solution to the following question? I have a block of coal, in a seam pitching 28 deg. due south. This coal is opened by a gangway driven due east. At a certain point on this gangway, a heading has been driven 90 ft. to the rise. Owing to a heavy fall of roof which had closed the gangway, it is proposed to start a slant road from a point on the gangway, 200 ft. outby from the mouth of the heading. The problem is to determine the length and the grade of the slant road, such that it will intersect the heading driven up the pitch, at its face.

JOHN WILLINGHAM, Fireboss,
T. C. I. & R.R. Co., No. 4 Mine.

Belle Sumter, Ala.

The slant road forms the hypotenuse of a right triangle whose respective sides are the heading, 90 ft., and the gangway, 200 ft. The length of the slant road, measured across the pitch is then

$$\sqrt{200^2 + 90^2} = \sqrt{48{,}100} = 219.3\ ft.$$

The inclination of the seam being 28 deg., the vertical rise of the face of the heading above the gangway is

$$90 \times sin\ 28^\circ = 90 \times 0.46947 = 42.25\ ft.$$

Then, calling the grade angle of the slant road a,

$$sin\ a = \frac{42.25}{219.3} = 0.19266;\ \text{and}\ a = 11^\circ\ 06'$$

Since the tangent of this angle is 0.196, the slant road has a grade of 19.6 per cent.

Examination Questions

Questions for Examination of Mine Electricians*

Ques. 1—What is a miter gear?

Ans.—Two bevel gears of the same size, each cut on an angle of 45 deg.

Ques. 2—What is a consequent-pole motor?

Ans.—A motor having two field coils and four poles.

Ques. 3—What is a differential compound-wound motor?

Ans.—A motor with the series and shunt field connected in such a manner as to oppose each other.

Ques. 4—What is a horsepower and what is its electrical equivalent?

Ans.—A horsepower is the power required to raise a weight of 33,000 lb. through a vertical distance of 1 ft. in 1 min.; or a weight of 330 lb. through a height of 100 ft. in the same time. This is expressed as 33,000 ft.-lb. per min. Electrically, 1 hp. is equivalent to 746 watts.

Ques. 5—What is meant by the drawbar pull of a locomotive?

Ans.—The drawbar pull of a locomotive is its tractive force; or the force a locomotive exerts to pull a load along the track. This force is determined both by the power of the locomotive and the adhesive effect of its wheels to the rails, and is limited by either of these factors separately. In mining practice, the drawbar pull of a locomotive is commonly taken as one-fifth of its weight; and with ordinarily good track and rolling stock, the load hauled on a level road will be from eight to ten times the weight of a locomotive, or, say from 40 to 50 times its drawbar pull.

Ques. 6—Why does a compound motor race when the shunt-field circuit is broken?

Ans.—There are two conditions that may be explained as follows:

1. If the motor is running without load when the shunt-field circuit is broken it will race, for the following reason: A motor always tends to develop a counter-pressure in its armature almost equal to the impressed voltage, and this counter-pressure depends on both the speed of rotation and the magnetic field. Breaking the shunt current at once weakens the field and the motor speeds up in an effort to adjustment. This increase in speed is accompanied with an increase in counter-pressure, which, being opposed to the impressed voltage, still further weakens the armature and series-field current and results in a still further increase of speed, the action being cumulative, which effect, in electrical language, is termed "racing."

2. If, on the other hand, the motor is running under a heavy load when the shunt-field circuit is broken, it will likely stop for lack of sufficient torque to turn the armature. This causes, at once, a large drop in counter-pressure in the armature, and an excessive curent results, in most cases blowing out the fuses or circuit-breakers or, otherwise, burning out the armature.

Ques. 7—What is an interpole motor?

Ans.—An interpole motor is one having small poles between the main poles of the machine, the purpose being to reduce the field distortion and permit the motor to run at a higher speed with less danger of sparking at the brushes.

Ques. 8—(a) What is meant by the pitch of a screw? (b) What is the U. S. standard for a screw ½ in. in diameter?

Ans.—(a) In a single-thread screw, the pitch is the distance between two consecutive threads, center to center, measured in the direction of its axis. In a double-thread screw, the pitch of the screw is twice, and in a triple-thread screw, three times this distance. Always, however, the pitch of the screw is equal to the distance the screw advances or travels, in the direction of its axis, in a single revolution or turn.

(b) The U. S. standard for a screw ½ in. in diameter is 13 threads to the inch.

Ques. 9—Have you ever observed a motor start up in one direction and then reverse itself; and, if so, explain what would cause this to happen.

Ans.—When a compound motor is started under no load, the shunt circuit naturally takes the larger current; and if, through a faulty connection, it happens that the shunt and series fields are bucking each other, the motor will start to rotate in a direction determined by the shunt current, which, for a time, predominates. But, when the motor takes its load, the major current will flow through the series circuit, with the result that the direction of rotation will be reversed.

Ques 10—For what purpose are the grooves cut on an armature shaft, next to the bearing?

Ans.—The purpose of the grooves is to prevent the oil of the bearings following the shaft to the armature, as this would destroy its action.

Ques. 11—Assuming a motor having four poles and but two coils, should the connections be such that the current will traverse these coils in the same or in opposite directions?

Ans.—The direction in which a current traverses a coil determines the north and south poles of the magnet. It is necessary that these poles alternate as north and south poles in the magnetic field. In order to accomplish this, it is further necessary that the current should circulate about the coils in the same, clockwise or counter-clockwise direction.

Ques. 12—Would it be possible to operate a four-pole motor having two coils, with one of the field coils removed?

Ans.—The motor would probably continue to run, but its operation would give less satisfaction. The removal of one coil from a two-coil motor would result in the production of a less torque, while the speed of the motor would probably be increased.

*Note—The above questions have been suggested by Frank Walker, chief electrician of the Pine Run Co., Vandergrift Heights, Penn., as suitable for the examination of mine electricians, whom he says must combine both mechanical and electrical knowledge.

Coal and Coke News

Washington, D. C.

The long-expected decision of the Interstate Commerce Commission in the so called advanced rate case was delivered by the Commission on Saturday, Aug. 1, late in the afternoon. The report covers the whole question of advanced rates on railways as affected by the application of four years ago which was then refused, and as affected by the application which has been under consideration and is now settled.

It is an interesting fact that the rate decision in a number of cases refers to mining products and assigns them a treatment different from that accorded to other items of freight. In dealing with the application for higher rates, the report now delivered says, after reviewing the general character of the problem:

Protests against a general increase in freight rates were presented by the railroad commissions. Protests against proposed increases in rates so far as they affect specific articles, of which the tonnage in some cases is large, were presented by many shippers, and particularly by shippers of coal, coke, ore, brick, cement, lumber, ice, sand, gravel, paper, pulp, corn products and petroleum.

The commission reviews the merits of the argument quite fully and reaches the conclusion that the roads in eastern territory are not receiving a satisfactory revenue and that they ought to be permitted to obtain more through an increase in rates. The claim, however, is made that there is a good deal of difference between the New England territory, the Central freight association territory and other portions and that a different treatment in these is required. Dealing specifically with the question of an advance the commission exempts mining products from the application of higher rates, saying:

We have seen that the class rates in central freight association territory are on a lower scale than can be found elsewhere in the country and that many of the commodity rates are too low and are probably unremunerative, considering the diviserfied nature of the traffic. The class rates and many of the commodity rates may therefore with propriety be increased. This approval, however, is subject to the following limitations:

(a) With respect to certain heavy commodities, namely, brick, tile, clay, coal, coke, starch, cement, iron ore, and plaster, protestants made such a showing as to constrain us to hold that the carriers have failed to sustain their burden under the statute.

(b) Reference has heretofore been made to the fact that the proposed tariffs are based on a minimum increase of 5 cents per ton on all commodities moving under rates stated in cents per ton when less than $1 per ton; with respect to certain hauls, this would result in increases much in excess of 5 per cent. and in certain cases these would be as high as 50 per cent. The carriers have failed to establish the propriety of this minimum increase, and the evidence offered by the protestants makes it clear that it would work hardships and discriminations and cannot be approved, since under it a disproportionate burden is cast upon the heavy short-haul traffic.

There is an interesting point in the portion of the report which deals with those railways which are largely engaged in the carriage of mining products. Attention is called to the fact that the coal carrying roads are very prosperous and then to methods that may be employed by the railways in general for the purpose of economizing their outlays. In this connection attention is called to investigations not heretofore announced, conducted by the Bureau of Mines. The Commission says:

Fuel is, next to wages, the largest item in operating expense. The railroads of the United States report their aggregate fuel cost to be about $250,000,000 a year. But the actual cost is much greater; for the reported figures do not include, ordinarily, the cost of hauling the fuel on the lines of the carrier by which it is used. Furthermore, the cost of coal is increasing.

Much has been done in recent years by means of mechanical devices and otherwise to reduce fuel costs. Thus the Baltimore & Ohio since 1910 reduced its coal consumption 9½% per unit of freight traffic moved. But it has been demonstrated clearly that by knowledge and care on the part of employees and the management much greater savings can be made. With the assistance of the Bureau of Mines, questions were framed calling upon the carriers for details bearing upon this subject. Other investigations are being made by the Commission.

In closing the Commission says: "The contention of the carriers is that upon investments in property amounting to approximately $640,000,000 since 1910 no commensurate return has been made, and that the net operating revenue between 1910 and 1913 shows an actual decline. Additional capital cannot be expected on the showing made on the last increments of investment. . . . . It is not necessary to say that on such a showing the investing public will hardly be eager to entrust its funds to transportation enterprises."

Investigation in Illinois Fields

Additional information has been made public by the Interstate Commerce Commission with respect to the investigation it has lately been carrying on regarding the operations of railroads in the Illinois coal fields with regard to the control of coal deposits in their interest or in the interests of officers of the different lines. The Commission devotes special attention to the New York Central and its officers, giving a long detailed account of the operations of W. C. Brown, of the New York Central in connection with these lands and the companies which operated them. The central factor in the discussion is the O'Gara Coal Co. and the connection between that concern and Mr. Brown, of the New York Central. On this subject the commission after lengthy study says:

Neither W. C. Brown nor his associates can escape severe criticism for permitting these practices to exist. The Commission deems as significant the attitude of Mr. Brown and Mr. Carstensen in the matter of the payment to the O'Gara Coal Co. of the $60,000 rebate described elsewhere. In testifying before the Commission, Mr. Huddleston, the general auditor, took upon himself the entire responsibility of that transaction, and asserted that his superiors did not authorize or even have knowledge of the payments. Mr. Brown and Mr. Carstensen specifically denied any knowledge of the $60,000 rebate and appeared shocked that such conditions should prevail in their organization. A singular phase of the situation is that no one connected with the New York Central lines except Mr. Huddleston pretended that he had authority to make such a payment. . . . .

On various occasions the New York Central officials have had under consideration plans for the consolidation of all the coal properties in the Harrisburg district associated with the New York Central lines. Briefly, the plan contemplated that the Chicago & Harrisburg Coal Co., owned by the Big Four, would issue bonds guaranteed by that road and purchase from the latter its coal lands and from the Saline County Coal Co. and O'Gara Coal Co. their mines and lands. There was then to be formed an operating company, to which the mines and part of the lands would be leased for operation.

W. C. Brown and other officials testified that this plan never received serious consideration and in all probability would never be effected. It is worthy of mention, on the other hand, that in the latter part of 1913 the capital stock of the Chicago & Harrisburg Coal Co. was increased from $55,000 to $1,500,000, and that the company began taking over the coal lands owned by its parent firm, the Big Four Ry.

Whether this is the beginning of a gigantic coal proposition involving the purchase of the Saline and O'Gara properties, and based on the credit of the New York Central lines, the record does not disclose. Such a use of railroad credit for the private ends of favored individuals should obviously receive, if carried out, the severest condemnation of the law.

HARRISBURG, PENN.

The declaration of war against Servia by Austria-Hungary and the call to the colors of aliens in this country is likely to have a serious effect on the coal-mining industry of this state. Reports received here, some of sensational trend, go so far as to say the mines of the state will have to shut down. But many operators take no such view.

It is thought that but few mines will be vitally handicapped by the absence of those who will answer the summons to return and fight the battles of their native land.

In one district in the Wyoming region out of 8000 employees 222 are Austrians and 57 are Hungarians, or a total of 279, who might be subject to Austria's call; 283 employees are Russians and 3400 are Poles and Lithuanians, or a total of 3683, who are or have been under Russia's flag.

These figures make a grand total of 3962, or near 50 per cent. of the men employed in the one district, which is a fair estimate. On the face this would appear to bear a serious aspect, for if half of the men in the mines were to return home, and it might be said that these figures are fairly representative of both the anthracite and bituminous regions, surely the industry would be severely crippled and perhaps made helpless.

But a closer analysis is reassuring. In the first place, it is estimated that half these 3962 men are either naturalized or have taken out first papers. It is regarded as highly probable that a few of these will hasten to return, for the threat of exile to them will bear as stern a face as it will to those whose homes are still across the sea, and who have sent large

sums of money abroad and are afraid that the investments they have made in their native country will be impaired, if they do not answer the summons. With reference to the Austro-Hungarians, even the consuls admit that probably no more than 30 per cent. of these subject to military duty will obey the call to arms.

As to French and German miners the number is negligible. There are many Italians, in certain sections of the state, but there are no signs that many of them expect to leave. English and Welsh miners for the most part are pretty well Americanized.

The coal operators are not seriously concerned as yet over the possible scarcity of labor, for they doubt the prospects of facing any such wholesale departures as would come before suspension of operations would be necessary. It is estimated that at the most 15 per cent. of the mine employees are likely to abandon their places in the mines for the battlefield.

The European situation is not expected to have any direct effect on the market. Of course a general business depression superinduced by whatever struggle may be brewing would have the usual deteriorating influence on the demand for coal.

While it is not yet known to what extent war will effect the mines of the state, operators say the labor market will become acute if Russia makes a call. The subjects of the Czar outnumber those of Franz Joseph, these two countries having furnished a large portion of the coal-region immigrants for a number of years past.

PENNSYLVANIA

Anthracite

Forty Fort—The famous suit of the Trustees of the Proprietors of Kingston Township against the Lehigh Valley Coal Co. has been finally settled and the money paid over, the trustees now having over $100,000 in the bank. The use to which the money is to be put has not been determined, but it will likely be invested or kept at interest until two similar suits now pending are disposed of. One of these is against the Kingston Coal Co. for a tract in Kingston Township, and the other against the Lehigh Valley Coal Co. for a small tract in Forty Fort.

Pittston—Judge Garman handed down a decision on July 31, in the suit of Jacob McCollum against the Pennsylvania Coal Co., wherein he refused a motion for a new trial. McCollum was employed as a miner, and while working in a chamber was struck by cars pushed by an electric locomotive, was run over and sustained the amputation of one of his legs. He charged the company with negligence in that the locomotive was not properly equipped with a headlight, and that he had no warning of approach. At the trial McCollum secured a verdict of $5546. The court sustained this verdict.

Nanticoke—A mistake in the signals to stop the ascent of the carriage at the Bliss colliery of the Delaware, Lackawanna & Western Coal Co., on July 31, resulted in the heavy carriage being carried over the sheave wheel. The beams upon which this wheel rested were splintered and the shaft tower demolished. The colliery has been forced to shut down until the tower can be repaired which will probably take about 10 days. In the meantime the coal from the Espy tunnel and the Loomis colliery will be handled at the Bliss breaker, but the shaft will be out of commission.

Mahanoy City—The Philadelphia & Reading Ry. tracks at the west end of this city dropped out of sight on July 28, just before the arrival of a passenger train with four coaches and a pullman. Miners going home from work discovered the cave-in and flagged the train, causing great excitement among the passengers. The breach was caused by the roadbed falling into abandoned workings of the Tunnel Ridge mine. Some of these mines have not been operated for 20 years, and evidence of surface settling has often been noticed despite flushing.

Parsons—An effort is being made to induce the Delaware, Lackawanna & Western Coal Co. to donate to the Wilkes-Barre park system a piece of land along the Miners Mills road. This consists of about three acres, and is so situated that it is almost necessary for the city to possess in order to carry out its plan in connection with the improvement of Hollenback Park. The land in question is said to be of no particular value to the company, but would be of great value to the city.

Larksville—Operations were suspended on Aug. 1, for 10 days or more at Nottingham No. 15 colliery of the Lehigh and Wilkes-Barre Coal Co., in order that necessary repairs may be made to breaker machinery and inside pumps. The company machinists will push the work as rapidly as possible to the end that work may be resumed within the time stated.

Bituminous

Marianna—Marianna, which has been dull for some time, or since the closing of the mines and the bank, is regaining some of its activity. The mines have been reopened, and hundreds of men who were out of employment last winter and spring are at work, and prospects of a revival of business in the community are bright. Since the closing of the bank and the shutting down of the mines, business has been practically at a standstill.

Charged with having violated the bituminous coal-mining laws, Anthony Chievereno and Edward Jones, both employed at the Rachel mine of the Pittsburgh-Buffalo Co., were placed under arrest on July 31, and when arraigned waived hearings for court. The accusations against the men are made by C. F. Byrne, mine inspector of the 21st district. Chievereno was charged with carrying "the makings" for cigarettes and other smokers articles beyond a point in the mine where only locked safety lamps are allowed. Jones faces a charge of having passed a danger signal into a section of the mine where he should not have gone.

Fredericktown—George Hanko has brought action against the Vesta Coal Co. for damages to the amount of $10,000 for injuries sustained in the Vesta No. 5 Mine. Hanko sets forth he was employed as a track and road builder and was crushed by a motor driven by an inexperienced man. He also alleges that this motor had no headlight, and gave no warning of its approach. He alleges that the company made no provisions for safety holes and that he had not been given instructions as to danger.

Pittsburgh—D. W. Kuhn, and the Fidelity Title & Trust Co., of Pittsburgh, were, on July 30, named receivers for the Pittsburgh & Westmoreland Coal Co. The action, it was stated, was deemed advisable in order that the company might refund a note issue of $900,000, which was due Aug. 1. The company has a capital of $3,000,000 and bonds to the amount of $5,000,000.

Ebensburg—Certain Lilly (Penn.) residents and local union No. 1284 of the United Mine Workers of America have filed exceptions with the prothonotary at Ebensburg against the granting of a charter to the Miners, Laborers and Tradesmen's Union, of Lilly. They allege that those petitioning the charter constitute less than one-third of the total number of men employed by the Piper Coal Co., at Lilly. The filing of the exceptions is believed to be preliminary to an effort to adjust the differences which now prevent a settlement of the strike at the Piper mine.

WEST VIRGINIA

Charleston—The Winifrede coal mine resumed operation, July 30, after being idle on account of a strike since June 1. It had been intended to start this mine on July 27, but a delay was occasioned by a misunderstanding.

The case of the Lehigh Coal Co. operating mines near Morgantown in Monongalia County, against the Buckhannon & Northern Ry. Co., before the public service commission, was compromised by the parties interested and an entry of settlement has been made in the record of the commission.

Morgantown—The School of Mining at the University of West Virginia, is now an accredited training station for mine rescue and first-aid work. The school has installed considerable equipment for use in demonstration and in teaching rescue and first aid in connection with other courses. A class of five men were recently examined and passed and will duly receive certificates.

KENTUCKY

Mater—The Elkhorn Coal Co., of which J. H. Hall, Lexington, Ky., is manager, is making increases in its output and will soon be shipping a large tonnage. Increase in the working force was made Aug. 1. An additional 100 miners' houses are under construction.

Whitesburg.—Cincinnati people have begun a big coal development between Cornettsville and Viper, on the main line of the Lexington & Eastern in the Perry County field. Several hundred acres, it is stated, will be developed, including several timber areas. The promotors are, it is stated, to build a first class mining town at once.

Waverley.—The Drury Coal Co. has lost the case before the Interstate Commerce Commission, in which it sought to have the rate of $1.47 per ton on soft coal from its mines to Chicago held unreasonable. The Miles Brothers Co. asked the commision to change a rate of $1.15 per ton on coal from Kentucky points on the Straight Creek branch of the L. & N. to Chattanooga and lost also. The commission dismissed both suits.

OHIO

Cincinnati.—Operators are considerably interested in a plan involving the consolidation under one organization of the coal-distributing companies in Cincinnati, Cleveland, Columbus, Dayton, Toledo and other Ohio cities, with a capitalization of $10,000,000. It is understood that the com-

pany will be known as the Ohio Consumers' Company, and that it will have its headquarters in Cleveland. This is said to be the idea of a group of Chicago capitalists, who organized a similar combination in that city.

Columbus.—The Maynard Coal Co., which recently increased its authorized capital from $200,000 to $350,000, has absorbed two former subsidiary firms known as the Pomeroy Coal Co. and the Jackson Mining Co. The combined output of the mines now controlled by the Maynard Coal Co. is 2500 tons daily.

The Victoria Coal Co. has purchased an interest and has been appointed general sales agent for the East Kentucky Coal Co., of Torchlight, Ky. The general sales offices of the firm, in charge of Daniel H. Hitt, which were removed to Cleveland about a year ago have again been moved to Columbus, as it is found to be a more advantageous point. The concern has a number of mines in the Hocking and Crooksville districts.

INDIANA

Terre Haute—The demand for coal at Indiana mines is apparently better especially in domestic grades. The retail dealers in most cities which use the Indiana product are enabled to offer at lower prices than for several years in mid-summer and there is some response to this proposition

Clinton.—A cyclone recently blew down the tipple of Crown Hill mine, No. 1, owned by the Clinton Coal Co. The mine is about worked out and the remaining coal will be taken through neighboring mines.

Boonville.—Fire has broken out in the Warrick Coal Mining Co.'s mines east of this city. After unsuccessful efforts to extinguish the flames, a canal is being dug 30 ft. wide and a mile long around the burning mass. The fire started from a shovelful of hot ashes thrown on surface coal by an engineer. No attention was paid to the small blaze that sprung up.

ILLINOIS

Herrin.—The Oak Ridge mine, formerly of the Southern Illinois Coal & Coke Co., which was recently purchased by the Taylor Coal Co., is to be abandoned on account of the expensive upkeep, caused by squeezes and falls. This mine produced a coal that was recognized as a leader, throughout the Central West, on account of its quality.

Trenton.—For the past three or four weeks prospectors have been busy drilling test holes southeast and southwest of this place, in an effort to ascertain the thickness of the remaining portion of the Trenton vein. It is claimed that there are still several hundred acres of this coal in a body that can be worked.

Zeigler—A recent fire at the mine here caused operations to be suspended for practically two weeks.

MISSOURI

Rich Hill.—The Atlas Coal Co. has completed an 800-ft. well, which insures an adequate water supply in the future. The water is soft and especially suitable for steam purposes.

KANSAS

Mulberry.—The Clemens Coal Co. has purchased the farm of J. E. Lewis, near Mulberry, for $18,000 and is sinking drillholes preparatory to active development.

Frontenac.—The Jackson-Walker Coal & Material Co. has authorized the Whitmer Contracting Co., of Philadelphia, to operate a steam shovel and strip the coal on both sides of the Cherokee & Pittsburgh mine No. 15 west of Frontenac.

Pittsburgh.—Coal companies operating in the Pittsburgh field are much interested in the possibilities of making their land valuable from an agricultural standpoint. It is believed that the coal men could with little trouble grow enough fodder for their animals, instead of importing it or buying it on the market, as heretofore. The plan outlined will be thoroughly tested in Crawford and Cherokee Counties.

Topeka.—The state Public Utilities Commission settled the mine run coal case on July 28 by refusing to allow the operators to ship mine run at slack rates. The order of the commission allows carriers to establish screen specifications, providing in substance that slack coal rates shall apply on nut, pea, slack and screenings that will pass through a bar screen with 1⅝-in. openings, or through round holes 3-in. in diameter.

OREGON

Medford—A 13-ft. bed of high-grade semi-bituminous coal has been struck at the Little & Burr mine near this place. According to the owners this will mean the establishment of a new industry in the Rogue River Valley. The fuel contains but little sulphur, and will be well adapted to gas manufacture.

FOREIGN NEWS

Dordmund, Germany—Fifteen coal miners were killed July 28 by fire which broke out in the Hansemann Pit. Six of the bodies were quickly recovered.

Cardiff, Wales—The British Admiralty has notified the collieries warning them against shipping coal, and has furthermore sent out notification that all coal is liable to be taken by the Admiralty under emergency contract in which case inedmnity will be made for breach of private contract.

The executive council of the South Wales Miners Federation on Aug. 1, refused to acceed to the suggestion of the British Admiralty that the miners in the collieries supplying vessels of the navy should work on Aug. 4 and 5 which had been arranged as miners' holidays. The council took the ground that it was not necessary for defensive purposes for the miners to work, and declined to encourage British intervention in the European conflict.

PERSONALS

H. S. Wyly, formerly connected with the East Kentucky Coal Co., of Torchlight, Ky., has taken the position as traveler in Indiana with the Victoria Coal Co., of Columbus, Ohio.

Daniel F. Connor, general sales agent of the firm of Whitney & Kemmerer, has left New York for Marblehead, Mass., to join M. S. Kemmerer on his yacht the "Uinta" for a cruise on the coast of Maine.

Clarence M. Schwerin was elected president of the Vinton Colliery Co. at a meeting of the board of directors held at Vintondale, Penn., on Tuesday, July 28. Warren Delano was elected chairman of the executive committee at the same meeting.

W. C. Pollock, formerly foreman for the Sonman (Penn.) Shaft Coal Co., has been appointed superintendent of the Elkhorn Mining Corporation of Wayland, Ky., his place as foreman being taken by W. G. Strachan, who was formerly with the Elkhorn Mining Corporation.

Senator J. K. P. Hall, the well known bituminous operator has suffered a slight relapse. On July 29, he was able to walk about his room. Attending physicians are of the opinion he will recover, although his convalescing period will take several weeks. Senator Hall is in his 70th year.

John Berkheiser for many years inside superintendent for the upper division of the Scranton Coal Co., has partially severed his connections with that firm. Mr. Berkheiser will be succeeded by James W. Smith, of Peckville. He will, however, remain with the company in an advisory capacity.

John C. Neale has resigned his position as assistant general manager of sales and structural engineer of the Carnegie Steel Co., of Pittsburgh, Penn., to become president and general manager of the Central Steel Co., of Massillon, Ohio. John W. Dix has succeeded Mr. Neale with the Carnegie Steel Co.

OBITUARY

John P. Thomas, said to be the oldest miner in Missouri in point of service, died at Marceline on July 17. He was 75 years old, and had worked in coal mines in Wales, his native country, and the United States, since he was seven years old.

Thomas J. Pearce, of Portage, Penn., died July 30 at the Memorial Hospital, District No. 2, of the United Mine Workers of America. A native of England, Mr. Pearce came to Portage about 24 years ago, being a member of the firm of George Pearce & Sons Coal Mining Co., operating two mines, and employing 400 men. In addition to being General Manager of the above concern, he owned the Ivy Ridge Coal Co., was president of the River Mining & Manufacturing Co., of Virginia, and president of the Forest Hill Coal Mining Co., of Johnstown. His death followed an attack of appendicitis from which peritonitis developed, and which an operation failed to relieve.

CONSTRUCTION NEWS

South Bethlehem, Penn.—A new 500-ft. additional extension is being made to the coal storage plant of the Lehigh Coke Co. at this place.

Lexington, Ky.—The Commonwealth Coal & Timber Co., recently organized in Lexington, expects to begin within the next few weeks, some important development projects in Letcher and Perry Counties.

Bakerstown, Penn.—The Sterling Coal Co. and the Bakerstown Land & Improvement Co. anticipate the construction of a new machine shop, 10 new houses, and the installation of new electrical equipment some time early this fall.

Oscaloosa, Ky.—The Valley Creek Lumber Co., with headquarters at Rochester, N. Y., has purchased an additional 1000 acres of coal and timber properties. It will develop the timber tracts, and lease the coal for early development. The property lies near the Lexington & Eastern Railroad.

Hazard, Ky.—The Middle Fork Coal Co., of which C. G. Bowman is president, and which was recently organized, announces the early beginning of a large development of coal properties near Bullock, three miles above Hazard, on the Louisville & Nashville railroad. This firm will have an output of about 1800 tons daily.

Colver, Penn.—Contracts have been let for the erection of 40 new houses in Colver. A new two-story brick building which is to house the post office has also been ordered erected. The houses are to be of a superior style of construction. They will be of wood and will contain six rooms, with all modern improvements. The new Presbyterian Church is nearly completed and will soon be ready for dedication.

Earlington, Ky.—Work is proceeding rapidly on the Victoria Coal Co.'s development of its mine No. 9, several hundred yards north of the present workings. This shaft will be 300 ft. deep and with the air shaft will require several months to complete. Frank D. Rash, president of the company, and the other officers and stockholders at a recent meeting perfected plans for reorganization, but these plans have not been given out.

Finleyville, Penn.—Work at the new coal shaft at Coon Island is progressing steadily. The shaft is being cemented to a depth of 85 ft. As soon as this work is finished excavations will be resumed and the shaft sunk to a lower level when another stop will be made for concreting. Arrangements are being made for the erection of 40 four-roomed houses. A spur has been built from the Baltimore & Ohio railroad to the new works, which are located on the south side of the main line and in plain view of the travelers on the old National road.

NEW INCORPORATIONS

Knoxville, Tenn.—The Big Emory Coal Co., with an authorized capital of $50,000, has been incorporated here, the incorporators including C. W. Henderson, C. M. Thomas, W. S. Bobinson, A. H. Bowling and Harry R. Smith.

Huntington, W. Va.—Notice of the dissolution of the Island Creek Fuel Co., which was recently given by the attorneys of the United States Coal & Oil Co., has no significance particularly as the Island Creek Fuel Co. is an old holding firm and no operations have ever been carried on under this name.

Winding Gulf, W. Va.—The Stone Coal Co., has been organized with a capital of $25,000, all of which has been subscribed and $2500 paid in. This firm is privileged to buy lands in Raleigh County, build and operate railroads, electric, power and telephone lines, operate coal mines, etc. The incorporators are E. C. Minter, B. E. English, and H. A. Minter, of Winding Gulf, Jesse E. Oliver, and Joe L. Smith of Beckley, and G. A. Hinterleigner of Affinity.

Richwood, W. Va.—A charter has been issued to the Beaver Coal & Timber Co., with chief works located at Richwood. The object of the incorporation is the acquisition of coal, oil, gas, and timber lands, the development of the same, and the manufacture and sale of their products. The authorized capital stock is $100,000, of which amount $500 has been subscribd, and $100 paid in by the incorporators, who are G. H. Odell, J. W. Odell, E. D. Crawford, J. E. Crawford, and W. L. Ashby.

INDUSTRIAL NEWS

Columbus, Ohio.—The contract to supply 15,000 tons of coal to the Ohio State University has been awarded to the Victoria Coal Co. on a B.t.u. basis. The coal will be furnished from the Sedalia mine.

Tamaqua, Penn.—The Panther Creek valley washeries of the Lehigh Valley Coal & Navigation Co. have suspended operations indefinitely. This close down is attributed to the poor demand for washery coal.

Philadelphia, Penn.—The United Gas Improvement Co., of Philadelphia, is reported to be in the market for its annual supply of coke, amounting to approximately 250,000 tons. It is said also, that the Reading Coal & Iron Co., has contracted for about 20,000 tons of furnace coke.

Columbus, Ohio.—The announcement is made by the officials of the Chesapeake & Ohio R. R. Co. that the new line to be built to connect Portsmouth and Columbus will carry passengers as well as freight. The original announcement was that it would be a freight line exclusively.

Jefferson City, Mo.—The Western Coal & Mining Co. of St. Louis, owned and controlled by the Goulds of New York, recently secured the contract to furnish 25,000 tons of coal to the penitentiary for use the ensuing year, at $2.55 per ton delivered. The highest bid was $2.90 per ton for the same grade of coal.

Columbus, Ohio.—The Columbus Coal Exchange of Columbus, Ohio, has been organized by the local retailers for the purpose of fighting trade abuses. It is proposed to ask operators to refuse to sell to "snow birds" and consumers directly. Other trade abuses will also be taken up and the matter of establishing a credit bureau is being seriously discussed.

Columbus, Ohio.—A new phase of the application of the Ohio mine-run law has appeared. This is in reference to lands leased for coal which are always paid for on the basis of the coal mined. These leases are all on the screened coal basis. Since the new law provides that all coal must be weighed this eliminated the screened feature and thus a new basis of settlement must be devised.

New York City—The Terry Steam Turbine Co., with works at Hartford, Conn., announces the appointment of Fimdanque Bros. & Son, of New York and Panama, with main office at 15 Whitehall St., New York, as its representative for the Republic of Panama and the Canal Zone. The Cleveland office of the Turbine company in charge of L. G. Finlay, has been moved from 710 New England Bldg., to 503 Union Bldg., Cleveland, Ohio.

Connellsville, Penn.—W. H. Warner, president of the W. H. Warner Co., a large operating and selling corporation of Cleveland, Ohio, recently negotiated the purchase of 262 acres of coal in Washington County, about 6 miles from Charleroi, along the Monongahela River and within reach of the Monongahela Division of the Pennsylvania R. R. The price paid ranged from $900 to $1100 per acre, without the surface rights. This was for the Pittsburgh seam only, the Freeport vein being reserved by the sellers.

Springfield, Ill.—The State Civil Service Commission, of Illinois, will hold an examination at Springfield, on Sept. 5 next, to provide an eligible list of persons qualified to act in the position of assistants to the three mine rescue stations of the state located at La Salle, Springfield and Benton. This examination which will be entirely oral and thoroughly practical will be held in the mine rescue station in Springfield before a competent board of examiners. The salary limits are $75 to $100 per month, and the age limit is between 21 and 50 years. Several vacancies for these positions now exist.

Pittsburgh, Penn.—It is stated that a pronounced impetus has been imparted to the coal business of the Pittsburgh and West Virginia districts as a result of the impending European war. West Virginia companies took heavy contracts to supply coal to the Italian and Egyptian governments early in May, and orders have been received to hurry shipments in order that cargoes might be landed before serious hostilities had begun. Hurry orders were also received from across the Canadian border. While Nova Scotia produces coal in abundance, the distance to the cities and ports on the St. Lawrence River in the provinces of Ontario and Quebec is so great, that coal from West Virginia and Pennsylvania is shipped there. For purposes of coast defence in case of serious hostilities, it will be necessary to have a supply of coal at available points, consequently the hurry orders above mentioned.

Coal Trade Reviews

General Review

Anthracite operations heavily restricted. European wars disrupt routine business on the Atlantic Seaboard. Market technically strong but subject to many disturbing influences. Middle Western situation improving.

Heavily curtailed operations in the mining regions and large cuts in the circular by individual producers, continue the predominating features in the hard-coal trade. The temporary spurt at the close of last month, due to the regular advance in the price schedule, has disappeared and with the possible exception of some increase in Lake shipping, the business is flat and devoid of any interest. Fears are expressed in some quarters as to the possibility of a labor shortage as a result of the European war. While it is true that the rank and file of our mining population is largely foreign born, conservative observers do not believe the migration will attain sufficient proportion to prove a serious menace to the coal industry.

The Atlantic seaboard bituminous trade is rather more unsettled as a result of the European controversy. The almost complete cessation of exports in lines dependent upon the coal industry, as well as in the industry itself, have so disturbed routine business that producers are showing a disposition to hold off pending further developments. Poor collections and more stringent regulations of credit as a result of the worldwide liquidation of securities of all sorts, is another important factor in the situation. As a rule very little business is being negotiated. Operators are rigidly curtailing production down to immediate requirements, while the circulars are firmly maintained as a rule. Some few tonnages have accumulated at New York as a result of the cancellations of shipping, but these are by no means excessive. The trade is in a technically strong position and will respond rapidly to any expansion in general business.

Pittsburgh district prices continue irregular on both spot and contract business, while Lake shipments are still unsatisfactory and the line trade only slightly better; definite indications of increased activity and improved sentiment in the iron and steel industries are the best features of the current situation. As a rule no important developments are anticipated before the fall trade opens up, although isolated buying from unexpected quarters is regarded as significant of the trend of conditions. With some of the Ohio mines now under operation and others resuming as rapidly as possible, a more optimistic feeling prevails in the trade there. Steam consumers, now dependent upon West Virginia mines are showing a disposition to swing back to the Ohio product and contracts are being negotiated on a profitable basis.

The southern situation has not experienced any change with the possible exception of some increased inquiries for lump coal, and a slight stiffening in the steam prices. A substantial improvement is noted in the Middle Western domestic grades, while the steam fuels are weak with every indication of continuing so, unless there is a sharp increase in the industrial consumption. The Ohio coals are still out of the market while there is considerable buying for storage purposes and the beneficial effects of the large crop will soon be in evidence.

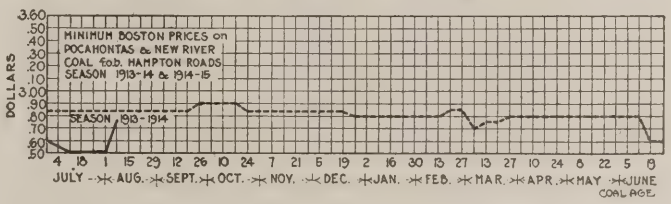
ATLANTIC SEABOARD

BOSTON

Pocahontas and New River shippers marking time but the outlook is favorable. Market coal eliminated. Pennsylvania grades steady as to price with some gain in tonnage. Georges Creek in excellent position with prices still firm. War scare causes some speculation as to effect on mineworkers.

Bituminous—Pocahontas and New River are very dull. That the shippers are marking time, however, instead of forcing shipments on a demoralized market is a great improvement, because of the extremely quiet situation. A rigid curtailment is in effect in most of the West Virginia districts and this week the last of the market cargoes was disposed of. Schooners, barges, and steamers are all in plentiful supply and rates from Hampton Roads are as low as at any time in three or four years. F.o.b. sales, so far as reported are strictly on the $2.85 basis; on many sides there seems a disposition to go easy until the market tones up. That September will develop a wholesome situation for the Southern coals is now freely predicted.

Although the Pennsylvania grades have not yet shown any increase in price there are many signs of buying power. Contractors are showing interest again and while the gain is very slight there is no doubt the market is already on the mend. The quality grades are naturally the first to feel the benefit but a comprehensive improvement is counted on with the approach of September. Those buyers who cannot credit a permanent settlement of Hampton Roads price difficulties are calling for moderate supplies of Cambria coals, for instance, and this has a steadying effect on all the grades moving into Philadelphia and New York.



The Georges Creek shippers are well supplied with orders for several weeks and the price list is as strong as ever. The movement of the fleet in July was up to the maximum and there is now no uneasiness over the outlook. The demand for all-rail is also improving.

Anthracite—The trade is almost featureless. The mines were under suspension several days in July and consequently there has been some delay in loading cargoes at New York, particularly when requisitions called for a proportion of stove. A few dealers are taking seriously the alarmist reports that Pennsylvania will be emptied of skilled miners by reason of summons to help their native countries in the war. This is not a feeling that is at all general, however, and in all probability there will be nothing to start anthracite moving in better volume until stocks have been worked into by the consumer more than they have thus far. Dock screenings are still in good demand.

Bituminous prices at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.90@1.45	$1.20@1.65	$1.67@1.77	
Philadelphia*.....	2.15@2.70	2.45@2.90	2.92@3.02	
New York*.....	2.45@3.00	2.75@3.20	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.75@2.85
Boston†.....	.....	.....	.....	3.58@3.65
Providence†.....	.....	.....	.....	3.68@3.78

* F.o.b. †On cars.

NEW YORK

European wars and uncertainties in the financial situation causing a contraction in the bituminous trade. Considerable inquiry from foreign governments. Anthracite quiet and further restrictive measures put into effect.

Bituminous—The already flat situation prevailing in the New York soft-coal market for the past few months, has been further accentuated by the European wars. At the present moment the severest strain is felt in the monetary situation. The heavy liquidation of securities of all classes has created such a tense situation in financial circles that banking interests are placing severe restrictions on loans with the result that collections are bad, and sellers are disposed to require unusual protection. Marine business is at more or less of a complete standstill pending a re-adjustment to the new conditions.

Particular interest is felt in the bunkering and export trades. With the Berwind White Co. refusing any information on this subject beyond issuing a statement that "conditions are normal" there is little data to be had. Outside rumors are current to the effect that the Berwind Co.'s storage facilities at tidewater were congested with about 40,000 tons of coal early in the week. Considrable inquiry is reported generally from foreign governments. Local companies are inclined to scrutinize credits on such business carefully.

Shipments to tidewater have been vigorously curtailed of late, so that the market was in a strong position in this respect, but the disruption in export business will no doubt result in accumulation of demurrage coal, for the time being. A temporary slowing down in the industries dependent upon export trade will be inevitable, but it is generally felt that they must shortly feel the increased call from foreign countries for American commodities.

The market is not quotably changed from the past few weeks which we continue as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The exports of hard coal being practically nil, the market has experienced no change with the possible exception of a contraction in credits. The companies are still stocking chestnut while the individuals are offering substantial concessions in order to move it. The first of the month activity helped egg and stove coal, particularly the latter, but the market has again relapsed back into the former dullness. Some line demand for egg and stove is noted, but there is no call for nut in any direction. With firmer water rates prevailing to down east points, and purchasers well supplied for the time being, there is a tendency to stop buying pending a break in the water freights.

On the steam grades few concessions are offered on high grade pea coal, but the off qualities are available at substantial cuts. The Nos. 1, 2 and 3 high grades of buckwheat are in short supply due to restricted operations at the colliers where these are produced; the lower grades are offering in large tonnages, at from 25 to 50c. off the prevailing circular.

In view of the tight situation in monetary circles, the coal men are becoming exceedingly careful about who they sell and are showing a disposition to require satisfactory guarantees as to payments. Reports were current early in the week that further restrictions would be put into effect.

The market is now quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	$4.60@5.00	$4.95	$4.55@4.95
Egg	5.25	4.90@5.25	5.20	4.85@5.20
Stove	5.25	5.15@5.25	5.20	5.00@5.20
Chestnut	5.50	4.95@5.50	5.45	4.75@5.45
Pea	3.55	3.40@3.55	3.50	3.25@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	1.90@2.75
Rice	2.30	2.15@2.30	2.00@2.25	1.50@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

BALTIMORE

Bituminous and anthracite are both extremely flat with little prospect of any immediate change. Much speculation as to effect of European war on the export trade.

A feeling of inertia hangs over the coal trade. Outside of that moving on contracts, the past week saw little or nothing doing. New business is so infrequent as to be negligible. Railroad movement from mines to tide is considerably better, but it is now a question of getting buyers at terminal points. More of a surplus was noted about the piers and terminals the past week than for a long time past.

Depressed conditions are partly due to the uncertainty of the export coal trade; some of this coal was released on the market due to refusals to charter. Occasional foreign charters are being made, but there was a notable lack of any movement to the French points that have recently been taking American coal. What the effect of the complete withdrawal of Welsh coal will have on the marketing of the product of this country, is one of the uncertainties of the hour as created by the general war scare in Europe.

Prices of fuels for domestic use have undergone little or no change, and it is hard to set a price when so little trading is going on. In West Virginia three-quarter gas was offering at from 80 to 90c., run-of-mine at 70c., and slack at varying prices from 55c. upward. Pennsylvania line coals in some cases sold as low as 95c. to $1, with better grades at from $1.15 to 1.35, with very little selling of the best fuels.

Export figures for July as announced by the Custom House showed a total shipment from the Baltimore piers of 87,265 tons.

PHILADELPHIA

No improvement noted in the anthracite trade. The heavy curtailment an index of existing conditions. No immediate change looked for. Bituminous still flat, with very little spot demand, and prices on a parity with last week.

Anthracite—There has been no apparent change in the anthracite situation. Curtailment at the mines still continues with the output at about 50% capacity. At the present time, there seems to be a slightly better call for egg size. Broken is well taken up on contracts, and with curtailed production, the junior sizes, with the possible exception of pea, are moving off. Outside of chestnut and pea, the market is absorbing practically the entire output under restricted mining, and continued efforts are being made to increase the market on these sizes. While it is not felt that the European war troubles will effect the labor situation to any appreciable extent, at the same time speculation is rife as to what this will ultimately result in. Many of the foreigners in the anthracite regions still owe allegiance to foreign countries, although little fear is expressed that the exodus will have any appreciable difference on the production of either anthracite or bituminous coals.

Bituminous—Trade is still flat in the bituminous industry. Spot coal is seeking a market, and prices realized are far from satisfactory. Operators generally believe that both demand and prices will improve within the next month or six weeks. Considerable accumulation of coal is reported at tidewater, but this is all likely to be disposed of as soon as vessels or barges can be secured. Refusal to entertain propositions to contract at the current prices is still the position taken by the operators ,who apparently are strong in their contention that the fall will see an improved demand. Purchasing agents are shopping around, and are able to secure their requirements, at considerably less than contract quotations.

CHARTERS

Coal Charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tonnage	Rate
Queenswood [2]	British	Cardiff	Bermuda	1694	$1.68
Iona Tunnel [1]	.....	Philadelphia	Cay Francis	1118	1.90
James W. Ewell [2]	.....	Philadelphia	Porto Rico	1081	1.60
Florence Creadick [1]	.....	Philadelphia	Jacksonville	657	.....
Hope Sherwood [1]	.....	.....	Mayport	522	.....
Pendleton Sisters [1]	.....	Philadelphia	Calais	899	1.10
Eagle Wing [1]	.....	Philadelphia	Boston	1076	0.60

[1] Schooner [2] Steamer

HAMPTON ROADS

Movement of coal from Hampton Roads still light. Dumpings for month of July 929,956 tons. Accumulations at tidewater continue above normal. Some price cutting.

The dumpings for the week have been light although some large cargoes have moved to Boston and other New England ports. Export shipments have been few, the Italian market taking the largest percentage of the business. Shipments foreign have been to Genoa, Venice, and Para with one cargo to Luderitz Bay, South West Africa. This latter cargo was taken by the sailing ship "Timandra" while the other foreign shipments went by steamers.

Coal accumulation at Hampton Roads railway yards is still above normal and while vessel tonnage about due will considerably reduce stock on hand shipments coming forward will still keep the supply above normal. Demand on all grades is light and little spot coal is being sold.

Regular circular prices are still being quoted although it is believed some of the smaller suppliers are making some cut in order to move some tonnage in the railway yards.

Dumpings for July, while falling somewhat behind those of July, 1913, are considerably heavier than was expected. The total dumpings for the month were: Norfolk & Western Ry. at Lamberts Point 448,295 tons, Chesapeake & Ohio Ry. from Newport News 264,870 tons and the Virginian Ry. at Sewalls Point 216,791 tons. Both the Virginian Ry. and the Norfolk & Western have fallen below their figures for July, 1913, while the Chesapeake & Ohio Ry. shows a fair increase.

LAKE MARKETS

PITTSBURGH

Rumored negotiations for 1915 supplies for byproduct coking plants. Demand slightly improved. Prices still very irregular.

It is reported that there are some tentative negotiations looking to 1915 coal contracts for byproduct coke ovens, but it is not likely any business will be closed in the very near future. Lake shipments continue unsatisfactory, though there are hopes of improvement by the middle of this month. Line trade has improved slightly, partly by further exhaustion of stocks and partly by increased manufacturing activity. The iron and steel industry has operated as well in July as in June, which is unusual, and expects materially heavier operations in August, with an increase of perhaps 10% over July and a similar increase in coal consumption.

Prices continue very irregular, not only for free coal but also for contract coal. Slack, however, continues to show

the firmer tone noted a week ago, and is quotable at 60@65c. for prompt lots. Regular circular prices, which are entirely nominal at this time, remain: Slack, 80@90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Bituminous a trifle better at occasional points. No higher prices anticipated yet and may not come till winter. Anthracite helped by end of the month rushes but otherwise unchanged.

Bituminous—Here and there a well-received jobber finds that a few good orders are coming, but the rule is that they are difficult to find. This is encouraging, however, as changes for the better have to begin in that way. It will probably be cold weather before the demand is really good. Even then the mines have so much more capacity than is used now that it would be easy for a long time to keep ahead of any improvement in the demand, no matter how fast it appears.

There is every effort to keep the coal trade in hand as much as possible. Some of the mine owners occasionally ship a few cars into territory where some good salesman is well known and then invite him to sell them. There is hardly the former amount of coal selling at low prices, which is a move in the right direction, though the people who sell unbought coal for their friends do not pretend to get as much for it as they do for their own. Quotations remain on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley sizes are about 25c. less. Slack is doing better. The large amount of it from points beyond Pittsburgh is often what makes the mischief, especially as it is not very high grade.

Anthracite—There has been a better long-distance trade in anthracite to finish the month, as is usually the case. A good salesman can dispose of a cargo in the Lake district at such time, to save the 10c. a ton, when he could not sell it at all, early in the month. The movement of anthracite by Lake is heavy, being 178,000 tons for the week and 810,410 tons for July, which is 30,000 tons more than in July last season. The shipment for the season is 2,219,735 tons, as against 2,566,606 tons to date last season. There is very little local demand for coal.

TORONTO

Market dullest for a long time. Acute situation developed by the war scare fails to create any buying.

Trade continues quiet, the demand for steam coal being smaller than it has been for some years. Notwithstanding the general anticipation of a speedy rise in price owing to the war, few are buying ahead of immediate necessities. Prices remain as follows with occasional shadings in car lots by jobbers in bituminous: Retail—anthracite, egg, stove and nut, $7.50; grate, $7.25; pea, $6.25. Bituminous, steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50; wholesale, f. o. b. cars three-quarter lump, $3.68, screenings, $2.64.

TOLEDO

Situation unchanged but an excellent undertone prevails. Industrial conditions improving rapidly. Labor situation clearing up.

Toledo has shown little change, save for the usual raise in prices Aug. 1. Business is coming in about the same and the Lake shipping has shown no particular betterment. But despite all this, dealers are predicting improvement as soon as the weather is a little cooler. Notwithstanding the fact that all orders have to be dug up by persistent work, business generally is on the up grade.

The influence of the heavy crops is already noticeable. The railroads have begun placing orders for new rails and equipment, and placing idle shops in operation getting ready for the heavy traffic due within a few weeks. Industrial concerns are increasing operations and there is a general quickening of business. During the past week the increase in operations at the steel plants has amounted to 5 per cent. as compared with the previous week's average.

COLUMBUS

Mining is being resumed in the Hocking, Pomeroy, Jackson and Cambridge fields. Sales agents report a good demand for both steam and domestic sizes. Lake trade will also be active.

With the working agreement in most of the Ohio districts adjusted, mining will be resumed in many places early in the month; in fact quite a few mines opened Aug. 3 and others are being put into operation as rapidly as possible. The situation is correspondingly better and coal men expect a fairly busy season from this time on.

Steam demand is gradually increasing and salesmen have been started out for orders. While many of the steam users have been depending on West Virginia coal, they are expected to switch back to Ohio product as soon as mining is resumed. A few contracts for steam grades have been made and others will be closed within the next few weeks.

In the domestic trade there is some activity developing also. Dealers' surpluses are quite small and since they are moving larger quantities they have been compelled to replenish stocks. There is a marked preference in this market for the fancy grades such as Pocahontas and re-screened varieties but Hocking Valley is also still in demand. Retail prices advanced on the average of 25c., Aug. 1.

Lake trade is expected to take on more activity with the resumption of mining. Chartering of boats is going on rapidly and it is expected that Ohio will furnish quite a tonnage to the head of the lakes before the close of navigation. Dock prices are the same as last year. Reports from the Northwest show that the docks are not at all congested. Th Toledo docks of the Hocking Valley Railway Co. have handled 1,193,000 tons since the opening of navigation.

Prices in the Ohio fields:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Rescreened lump	$1.60		$1.65	$1.50
1½ inch	1.50		1.50	1.50
¾-inch	1.30	$1.20	1.35	1.30
Nut	1.25		1.35	1.15
Mine-run	1.15	1.05	1.15	1.10
Nut, pea and slack	0.70		0.75	0.65
Coarse slack	0.60	0.60	0.65	0.55

CINCINNATI

Temporary activity in the steam market preceded the circular advance of August, and a slightly improved domestic demand is felt. Lake traffic is comparatively slow, with plenty of boats available. Outlook regarded as very favorable.

The fact that prices for August delivery were scheduled for an increase, resulted in an improved demand during the last week of July, a number of contracts being closed and the movement of spot coal, better than for some time. But in all essentials the situation here remains unchanged, the slight improvement in the industrial field having as yet brought no marked increase in the consumption, while in the domestic market the same state of indifference on the part of the dealers and public alike exists as heretofore When this disappears later on, as it certainly will, there will be difficulty in supplying the demand, but so far this consideration has had little, if any, effect on the trade.

CLEVELAND

An improvement in retail and out-of-town demand noted. Heavy shipments of slack have created a light demand in Cleveland proper. The Lake trade is again showing signs of improvement.

Following heavy receipts of slack, amounting to as much as 100 cars a day, there is very little demand for fine coal. Receipts over Sunday were not as large as the average for last week and though the market is slightly lower it is not so weak as would be expected under the circumstances.

Out-of-town trade is inquiring for coal and orders for all grades are being taken for shipment, as soon as Ohio mines are at work. Hocking and Cambridge districts are shipping Lake coal and some of these grades are being sold in the all-rail markets.

The retail trade is taking more Pocahontas and anthracite. Owing to the small demand for slack, prepared sizes are held firm and in some cases lump and egg are quoted as high as $2.35 to 2.50 at the mines. Only a limited number of companies are taking orders at the circular. Those who are quoting higher prices claim to be well sold up. Operators are offering 1¼-in. Youghiogheny at $1.50 at the mines, but it is understood sales at $1.35 to 1.40 are being made.

The Lake trade is showing some signs of improvement. With all districts at work except No. 8, other coals are beginning to show greater tonnage. Docks are sending a little more fuel forward and, as Upper Lake docks are relieved, shipments from lower ports are increased. The incease is not particularly noticable as yet, but shippers expect it to be considerably improved by the end of the month.

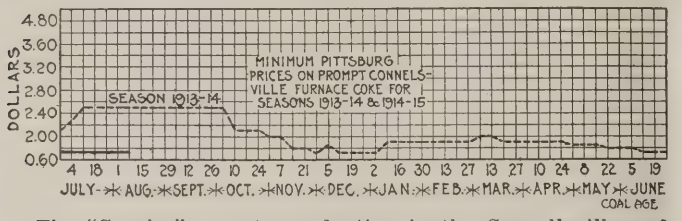
Quotations are as follows:

	Pocahontas	Youghiogheny	Fairmount	W.Va. No. 8
Lump	$3.60			
Lump, 1½ in.		$2.50		
Lump, ¾ in.		2.20@ 2.25	$2.05	$2.05@ 2.10
Egg	3.60			
Mine-run	2.60	2.15	1.95	2.00
Nut		2.20		
Slack	2.20@ 2.35	1.65	1.70	1.60@ 1.65

COKE

CONNELLSVILLE

The month-end brought no demand for furnace coke, and it is evident that all consumers are covered for July and August at least. At the beginning of July there was $1.75 coke available for the two months, if not for three. Prior to that time a number of contracts for second-half had been made. About the middle of May there were three or four contracts at $1.85 and 1.10, while about the middle of June three contracts were closed for coke at $2, this, however, being for an exceptionally desirable brand. There are rumors that considerable prompt coke could be had at less than $1.75. We quote: Prompt furnace, $1.75; contract furnace, $1.75@2; prompt foundry, $2.25@.35; contract foundry, $2.35@2.50, per ton at ovens.



The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended July 25 at 268,290 tons, an increase of 90 tons, and shipments at 267,361 tons, an increase of 8599 tons. Production appears to have exceeded shipments in the week by 929 tons, while the accumulated excess in 18 weeks appears to have been 53,032 tons.

BUFFALO

There is no stir reported anywhere, and not much encouragement to sell. The demand is not improved and dealers seem quite discouraged. One reports that he has as much difficulty in selling a car of coke as he did in half a dozen cars of coal. It seemed as if the less a consumer bought the more time he had to complain of it. Quotations remain on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.25 for stock coke.

DETROIT

There are signs of an improved demand for coke on this market. Connellsville has been as low as $1.90 but is gradually advancing and is now being quoted at $2.15 for prompt delivery. Semet Solvay is quoted today at $3.25 and gas house at $2.75. There is little or no demand for the latter.

CHICAGO

Furnace and foundry coke have not advanced as rapidly as was expected as the betterment in the iron and steel trades has not been as marked as was anticipated. Connellsville and Wise County are quoted at $5; byproduct, egg, stove and nut, $4.75; gas house, $4.25.

ST. LOUIS

There is no coke moving in but there is a good demand for the local product. Gas house is quoted at $4 f.o.b. St. Louis and retails at $5.75.

BIRMINGHAM

This week has brought no change in either the furnace or foundry coke market. There is some foundry coke moving at satisfactory prices, but the tonnage is not large, consumers buying only for their immediate requirements. There is nothing doing on furnace coke.

SOUTHERN

BIRMINGHAM

Lump coals show a slight improvement but steam grades are unchanged from last week.

This week has brought about a slight change for the better in the lump coal market. Prices have remained about the same but inquiries are more numerous and for larger tonnages although the movement has not increased yet. The steam-coal market shows very little change; the demand is far below normal, and prices, in many instances, have declined below the usual base. It is stated that many of the larger railroad contracts are being closed at a lower price than last year. The prospects for a better demand and prices are very good, and business should be greatly improved within the next 30 days.

LOUISVILLE

Considerable stocking for the winter and the trade is notably stiffer. Steam grades also in better demand.

A stiffening all along the line is reported by operators and dealers at the beginning of August, with prices, averaging ten cents higher on practically all grades. Extensive rains helped the demand from the interior points, where the farmers are putting in their winter supplies of fuel and the requirements from other points have increased.

Steam coals have come into better demand from both the North and the South, especially with the Eastern Kentucky fields. There has also been some improvement in the Western field, though the winter requirements do not begin to help this section so soon.

Prices range around 75 and 80c. for the better grades of nut and slack; 90 to 95 for four-inch run of mine; $1 to $1.05 for run-of-mine; $1.65 to $1.75 for block, all prices f.o.b. mines.

MIDDLE WESTERN

INDIANAPOLIS

Operators expect an improvement by the middle of the month. The crop movement will then be under way and railroads will be larger buyers. Domestic grades will also be moving. Mines are on about half-time.

No improvement is noted yet but operators believe a change is due shortly. By the middle of August the movement of the wheat and oats crops will be felt and domestic grades will begin to move to retailers' yards for storage purposes.

Operators also expect an improved demand this month as a result of the low prices. These are still at the summer level and retailers will doubtless take advantage of them. The demand for steam grades is about unchanged. Mine-run is selling at $1.05 to 1.10 and screenings at 85 to 90c. The mines are on not better than half-time generally and low prices are made to keep them in operation. This is tempting some buyers who would not otherwise be in the market.

CHICAGO

Customary advances being made in the circulars. Considerable buying for storage purposes. Ohio coals still out of the local market.

Following the usual custom at this time of the year the companies are beginning to advance prices and quotations are now on the same level as those of last year.

Smokless and Hocking—There has been a marked improvement in the smokeless situation due principally to heavy storage buying for apartment houses. Retail dealers do not care to draw on their storage piles yet and are taking care of this demand by placing orders with the mines. The supply of smokeless lump and egg is still less than the demand and the price is firm. Although a few Hocking mines are now in operation, none of this coal is being received in Chicago the current production being moved to markets near the mines and to the Lakes.

Illinois and Indiana—Carterville operators are asking $1.35 for lump and egg for the first half of the current month. No. 1 washed coal is being held at $1.40 to 1.50, the bulk of the business moving at the lower figure. Both groups of Franklin County operators have advanced prices. The smaller companies now have a circular price on lump, egg and No. 1 nut of $1.50 which will be in force until Aug. 15. Several of the larger companies have issued a circular of $1.60 for the first half of August and one concern quotes $1.65.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07	$2.55@2.70	$2.12	
Steam lump	1.87@1.92		1.97	
Egg		2.55@2.70		$4.05
Mine run	1.87	2.15@2.25	1.87	3.30
Screenings	1.57@1.62	2.55@2.70	1.57@1.62	

Harrisburg quotations are: Domestic lump and egg, $2.40; steam lump, $2.25; mine-run, $2.15@2.25; screenings, $1.80@1.90; No. 1 nut, $2.55; No. 2 nut, $2.40.

Carterville prices are: Lump and egg, $2.40; No. 1 washed, $2.45@2.65; No. 2, washed, $2.35@2.40.

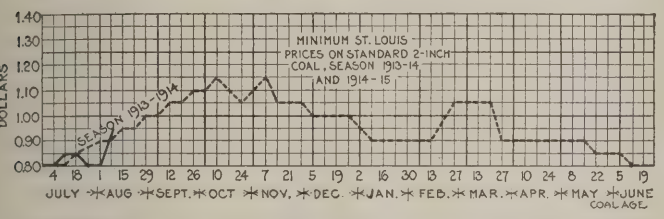
ST. LOUIS

Prices advancing and a stronger demand in all quarters especially for domestic grades. Steam coals the only exception. Possibilities of an acute situation already in sight this fall.

The month of July closed with prices advancing on all the high grade coals, especially domestic fuels, and a growing demand from all quarters. The steam market is a trifle weak

with prices gradually dropping; indications are that by the latter part of September prices on steam coal will be lower this year than they have in many years past, unless there is sharp picking up in the industrial lines. Prices on the high grade domestic coals advanced on the first of August from 10 to 20c. a ton, and these prices are only good for the first ten or fifteen days in the month, and subject to change without notice.

The washed market is a little weak, and washed coals have been lower than for many years at this particular time, although there are indications that the Nos. 1 and 2 washed sizes will move freely about the tenth of the month, when the cotton gins begin their buying in the South.



Standard 2-in. lump is gradually going up on account of the slump in the screenings market, and the first of the month saw this grade quoted at from 95c. to $1, with a good chance of going better. Screenings, on the other hand, were down to 60c., and liable to go to 50c. without more than 24 hr. notice. Even at this, the operators in the Standard field are still selling coal far below the cost of production, and it begins to look as if this would continue throughout the season.

The present circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.30	$0.95@1.00	$1.00
3-in. lump	.....	....	.....	....	.....
6-in. lump	$1.25@ 1.40	....	1.40	1.00@1.10	1.25
Lump and egg	1.85@ 2.15	$2.15	.....	....	1.15
No. 1 nut	1.20@ 1.35	....	.....	....	.....
Screenings	0.70@ 0.75	....	0.80@0.85	0.65@0.70	1.60
Mine-run	1.00@ 1.15	....	.....	0.75@0.80	.....
No. 1 washed nut	1.35@ 1.40	2.25	1.50	....	.....
No. 2 washed nut	1.20@ 1.25	....	1.35	....	.....
No. 3 washed nut	1.15@ 1.20	....	.....	....	.....
No. 4 washed nut	1.10@ 1.15	....	.....	....	.....
No. 5 washed nut	0.60@ 0.70	....	.....	....	.....

Smokeless lump and egg is $4.90. The retail price is $6. Arkansas Spadra, f. o. b. cars St. Louis, for egg, grate, and nut is $5.80. The retail price $7.

KANSAS CITY

Operations on practically a fulltime basis and the outlook favorable. Stocks reported light.

Mines in Kansas and Missouri are working nearly to capacity. Demand is the best since last winter and operators are finding no difficulty in moving practically their entire output. Dealers' stock are light, as the result of their disinclination to buy, except on a hand-to-mouth basis, last spring. They cleaned out their yards in good shape at that time, and are now loading up for expected fall demand. With record breaking crops, operators believe that the season of 1914-15 will be one of the best in the history of the Southwestern trade.

PRODUCTION AND TRANSPORTATION STATISTICS

VIRGINIAN RAILWAY CO.

Shipments over this road for June, with details of leading operators were as follows in short tons:

Shipper	Tons
Knw., Glen Jean & E. R.R.	32,920
E. E. White[1]	26,073
Gulf Smokeless	21,869
Loup Creek Colliery	20,717
Slab Fork	19,811
New River Collieries	19,244
Pemberton Coal & Coke	17,253
E. E. White[2]	16,253
MacAlpin	14,324
Winding Gulf Colliery	13,278
Long Branch	12,454
Bailey Wood	11,707
The New River	9,743

[1]From Glen White. [2]From Stotesbury.

Gross shipments totaled 321,181 tons as compared with 304,030 for June, 1913, and 359,879 tons for May of the current year.

I. C. C. No. 5567—Beatrice (Nebraska) Commercial Club vs. Chicago, Burlington & Quincy R.R. Fourth section applications Nos. 1791, 1681, 1872, 1951, 2522, 4218, 4219 and 4784.

Rates on coal from Milwaukee, Wis.; Chicago and East St. Louis, Ill.; the coal fields of southern Illinois; southern Iowa; northern Missouri; the Kansas-Missouri districts and the Spadra, Ark., district, to Beatrice, Neb., not found to be unduly prejudicial as compared with lower rates to Lincoln, Neb., to which point Beatrice is intermediate. Complaint dismissed and carriers relieved from operation of the long-and-short-haul rule.

NORFOLK & WESTERN RY.

Destination of shipments over this road for June and the first six months of this year and last year were as follows in short tons:

	June		Six Months	
Coal	1913	1914	1913	1914
Tidewater, foreign	175,414	160,300	876,320	922,045
Tidewater, coastwise	.....	.....	22,841	15
Domestic	262,574	310,125	1,903,318	1,962,226
Coke				
Tidewater, foreign	1,623,923	1,845,531	8,651,814	9,632,950
Domestic	123,941	87,921	817,801	580,655
Total	2,185,852	2,403,877	12,272,094	13,096,989

Distribution of shipments for May and June compare as follows:

	May			June		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas	1,123,694	16,249	1,139,943	1,136,568	14,804	1,151,372
Tug River	260,887	2,268	263,155	242,208	2,134	244,342
Thacker	270,356	9,792	280,148	214,595	9,968	224,563
Kenova	92,958	8,810	101,768	88,455	8,897	97,352
Total	1,747,895	37,119	1,785,014	1,681,826	35,803	1,717,629

Shipments of coke, entirely from the Pocahontas field, amounted to 59,370 tons in June as compared with 60,949 tons in May.

FOREIGN MARKETS

GREAT BRITAIN

July 24—Spot coal continues to be weak. August coal, however, is very firm, in view of the Holidays and consequent further restriction of output. The Greek Government are reported to have bought a block of best coal, August shipment, at enhanced prices.

Approximate quotations:

Best Welsh steam	$5.04@5.28	Best Mountainshires	$4.08
Best seconds	4.56@4.80	Seconds	3.84@3.96
Seconds	4.20@4.32	Best Cardiff small	2.58
Best dry coals	4.20@4.32	Seconds	2.46

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those of Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days.

Coke is quoted at: Special foundry, $6.36@6.72; good foundry, $5.28@5.76; furnace, $4.56@4.80.

British Exports—The following is a comparative statement of British exports for June and the six months of the last three years, in long tons:

	June			6 Months		
	1912	1913	1914	1912	1913	1914
Anthracite	189,973	218,814	205,686	974,193	1,407,097	1,360,242
Steam	3,928,199	4,397,791	4,112,167	18,720,167	26,034,245	25,094,812
Gas	1,161,590	986,510	993,284	4,487,837	5,510,408	5,739,845
Household	154,856	144,792	139,430	640,455	855,375	742,440
Other sorts	322,026	258,503	283,753	1,350,671	1,719,110	1,649,599
Total	5,756,644	6,006,410	5,734,220	26,173,323	35,526,235	34,586,938
Coke	51,139	75,336	74,163	388,108	499,670	517,609
Briquettes	108,649	185,162	192,034	635,283	1,022,232	1,044,360
Grand total	5,916,432	6,266,908	5,999,417	27,196,714	37,048,137	36,148,907
Bunker coal	1,561,215	1,721,016	1,681,477	8,125,897	10,087,037	10,182,157

SPANISH IMPORTS

Spanish imports for the first four months of this year and last were as follows in metric tons:

	1913	1914
Coal	949,199	939,728
Coke	125,304	126,501

GERMANY

Production, imports and exports of German Empire for the first five month of this year, as compared with last year, were:

	Production		Imports		Exports	
	1913	1914	1913	1914	1913	1914
Coal	77,648	79,132	4,071	3,830	3,691	14,909
Coke	13,333	13,310	235	229	2,837	2,171
Lignite	35,041	34,192	2,911	2,686	26	27
Coal briquettes	2,389	2,663	9	13	1,024	1,007
Lignite briquettes	8,576	9,415	52	57	375	355

Financial Department

Central Coal & Coke Co.

This company reports for the year ending Jan. 1, 1914, as follows:

RESULTS FOR CALENDAR YEARS.

Department	1914 Gross	1914 Net	1913 Gross	1913 Net
Wholesale coal	$930,740	$490,742	$920,289	$448,801
Retail coal	126,999	16,570	124,889	34,887
Wichita coal	40,251	3,862	50,873	8,008
St. Joseph coal	20,172	7,693	18,773	6,710
Salt Lake City coal	.....	.....	13,243	3,049
Washer	43,116	3,552	49,003	18,445
Mining	.....	.....	137,947	*33,808
Mining stores	.....	139,872	.....	132,903
Rentals coal department	.....	31,494	.....	.....
Wholesale lumber	743,229	305,804	788,204	363,496
Carson mill	829,051	169,276	661,410	93,856
Keith mill	529,478	96,503	574,212	113,582
Miscellaneous	.....	22,554	.....	41,812
Total	.....	$1,287,922	.....	$1,231,472

*Loss

INCOME ACCOUNT.

	Year ending Jan. 1. 1914	1913	18 mos. end. Jan. 1, 1912	Year end. J'ne 1, 1910
Net earnings as above	$1,287,922	$1,231,472	$1,395,304	$1,103,781
Deductions—				
Royalty cred. coal lands.	$126,664	$107,655	$125,665	$79,141
Royalty cred. timber lds.	339,865	253,679	278,619	241,805
Depreciation mill prop.	33,987	36,240	39,803	34,586
Deprec'n washer prop.	4,008	4,008	6,346	4,008
Deprec'n Kansas City motor trucks	4,544	.....	.....	.....
General expense	88,819	81,493	137,474	81,907
Interest on bonds	72,990	78,597	193,146	130,610
Interest and exchange	73,041	38,292	119,664	29,500
Total	$743,918	$599,963	$900,717	$610,557
Surplus earnings	$544,004	$631,509	$494,587	$502,224
Divs. on pref. stock	(5)93,750	(5)93,750	(7½)140,625	(5)93,750
Divs. on com. stock	(5)307,500	(6)307,500	(9)461,250	(6)307,500
Balance after divs.	sur$142,854	sur$230,259	def$107,288	sur$100,974

BALANCE SHEET YEARS ENDING JAN. 1.

Assets—	1914	1913	Liabilities	1914	1913
Coal lands	4,324,853	4,350,876	Common stock	5,125,000	5,125,000
Timber lands	3,536,350	3,459,554	Preferred stock	1,875,000	1,875,000
Coal shfts & bldgs	2,145,579	1,878,920	Undivided profits	1,624,264	1,574,848
Sawmills & impts	492,717	347, 241	Bonds	2,059,000	2,284,000
Yards & equip't.	99,227	99,373	Audited bills	657,262	542,954
Personal property	89,290	96,472	Bond int. not due	.....	26,381
Mo. & La. R. R. Co. stock	150,000	150,000	Sundry accounts	88,124	108,718
Bonds, etc., in other companies	160,102	150,101	Pay-roll balances	125,465	131,423
Acts for collect'n	1,788,463	1,544,311	Freight charges unadjusted	82,590	94,537
Inventories	684,701	603,254	Sink. fund for ins.	189,250	3,906
Cash	328,590	230,290	Bills payable	1,389,000	1,247,500
Sinking fund	50,000	50,000	Proceeds of sale of Delta Land & Timber bonds	647,832	.....
Sundry balances	13,915	43,875			
Total	13,853,787	13,014,267	Total	13,853,787	13,014,267

Note—For last previous annual report of this company see "Coal Age," Vol. 3, p. 628.

Island Creek Coal Co.

This company reports in part for the fiscal year ended Dec. 31, 1913, as follows:

Results—The mines during 1913 produced 1,916,000 tons, which is a decrease of 123,787 tons from 1912, the first decrease since mining operations began in your properties. The net profits also show a decrease of $47,460, due principally to the extraordinary causes below mentioned, which not only reduced the output but also to some extent disorganized our operating forces, involving a high expense.

In January 1913 a bridge on the Chesapeake & Ohio Ry., in process of erection across the Guyandotte River, near Huntington, W. Va., collapsed, and as all west-bound coal originating east of Huntington has to pass over this river, freight movements to the west on the Chesapeake & Ohio Ry. were very largely suspended for two or three weeks.

In April, owing to almost unprecedented floods, operations were again completely suspended on west-bound traffic for the best part of one month. The railroads affected by the floods were unable for several months thereafter to handle satisfactorily the same volume of traffic as previous to the floods. Your transportation properties on the Ohio River were not damaged to any extent by the floods nor was any of the floating equipment lost. Railroad transportation conditions, moreover, were poorer than usual.

During the entire year there was an ample market for coal, and your company could have disposed of a larger tonnage than it did if railroad transportation facilities had permitted. The new dock at Duluth was placed on an operating basis and handled a fair tonnage of coal in a very satisfactory manner. In June the saw-mill at Holden was destroyed by fire, and there were, therefore, no earnings from that source during the last six months. The sawmill, having been rebuilt, was put in operation in Jan. 1914.

The increase of $13,139 in the administrative and general expenses is the result of additional burdens imposed by the new income tax Act.

The charge against earnings for depreciation has been increased over that of last year, notwithstanding that a smaller tonnage was produced, and it is the belief that depreciation charges are upon a liberal basis.

Dividends—Preferred dividends at rate of $6 per share per year and ordinary dividends on common stock at rate of $2 per share per year, as well as an extra dividend on the common stock of $3 per share, were paid during 1913. The extra dividend was intended as a distribution of part of the surplus which had been accumulated in earlier years. The total of the surplus , Dec. 31, 1913, was $848,796, a reduction of $200,025 from last year.

COAL SECURITIES

The following table gives the range of various active coal securities during the week ending July 30, the New York Exchange being suspended Friday and Saturday July 31 and Aug. 1:

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	....	....	85½	96¼	82
American Coal Products Pref.	....	....	105	106	102
Colorado Fuel & Iron	24⅝	20½	21½	34½	20½
Colorado Fuel & Iron Pref.	....	....	140	140	140
Consolidation Coal of Maryland	....	....	102½	....	....
Island Creek Coal Com	48⅜	46	46	....	....
Island Creek Coal Pref.	88¼	87	87	....	....
Lehigh Valley Coal Sales	....	....	....	....	....
Pittsburgh Coal	18⅛	16½	16½	23½	16½
Pittsburgh Coal Pref.	87½	82	82	93½	82
Pond Creek	16½	13	13	....	....
Reading	160⅞	137	140	172½	137
Reading 1st Pref.	88	87	87	89⅜	87
Reading 2nd Pref.	85	82	82	93	92
Virginia Iron, Coal & Coke	40	35	37	52	35

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale		Year's Range	
Colo. F. & I. gen. s. f. g. 5s	88	....	90	90	86	99
Colo. F. & I. gen. 6s	104	....	105	July '14	105	105
Col. Ind. 1st & coll. 5s. gu	71	Sale	71	71	71	82
Cons. Ind. Coal Me. 1st 5s	....	70	73	Mch '14	73	79
Cons. Coal 1st and ref. 5s	....	92	89½	J'ly '14	89	90½
Gr. Riv. Coal & C. 1st g 6s	89	....	99½	Feb '14	99⅛	99⅛
K. & H. C. & C. 1st s f g 5s	....	98½	102⅝	Apr '06z	....	....
Pocah. Con. Coll. 1st s f 5s	....	93½	93	Mch '14	93	93⅛
St. L. Rky. Mt. & Pac. 1st 5s	86	Sale	86	86	84	88¼
Tenn. Coal gen. 5s	....	81	78	78	77	82
Birm. Div. 1st consol. 6s	102½	102¾	102½	102⅜	97⅛	103½
Tenn. Div. 1st g 6s	101⅞	103	102	102	101½	103
Cah. C. M. Co. 1st g 6s	101⅜	103	101⅞	J'ne '14	101	102½
Utah Fuel 1st g 5s	101	....	101½	Mch '14	101¼	101¼
Victor Fuel 1st s f 5s	....	74	73	Apr '14	73	73
Va. I. Coal & Coke 1st g 5s	85	91⅛	90	J'ly '14	90	95

DIVIDENDS

Burns Bros.—Regular quarterly dividend on the common stock of 1¼%, payable Aug. 15 to holders of record Aug. 1, and regular quarterly No. 6 on the preferred stock of 1¾%, payable Aug. 1 to holders of record July 17.

Pacific Coast Co.—Regular quarterly on the common and second preferred of 1% and on the first preferred of 1¼%, all payable Aug. 1 to holders of record July 25.

Dominion Coal Co., Ltd.—Dividend of 3½% on preferred, payable Aug. 1 to holders of record July 17.

COAL AGE

Vol. 6 NEW YORK, AUGUST 15, 1914 No. 7

The history of humanity is largely a history of its leaders. In connection with absolute monarchies such a remark is not surprising, but the statement holds with equal force in a consideration of any type of democracy.

Professors of political economy may tell us that such a belief is not in accord with the spirit of democracy, but they cannot disprove the truth of the assertion.

Not only is this statement true with reference to politics, but it holds with equal force in trades and professions. Let us hasten to add that we are not launching on a discussion in political economy.

We only wish to point out that miners are not the only class of human beings who follow after leaders. Even the most casual reading of history will also convince any one that leaders in the past have been of every sort, good, bad and indifferent. Why wonder then that miner folk are often led in search of false gods.

Let's go a little farther; since the leaders themselves are only human beings, is it strange that even they are sometimes misled by visions, or if not misled, are frustrated by other leaders who are following visions?

Such facts emphasize the folly of ignoring leaders. If they have had dust thrown in their eyes, help them to remove it. If they are attempting to throw dust in other people's eyes, make *them* (the leaders) realize that it can't be done. The most formidable ones are often victims of nightmare.

Most steps forward in industrial relations can be traced back to leaders who have progressed beyond their fellows and then have reached out to pull the lagging ones ahead.

Compare this method of progress with the only other system possible, namely, educating an entire community so that an educated leader must be chosen and the possibilities are apparent at once.

And even granting that the whole scheme is undemocratic (which it most certainly is), what harm can come of accepting the inevitable and trying to make the best of it?

If you think your are above hero worship yourself just think back a few years and try to explain some of your actions during one or two political campaigns. Better look at yourself in a mirror while you are doing it.

The Coal Miner

(After Kipling's, "The Sapper")

By Berton Braley

Written expressly for Coal Age

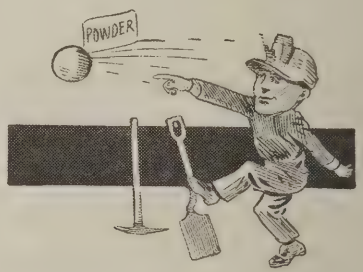
He may be a Russian, a Czech or a Pole,
He's princip'ly human, but partially mole,
And down in the workings he digs up the coal
And works for the wage of a miner.



He's seldom an angel—and sometimes a scamp,
He's often a bit of a rover and tramp,
But down in the darkness, the dust and the damp
He follows the trade of a miner.

Now if you would join with this coal-mining clan,
You hark to your elders as close as you can,
And listen to me while I tell you the plan
To pattern your life as a miner.

Be modest and quietlike when you begin,
Don't try to hand out any manner of chin,
It's a wise guy who doesn't get fresh and butt in,
When he's a new hand as a miner.



Don't think when you're careless that's showing your skill,
Don't take any risks that are not on the bill,
Don't smoke where it's gassy or tamp with a drill,
It proves you a fool of a miner!

When working with powder be gentle, that's all,
Don't slam it around like a cheap rubber ball,
For it sometimes makes pieces exceedingly small
Of someone who once was a miner!

Keep out of the places that sell you the drink,
They'll give you—a souse, and they'll take all your chink,
And they're likely to land you kerplunk in the clink
Which is not a bit nice for a miner.



Just take your pay home to your children and wife
Don't get into rows and dissensions and strife,
And you'll probably rise to a station in life,
As foreman of hundreds of miners!

It's true I ain't done things exactly that way,
And that's why I'm toiling and sweating today,
Don't do as I DO—but just do as I SAY,
Which is first class advice for a miner!

Modern Preparation of Bituminous Coal at the Mine

By R. G. Read*

SYNOPSIS—Broadly speaking, there are two classes of preparation plants—those handling steam coal and those treating domestic fuel. Representative examples of each type are here described.

The last 10 years have witnessed a marked improvement in the preparation of coal at the mines. This condition has been brought about by three main causes:

1. Increased use of mechanical stoking and combustion appliances, which has necessitated more careful sizing to suit individual requirements.

2. Scientific purchasing with respect to the sulphur and ash content of the coal which has forced a thorough cleaning.

3. Increased cost of labor at the mines, which has made advantageous the use of machinery wherever possible.

Coal preparation may be roughly divided into two classes corresponding to the existing market requirements:

1. Preparation for steam purposes, under which may be included the coal for the lake trade, which is only partially prepared at the mine.

2. Preparation for domestic or special uses.

In the general consideration of the subject, it may be well to call particular attention to the advisability of making a careful investigation into the physical characteristics of the particular coal in question before deciding to what extent preparation should be attempted. The coal from the different fields of the country, and, in fact, from different parts of the same region, varies to such an extent that no hard-and-fast rules may be laid down.

The prudent owner will, however, before embarking on the construction of an elaborate and expensive plant for the preparation of his coal, determine whether or not its physical nature is such that it will stand the treatment which may be necessary. The coal may be so soft or friable and the breakage and resultant percentage of fine material be so great as to make the preparation of no commercial value. The writer has seen a number of cases of this kind where large sums have been expended, resulting only in disappointment. There are some coals which are affected by the atmosphere to such an extent that careful screening and sizing at the mine is not apparent when the fuel reaches its destination. These remarks are intended to refer only to the sizing and not to the cleaning processes, as cleaning any kind of coal increases its commercial value.

In order that this article may be of greater interest it has been deemed advisable to describe two representative plants covering the general divisions referred to above. It is not to be understood that these examples cover all points involved, but they have been chosen as being typical and because no washery is operated in connection with either one.



Fig. 1. A Typical Plant for the Preparation of Steam Coal

The subject of coal washing is so intricate and of such a technical nature as to be best taken care of in a future article. It is now generally conceded that washing as a means of cleaning coal should only be applied to the small sizes, and even here its advisability should be considered with extreme care before this method is adopted.

A description of the two representative plants follows:

The Steam Coal Plant

The main points to be considered in the design of an equipment of this nature are simplicity in the handling of the coal and economy in power and labor. The preparation consists largely of screening the fine coal out of the run-of-mine. The present practice is to use gravity or stationary screens for this purpose.

Fig. 1 shows a general view of a double tipple of the

*Webster Bldg., Chicago, Ill.

latest design for this purpose. This consists of two entirely separate handling equipments, the right-hand side being arranged for screening purposes and the left for loading straight run-of-mine coal. No picking or cleaning other than an inspection in the railroad cars and the removal of large pieces of slate or refuse is provided for in this installation.

The operation is as follows: The coal is dumped from the mine cars into a receiving hopper of about 10 tons capacity, from which it is delivered by means of a reciprocating plate feeder to the top run of an inclined apron conveyor which elevates and discharges it into a small chute, from which it flows by gravity to the screens. The large coal passes over the screen and is loaded into the railroad cars by means of a curved-end loading chute with an adjustable apron.

This apron may be provided with fingers resembling a fork, which tends to deposit the small lumps underneath and the larger on top, which gives the loaded car a better commercial appearance. It was formerly the custom to design loading chutes to discharge crosswise or at right angles to the car. This necessitated the employment of at least two men, who were known as "trimmers," whose duty it was to build the pile on the car, this process being known as "topping out."

This was, of course, costly and dangerous, as the large lumps frequenty came down with such velocity as to injure the men. In no other detail has there been such improvement as in the design of these loading chutes. This will be more clearly understood from the fact that one person with small effort now loads the coal in quantities and in better condition than it could formerly have been done by four men.

Reverting to the consideration of the plant in question, the small coal drops through the upper screen onto the lower, where it is divided into two sizes, the larger being loaded as nut or egg on the center track. The upper screen is provided with suitable mechanism for quickly changing the spacing of the bars so as to vary the minimum size of the lump or maximum size of the small coal. The usual spacings are ¾ in., 1¼ in., 1½ in. and 3 in. The 1¼-in. spacing is the one most commonly used. In some installations this screen is made in sections about 4 ft. long, with a vertical drop of 4 in. to turn the coal over.

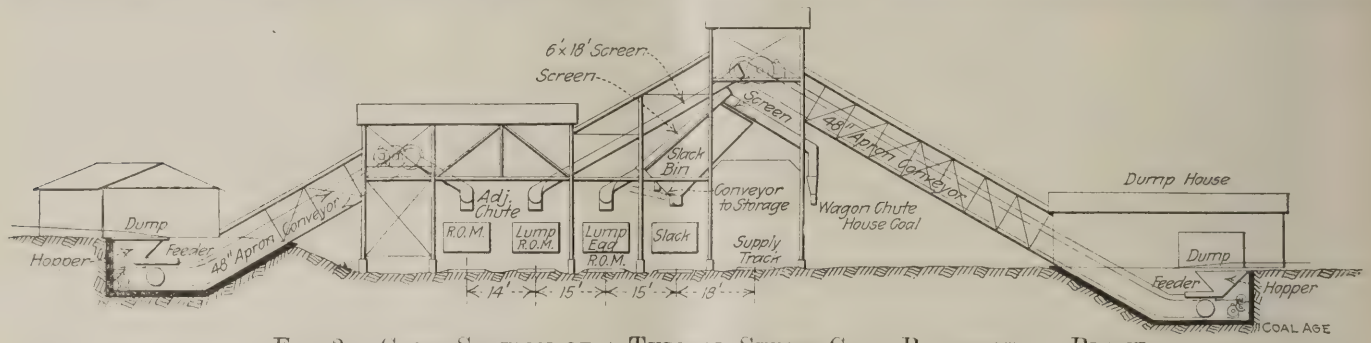


FIG. 2. CROSS-SECTION OF A TYPICAL STEAM COAL PREPARATION PLANT

SLACK IS EITHER SOLD OR MADE INTO COKE

The slack or fine coal from the under screen falls into a collecting bin or hopper, from which it is discharged into the railroad car or to a conveyor which carries it to a larger bin, from which it is taken to ovens for making coke. Provision is usually made in installations of this kind for conveying slack in sufficient quantity to the boiler house for power purposes, also for loading partially screened coal into wagons for delivery to the miners' houses for domestic fuel.

The handling equipment on the left is of the same general character except that no screening is provided for, the coal being loaded as it comes from the mine. This coal is largely used by the railroads for fuel, and by the larger distributing companies who maintain screening plants for retail purposes, in which case it is screened at the distributing center. The increasing use of stoker-fired locomotives is beginning to be felt in the trade, and it is probable that future installations will have to provide for at least enough screenings to meet these changing conditions.

It will be understood that the method of delivering



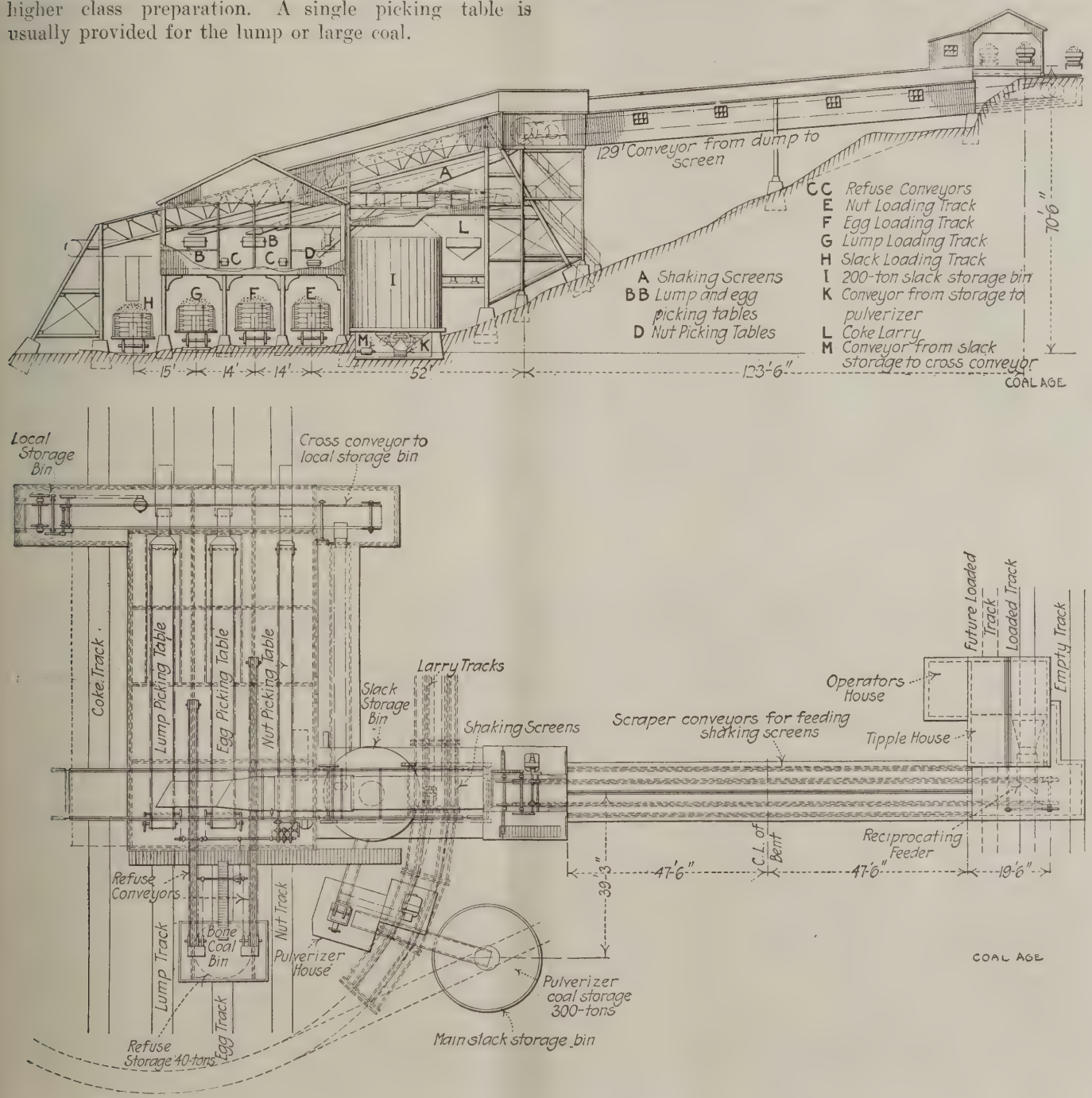
FIGS. 3 AND 4. TYPICAL PLANT FOR THE CAREFUL PREPARATION OF DOMESTIC FUEL

the coal from the mine to the screens varies with the local topographic conditions and the relative elevation of the coal seam and the railroad tracks. It is, however, becoming the general practice to dump the coal into a hopper at or near the mouth of the mine, from which it is conveyed to the screens. It was formerly customary to transport the mine cars to the screens, but this requires an expensive structure and complicates the operation of the equipment. The old method by which the coal was dumped in bulk into the screening equipment has been superseded by some method of feeding the coal at a uniform rate so that a better separation may be secured.

In the cases where cleaning of the coal is required it is taken care of in the manner described later. The picking or cleaning of fuel of this kind is not carried on so extensively or to a point of such refinement as in higher class preparation. A single picking table is usually provided for the lump or large coal.

The fundamental considerations in a plant for domestic preparation are to provide thorough screening or sizing, efficient cleaning and an adequate mixing of the various grades after preparation. The mixing is necessary so that any combination of sizes may be made to meet special combustion requirements. It also frequently happens that there is a large demand at high price for one particular size, while that for the other sizes is light, in which case the separation of all grades is made and the particular size desired is loaded separately, the others being mixed and loaded together. It will be understood that in order to properly clean the coal it is necessary to isolate it and pick the different sizes separately.

The plant taken as an example perhaps represents the highest development in this country, although there are installations of more recent completion. These later



FIGS. 5 AND 6. PLAN AND CROSS-SECTION OF PLANT, SHOWN IN FIGS. 3 AND 4

plants have, however, developed no new ideas and, in fact, have not carried the various operations to so high a point of refinement as the one to be described. It may be frankly stated that in the writer's opinion, the various operations are carried beyond the practical requirements of the trade at the present time, but the unavoidable expenditure was so great that the owners desired to anticipate future needs, since the life of the plant must necessarily be prolonged in order to justify the initial investment.

The question of handling the material so as to cause a minimum of breakage was given special attention, as the coal handled is rather soft and friable. Figs. 3 and 4 are general views of the equipment. The coal is dumped and conveyed to the screens substantially as described under the preceding section of this article. Figs. 7, 8 and 9 show a car dumping, the feeder and the conveyor.

The screens are what are known as "shakers" and consist of steel plates with different sized perforations built in a frame which is suspended either on hanger rods or rollers. This frame is connected to eccentrics which impart a reciprocating or shaking motion. It will be noted that these screens are on a much flatter pitch than the gravity type described above, the relation being approximately 15° to 30°. Fig. 10 shows the general construction and operation of screens of this class, but those

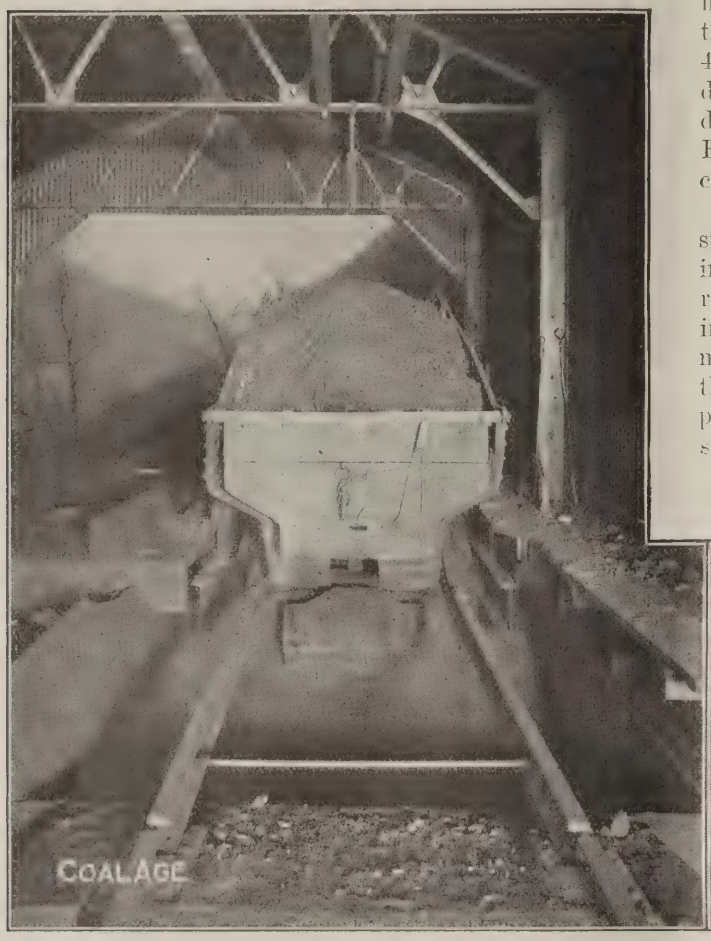


FIG. 7. A CAR ON THE HEAVY CROSSOVER DUMP



FIG. 8. RECIPROCATING FEEDER DISCHARGING TO CONVEYOR



FIG. 9. GENERAL VIEW OF CONVEYOR

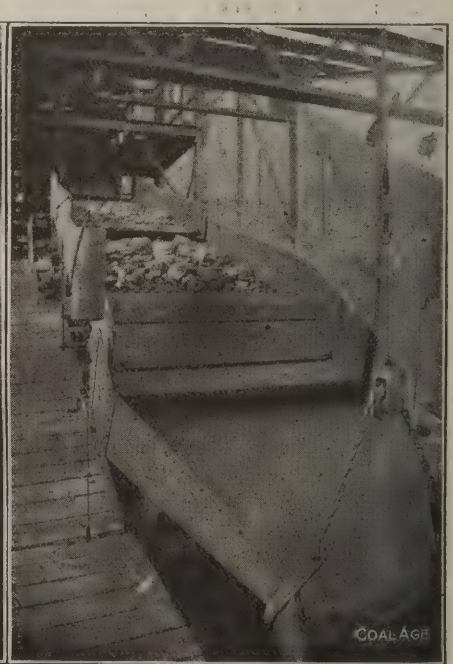


FIG. 10. THE SCREEN DISCHARGE



Fig. 11. Lower End of Shaking Screen over Picking Table

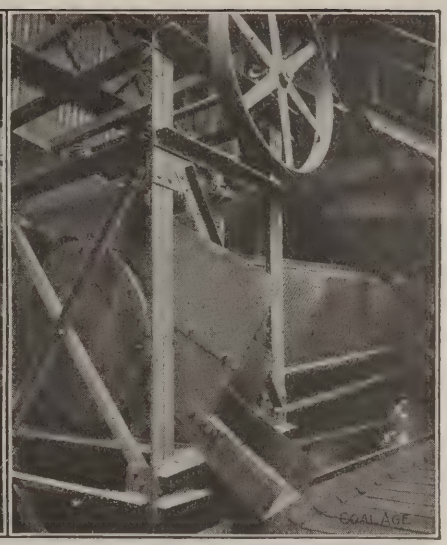


Fig. 12. Revolving Nut Screen

here illustrated are not a part of the equipment under discussion.

Picking Tables Have Adjustable Loading Booms

The lump coal after passing over the screens is discharged onto a picking table, which in turn delivers it into the railroad cars. Fig. 11 shows the end of the screen discharging onto the picking table, which consists of a flat steel belt made up of overlapping plates mounted on roller chains at either side which travel at the rate of about 40 ft. per min. Fig. 13 shows the pickers removing the refuse, consisting of slate or bone, and depositing it in chutes leading to refuse conveyors under the floor, which deliver it to a storage bin over the railroad track. This refuse is loaded in railroad cars and used for filling purposes along the tracks.

The discharge end of the picking table is supported on a structural hinged frame or boom, which is attached to an electric hoist, thus providing a means of raising and lowering the discharge of the coal to suit the cars. A small adjustable chute with loading "fingers" is fitted to the end of the boom.

The introduction of the loading boom has had a wonderful effect in the reduction of breakage, as coal can be laid down in the bottom of the car with practically no drop or fall.

The egg coal is handled in the same manner as the lump and goes through a similar path to the cars. The nut coal, on the other hand, after being separated on the shakers, is rescreened in a revolving or rotary screen, as shown in Fig. 12, to remove any slack or fine coal which may have passed over with it, and is then delivered to a picking table, where it is treated in the same manner as the lump and egg, except that no loading boom is provided, the delivery to the cars being made by a fixed chute with an adjustable apron.

The slack from the shaker screens passes into a storage bin, from which it is conveyed to a pulverizer and pre-



Fig. 13. Loading Booms at End of Picking Tables and Pickers Removing Slate

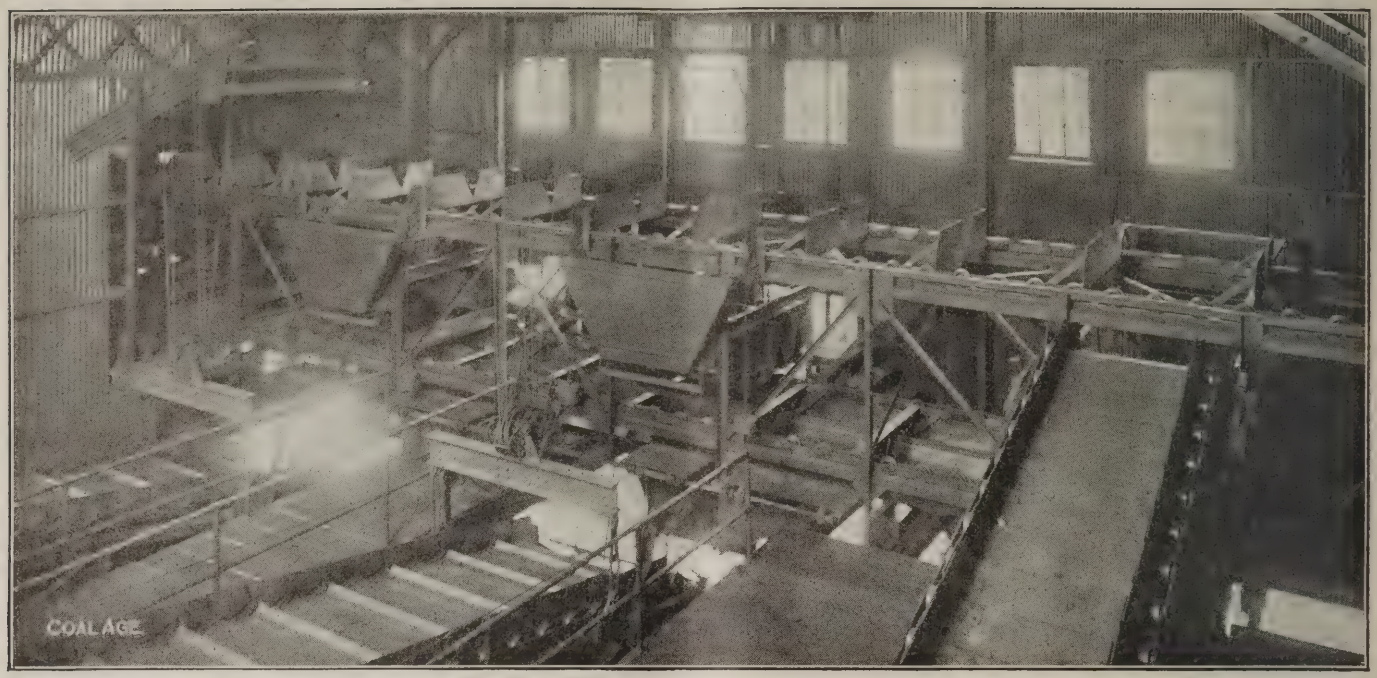


FIG. 14. THE TRANSVERSE MIXING CONVEYOR OVER THE END OF THE LOADING BOOMS

pared for making coke. An elevator carries it to a second storage bin, from which it is taken to the ovens. Provision is also made for conveying the slack to a point where it may be mixed with the other sizes or loaded in cars on a separate track.

The mixing of the different sizes after preparation is accomplished by means of a cross conveyor shown in Fig. 14, located at the end of the loading booms and the nut and slack conveyors. The booms are raised by means of the electric hoists above mentioned, and the slack and nut conveyors are arranged to discharge into this mixing conveyor, so that any combination of sizes can be made as desired. Provision is also made for discharging coal from this conveyor into a storage bin for wagon coal to the miners' houses.

The capacity of this plant is 5000 tons per day of 10 hours, with a maximum capacity of 750 tons per hour.

Fig. 15 illustrates a typical sizing equipment in connection with a retarding conveyor for delivering the coal to the screens, while Fig. 16 shows a similar installation in connection with a shaft mine.

In the Illinois field it is the general practice not to separate the nut and slack on the shaker screens, but to deliver the mixture to a rescreening plant, where it is separated into several intermediate sizes, which are stored in separate bins from which they may be loaded into the cars.

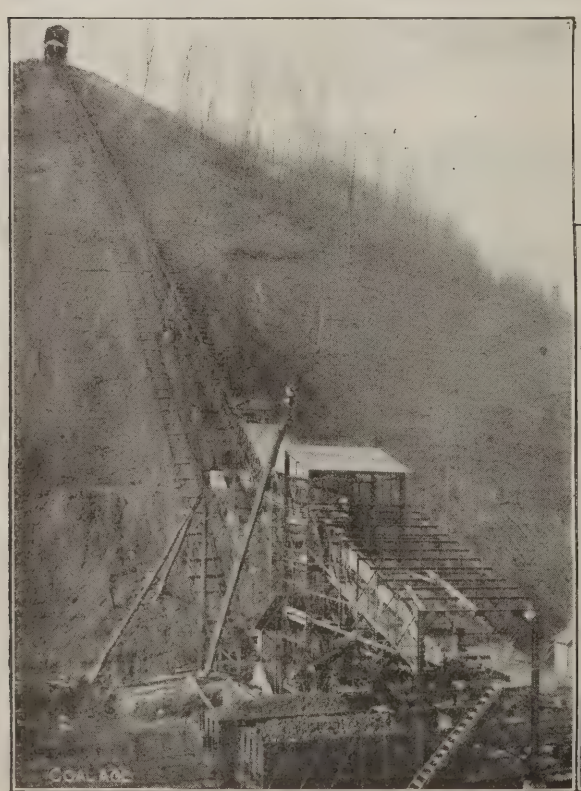


FIG. 15. A SMALL SCREENING PLANT AND A RETARDING CONVEYOR

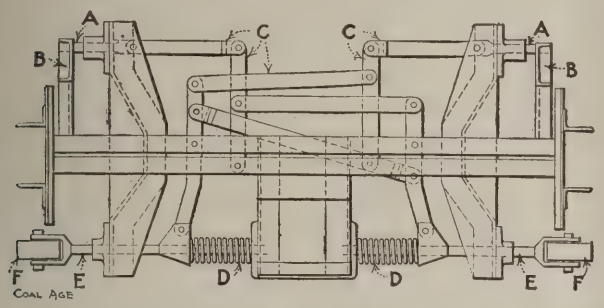


FIG. 16. A PREPARATION PLANT AT A SHAFT MINE

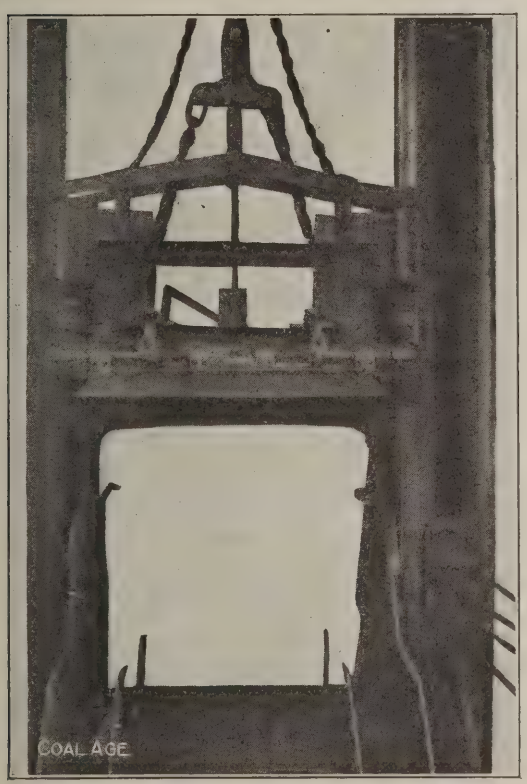
The Phelan Patent Safety Device

The Phelan patent safety device for self-dumping mine cages is essentially an automatic catch for preventing the cage from tipping in the shaft, or before it reaches its proper discharging position. It is so designed that the cage cannot tilt until the tip wheel enters the dumping guides at the proper point of the head frame.

Two forged steel pins *A* arranged to permit lateral motion engage at one end with each of the tip frame channels *B* and at the other end with a series of



TOP VIEW OF SAFETY DEVICE



GENERAL VIEW OF SAFETY DEVICE APPLIED TO CAGE

levers *C* which are actuated by two amply large springs *D* mounted on steel shafts *E*. The spring shafts *E* have forged eyes which are designed to accommodate the 6-in. diameter rollers *F*. These rollers are held in the out position by the springs *D* which also retain the latches *A* in engagement with the tip frame channels *B*.

Upon entering or at the point of entering the tip guides, each of the rollers *F* comes in contact with a wooden track which is so shaped as to depress the rollers, compress the springs *D* and release the tip frame latch *A*, allowing the cage to dump. On the return trip the rollers are released by the track and the catches *A* are immediately forced into safety position by the springs *D*.

Aside from being an absolute preventive of accidents which frequently occur from the cage turning over in the shaft, this device should recommend itself to all users of self-dumping cages on account of the saving of wear on the guides. The catch relieves the tendency of the cage to overbalance and by holding the tip frame guide-plates away from the wooden guide-rails and throwing all the engagement onto the guide angles of the cage it proves a decided factor in preventing wear on the wooden guides in the shaftway.

The manufacture and sale of this device are controlled by the Scottdale Machine & Manufacturing Co., Scottdale, Penn.

Rules for Boiler Erection

The Inland Steel Co., in its Book of Rules, gives the following instructions for boiler erection, which apply rather to the operating forces than to the erecting gang:

(1) Boilers shall be numbered at both ends and on top. The numbers should be placed so as to designate the boilers to which they apply and should be large enough to be plainly seen. Numbers perforated in steel plates are recommended.

(2) Seamless tubing should be used in all boilers.

(3) Guards should be provided for water-gage glasses.

(4) Pop safety valves of ample capacity should be provided and piped through the roof or to the outside of the building. No stop valve should be placed between the safety valve and the boiler.

(5) To relieve pressure in the blowoff line, for each battery of eight boilers, or fraction thereof, a vertical pipe should be connected with the blowoff line and run up through the roof, or to the outside of the building.

(6) Two stop valves should be provided in the blow-off connection.

(7) Two valves should be placed in feed-water connections of each boiler, one on each side of the check valve.

(8) To avoid untrue indication of water level, and possibly an explosion, no valves should be placed in connections between water columns and boilers, or if valves are so placed they should be locked open when not in use.

(9) One of the two valves in the connection between the boiler and the steam header should be a nonreturn valve.

(10) Suitable drains should be provided where necessary on all steam lines.

(11) Walks or platforms, equipped with suitable stairs or ladders, should be provided, wherever possible, on boilers, steam header and other places where men have to work.

(12) When boilers are not equipped with nonreturn valves, a guard provided with a lock, designed to lock the steam-valve wheel, should be provided and used when men are working in the boilers, to prevent anyone from turning in steam.

(13) Plank covering over exhaust pits should be frequently inspected and kept in perfect repair.

Extracts from a Superintendent's Diary

Attempting to honestly enforce the laws which regulate the ages at which children shall be employed within the mines has kept me sitting on thorns for the past month. For a time we were not vigilant about this matter, but lately word has come out from our legal department that we are to assume no discretion in interpreting the law and the rulings from our legal department cannot be winked at.

Each father has a special reason for wishing to work his boy, but they all come under two classes: 1. The boy does not want an education and so would be better off at work. 2. The boy's wages are absolutely necessary to the family. When argument fails, other means are attempted, such as concealing the boy's age.

If I were entirely in sympathy with the law, the task would not be so difficult and I might even derive some pleasure in trying to outwit the law-breakers, but I haven't been able to convince myself that 16 years is in all cases a desirable age limit.

I realize that we mine superintendents are not considered good judges when it comes to deciding questions of sociology, so I have taken pains to read all of the arguments advanced by the defenders of the law and still it looks visionary to me.

They insist that until a child is 16 he is not competent to choose a congenial occupation and for that reason he ought not to be forced into work which cannot benefit him, but on the contrary tends to dull his intellect for all future time.

Today old man Powell came to ask my advice about what to do with his son. He is 18 now and has never done a stroke of work worthy of the name. The father, a miner of the old school, accumulated a fair competency at hard work, while the boy was still a youngster, and, like many miners similarly situated, decided to give his son an education and put him in one of the professions. He realizes now that the boy cannot or at least will not take an education, and likewise he will not go to work. Keeping at work is either a matter of habit or the outcome of a determination to accomplish something in the world. This boy has never been allowed to acquire the habit and his teachers haven't been able to give him a life vision.

If he ever develops into a sure enough man, it will be in spite of his father's planning rather than because of it.

And he's not very different from six or seven other young fellows of our town with whom he passes most of his time.

In contrast to them I see our boss driver's son, who has worked in the mine every day since he was 13. He's now 18. Next year he expects to complete the correspondence course he is taking, after which he has been promised a position in a machine shop that specializes on mine equipment. Suppose he fails to make good, he still has the working habit to fall back on.

If the boys who have come under my observation are fairly average, I should say that the ones who have passed 16 without having earned a dollar will have to depend upon their wits mostly if they succeed in the world, and if all of them are successful at that, surely the value of labor to the world has been greatly exaggerated.

Southern Appalachian Coal Operators' Association

The semi-annual meeting of the members of the Southern Appalachian Coal Operators' Association was held in Knoxville, Tenn., Friday, July 24, about 100 being present. Gov. B. W. Hooper was present to confer with the operators in reference to the demand which they have made for years that the 800 state convicts, now employed at the state mine, be removed and placed on the public highways. Tennessee employs a large number of convicts on a farm; several hundred are leased, at a low rate of course, to lessees using them in different lines of trade, but no more than 199 are ever employed in any one trade except coal mining. It will thus be seen that coal operators are subjected to discrimination.

The convict mine is one of the largest producers in the state, is therefore a factor in the market, and, worst of all, state coal is sold regardless of market prices, especially when the market is at its worst, thus making the demoralization of prices more complete. Operators have persistently endeavored to get the convicts out of the mines, but politics has prevented. At this meeting, however, Governor Hooper assured the operators that he was in favor of placing a large number of convicts on the farm and some at trades, but with the number to each trade limited, so that their labor would have but little effect upon similar trades. Other convicts, he thought, should be placed on the public highways.

However, he stated that the operators should endeavor to convince the public and members of the legislature, which meets next December, that the coal industry is being injured by the employment of convicts in the state mine; also that some plan must be made to dispose of the operation without a large loss to the state on its investment, which amounts to several hundred thousand dollars. The state owns a good property, fairly well equipped, and it is believed that the mine could be leased if not sold outright.

E. C. Mahan reported briefly regarding the progress of the general freight rate case before the Interstate Commerce Commission, in which are involved all coal freight rates between Virginia, West Virginia, Kentucky and Tennessee and all southeastern territory. All evidence is before the commission, the case is to be argued at a date to be set, and a decision will probably be given in the latter part of September or early in October.

Under the leadership of B. A. Morton for the first three years and of E. C. Mahan, who now serves his second term, the Southern Appalachian Coal Operators Association has succeeded in getting a large majority of the coal operators of the Tennessee-Kentucky field to work together for the common good. This has been especially true in handling freight-rate cases and in the securing of credits and collections, many operators saying that the latter department has saved them many times the cost of membership and dues. Members' meetings are held quarterly, while domestic operators have frequent informal conferences during the season. The headquarters of the association are in the Holston National Bank building, in charge of the secretary-treasurer, J. E. McCoy. His offices adjoin those of the president, E. C. Mahan, who is general manager of the sales department of the Southern Coal & Coke Co.

Care of Rubber Belts

SYNOPSIS—Notes on splicing big and small belts so as to promote long life and smooth running. Square and diamond lap joints and those with a back splice are described. The writer points out the severe strain to which a thick belt is exposed on a small pulley.

Some valuable kinks in the handling and splicing of rubber belts are given by Robert Moore in *Power*. Care must be taken in putting on a new belt to stretch it as much as possible before splicing.

In placing a 36-in. eight-ply rubber belt on pulleys 50 ft. between centers, allow 1/8 in. per running foot for stretch. Put on the clamps, as shown in Fig. 2, and draw them tight. Do not be afraid of breaking the belt, as even a five-ply 10-in. belt will stand a strain of 10,000 lb. and larger ones in proportion; the pulley will collapse first. Take all the tension the bearings will stand, then turn the shaft slowly back and forth until the clamps touch the pulleys; taking up the slack as it is recovered from the upper half. Neglect to do this will stretch only one-half of the belt, and is apt to cause it to run out of line.

Preparing the Lap

After thoroughly stretching, proceed with the lap, which in this case should be 45 in. long. It should always point in the direction of travel over the pulley, as in Fig. 1. Thus any slip of the pulley will have a tendency to smooth down the lap. Place a board on the clamp rods on which to rest the splice and draw a line squarely across the belt 47 in. from the end. Lay the section off in 2-in. squares, starting 1 in. from the outer edge, as in Fig. 2. Punch 1/4-in. holes where the lines cross. As there are eight plies, there will be three cuts or scarfs. Cut a line just the depth of two plies at the 45-in. line and peel off these two thicknesses; do the same at the 15- and 30-in. lines.

Cementing and Sewing the Lap

Scarf the other end, place the halves together and punch holes in the lower half, inserting the punch in the holes in the upper half. By so doing, the holes will be directly opposite each other. Cleanse the surfaces with naphtha and apply a liberal coating of the best rubber cement. Allow this to dry until it will not stick to the fingers, then place the laps together, starting at the edge and rolling the upper one out as it is being cemented, so that air may not be entrapped between the surfaces. Sew the outer edges, using the shoemaker's stitch, shown in Fig. 3. Alternately roll and pound the joint until it is perfectly flat, then sew each row of holes as was done with the outer ones.

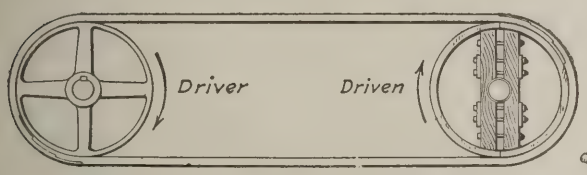
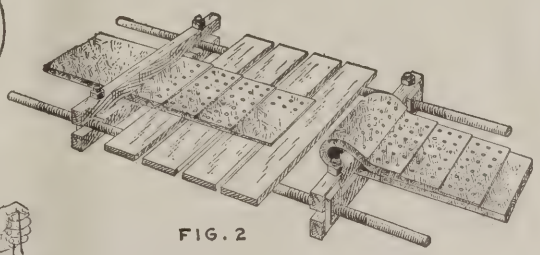


FIG. 1


FIG. 2

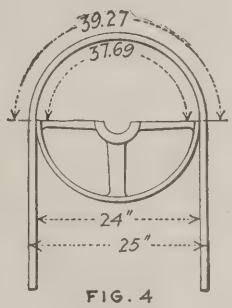


FIG. 4

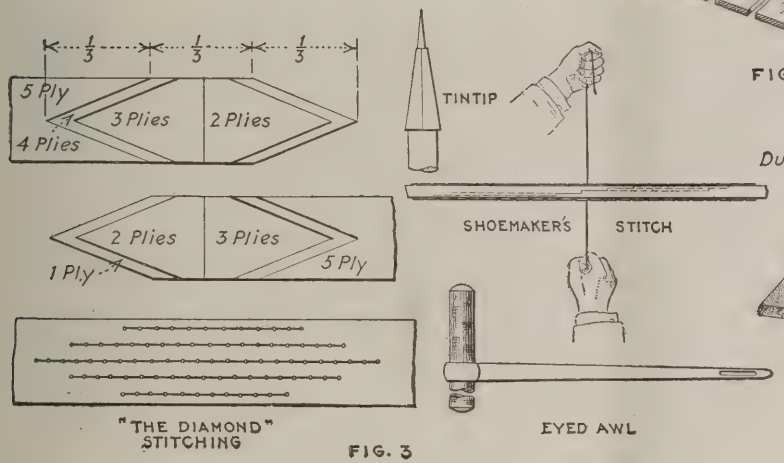


FIG. 3

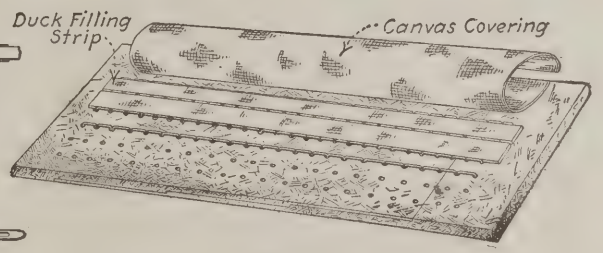


FIG. 5

METHODS OF STITCHING BELTS

Cut filling strips of duck the width of the spacing between lacings (most belt companies sell this duck all prepared) and give them several coats of rubber cement on each side. Clean the face of the belt between the laces with naphtha and give it a liberal coating of cement. When each surface is dry, that is, when the finger placed lightly to the surface will not adhere, place the strips between the lacing and roll them down. Now take a piece of duck, the width of the splice, but 4 in. longer, and cement this to the face of the belt, covering the joint. By so doing the lacings are protected and, except for the occasional renewal of the outer covering the joint is as durable as the belt itself. The manner of this is shown in Fig. 5.

For sewing, tip the laces like a shoe string by bending a V-shaped piece of tin around the ends, as illustrated, or use the eyed awl shown, to pull the lace through.

Small Belts Are Butted

Belts smaller than 10 in. are butted and have a butt strap on the outer surface; this is known as the "back splice." Belts on grindstones, saws, rattlers, etc., where shippers are used will wear on the corners where they are butted, and the outer lace hole will soon tear away, if this form of joint is not used. Shippers for belts of this kind should always be of the roller type. In joining canvas belts always stagger the holes and do not have them less than 1¼ in. apart as the fabric is apt to crack across in cold weather.

The Diamond Splice

Another form of joint, known as the "diamond splice," is used on generators with small pulleys, as there is less shock when the lap passes over the pulley, eliminating all flicker of the lamps when generating power for a light circuit. The diamond splice is made in much the same manner as the lap splice except that the scarfs are divided into three equal parts and cut as shown in Fig. 3; it is not so strong a joint as the lap splice, but is more flexible and, therefore, better adapted to small pulleys.

Why Small Pulleys Are Undesirable

Increasing the diameter of the pulley lengthens the life of a belt, as the stretch and compression are less per foot. As the thickness of the belt increases, so should the diameter of the pulley increase. For instance, the arc of a belt ¼ in. thick on a 2-ft. pulley would measure 37.69 in. next the pulley face, while the outer edge would measure 38.48 in., a total distortion of 0.79 in. If the belt were ½ in. thick the outer edge would measure 39.27 in., giving a total distortion of 1.58, just twice as much (Fig. 4). When more power is wanted and it is not advisable to increase the size of the pulley, better results are obtained by widening the belt and pulley face than by increasing the thickness of the belt. To increase the diameter of the pulley to 48 in. would give a total distortion of 1.58 in. when using a ½-in. belt, but as the arc would measure 75.4 in., the distortion for each lineal foot would be halved.

Animal fats and grease should never be used on rubber belts. Boiled linseed oil is good; also equal parts of black lead, red lead, French yellow, litharge and enough japan dryer to make it dry quickly. This will give a smooth, polished surface.

The Gary, W. Va., Gardens

The U. S. Coal & Coke Co., of Gary, W. Va., made their annual awards of premiums for the best kept yards and gardens at their various plants, on July 21 and 22. A committee of four, was selected for making the awards, consisting of Dr. E. A. Schubert, traveling agent, Agricultural & Industrial Department, Norfolk and Western R.R. Co.; Jesse M. Jones, field agent, Department of Agriculture, Washington, D. C.; Dr. T. C. Atcheson, Agricultural Department, University of West Virginia, Morgantown, W. Va., and W. H. Kendrick, state agent, Boys' Agricultural Clubs, in connection with the University of West Virginia.

The prizes given were the same as in former years, namely: $10 for the best kept gardens and $5 for the second best kept garden; and $5 for the best kept yards, at each of the twelve plants of the company. The awards for carefully kept yards went to 6 Hungarians, 3 Americans, one Slav and one Italian. The awards for good gardens were granted to 5 Hungarians, 2 Americans, 2 Italians, one Roumanian and a negro. The gardens were better than ever before despite the dry weather in May and June. The committee found at least 1000 gardens on the property of the company worth, in aggregate, at least $40,000.

A Fine Coal Year in Virginia

The production of coal in Virginia in 1913 was 8,828,086 short tons, valued, according to E. W. Parker, of the U. S. Geological Survey, at $8,952,653. Virginia broke all previous records during this year in the quantity of coal produced, and for the first time in six years the value of the output per ton exceeded $1.

The quantity of coal produced exceeded that of 1912 by 981,430 short tons, or 12.5 per cent., with a gain in value of $1,434,077, or 19 per cent. The quantity of coal mined by machines increased a little over a million tons. The average number of working days was exceptionally large, while the average production per man reached nearly 1000 tons for the year.

The bad practice of shooting coal off the solid was reduced to the extent of nearly a million tons, compared with 1912. The number of fatal accidents was lowered by a little more than ⅔, and there was not a single strike or lockout reported. This record bears on its face the evidence that the year was exceptionally gratifying.

For several years Virginia has stood relatively high in the coal produced by each man employed, and 1913 was no exception to this rule. The number of men engaged in the coal mines of the state increased from 8678 in 1912, to 9162 in 1913, and the average working time from 251 to 280 days. The average production per man in 1912 was 904 tons, and in 1913, 963 tons. The average daily production per man was slightly less in 1913, being 3.44 tons against 3.6 tons in 1912.

The most gratifying part of the record of 1913 was in the reduction of the number of fatal accidents. In 1912, 75 men were killed in the coal mines of Virginia, and in 1913, there were but 24 fatalities.

Lignite Deposits in North Dakota

Few parts of the United States have enjoyed a more rapid agricultural development than the region along the North Dakota and South Dakota state line, from the Missouri River westward.

In the settlement of this region, lignite has proved a great boon. The country is mainly treeless, and homesteaders are, as a rule, of scanty means, and the lignite is practically the only fuel available.

This region was recently examined by the U. S. Geological Survey, which found that the lignite beds are, for the most part, thin and of little value, but will furnish considerable fuel for local use. In many places, these measures are not over 18 in. thick, but have been mined for local use by stripping off the overburden of shale and sandstone.

In some parts of the field examined, the lignite beds are much thicker, in one place as much as 13 ft. Here mining is carried on by drifts, and, in one instance, by a shaft. The most important mining centers at present are near Haynes, on the Chicago, Milwaukee & St. Paul Ry., in Adams County, and near Leigh on the Cannon Ball Branch of the same road in southwestern Morton County.

The government report on this field, containing maps showing the distribution of the lignite and a general description of its quality may be obtained from the Director of the U. S. Geological Survey, Washington, D. C.

The Militia in the Colorado Labor War

SYNOPSIS—The militia of Colorado has been freely condemned by partisans and unthinking people. The Ludlow battle has been described as an attack by an overwhelming soldiery on an unarmed people, whereas it was simply the successful defense of a greatly depleted force of militia fighting against a rabble of southern Europeans who had learned that the troop they had to meet was ill able to protect itself. This attack was made in the face of a promise that violence would not be committed. Acting on this assurance the few troops still in the field were being withdrawn.

The newspapers have declared that women and children were burned, and shot down by the National Guard of Colorado or by the mine guards at Ludlow, but this is wholly untrue with but one possible exception. One boy, who rushed in between the brave defenders of the state and the serried ranks of armed anarchy, was killed. It is not impossible that the boy's death may have been due to a bullet from the guards.

Judge Ben. B. Lindsey stated in Chicago that the boy was beheaded by the militia and that the head was hurled at the boy's father when he asked for the body. After Governor Ammons had branded the story as false Judge Lindsey sent a feeble denial of the interview in which this statement was made.

THE FACTS ABOUT LUDLOW

Instead of Ludlow being the scene of a massacre it was rather the setting of a deep-laid plot by leaders of trained Greek soldiers, fresh from the Balkan war, to massacre a detachment of 44 national guardsmen left in the field for a day or two after the order of recall by Governor Ammons. The story of the gallant defense of their position against ten times as many men who had either been hired by the United Mine Workers of America to murder the guard, or who had gotten beyond the control of that organization, will compare in heroism and fortitude with the defense of the Alamo against the Mexican army. In position to mow down their enemies as they deployed over the level land from the tent colony to the railroad cut, this handful of guardsmen obeyed the order of Major Hamrock not to fire until fired on and permitted the armed enemy to gain cover from which they could fire on the uniforms and against the sovereignty of Colorado.

Six of these guards were boys of 18 years of age, students of Colorado colleges. Governor Ammons had called home the main force at Ludlow, and these were left to gather up the camp equipment and stray cavalry horses. But another week and General Chase would have had them out and on their way home. Governor Ammons had recalled the troops, under a pledge of peace arranged by John R. Lawson, Executive Committeeman of the United Mine Workers, specially in charge of the strike by orders from Indianapolis, and by other officers of the United Mine Workers. Beset by disloyalty in the State Capitol and a powerful and venal press in the city of Denver, harassed by the fact that the state was without funds to carry on the public defense, and suffering from attacks of illness, Governor Ammons listened to the promise of the strike leaders and the advice of powerful public men and private citizens, and agreed to remove the troops and did so—only this little detachment remaining in the field.

THE "STRIKERS" AND THE MILITIA

But the situation is best approached by recalling some events prior to the Ludlow battle. When the troops arrived in the disturbed district, Oct. 29, 1913, the strikers encouraged by their leaders had the hypocritical grace to welcome them.



THE MILITIA IN ACTION ON WATER-TANK HILL NEAR LUDLOW, COL.



MAJOR WILLIAMS, JOHN LAWSON, LOUIS TIKAS AND A CITIZEN

The strikers were afraid or pretended to fear the handful of mine guards engaged by the coal companies. Every train was adding, to the numbers of "strikers," men who had left Colorado a year or two ago to fight in the Balkan war or other gun men hired to become "miners" or "strikers." Many of them, like Louis Tikas, the Greek, the proprietor of a bootblack establishment in Denver, had never done a day's work in a mine. Already Robert Lee, marshal of Segundo, had been killed by strikers and numerous parties beaten up. The sheriffs and other officers of the counties had appealed for troops, saying they were unable to preserve life and property against the attack by the United Mine Workers of America.

DESTRUCTION OF SOUTHWESTERN MINE

Adjutant General John Chase established Trinidad and Walsenburg as his bases. On the night of the arrival of the troops, a band of men went to the Southwestern mine, an independent plant owned by J. W. Siple, H. D. King and John Vail, citizens of Colorado, poured oil on the tipple and mine buildings, set them on fire, and destroyed the property. After a long time arrests were made for these acts of arson, but the activity in prosecution was only because the post-office at the Southwestern mine was destroyed at the same time as the town and mine and the federal authorities were

Note—This article is based on one by L. C. Paddock, which appeared in the "Daily Camera," of Boulder, Colo. The illustrations are from photographs furnished by him for our columns and are the same as appeared in the publication mentioned.

the parties which acted. The district attorney of Las Animas county, either through fear or from his strike sympathies, had neglected to do anything.

The Southwestern was not a John D. Rockefeller property and the improvements valued at $60,000, were expended on it by Mr. Siple and his associates. All this went up in flames, entailing a total loss of surface improvements, flooding the mine with water, and necessitating great future expense in restoring the property to working condition.

THE FOREIGNERS KEPT THEIR GUNS

General Chase, moved by the assurance of Lawson and others that they would disarm their followers as soon as the mine guards were disarmed, proceeded to take the arms of the latter. This was easily done, as he says in his able report to the congressional committee, "Upon the Occupation of the Coal Strike Zone of Colorado."

"They were assembled by their employers and promptly turned over the high-powered rifles." . . . "I disarmed the mine guards and the employees of the operating companies in every camp throughout the entire strike zone, and speedily and easily finished the complete disarmament of that side."

General Chase was promised specially by Lawson that the strikers would now surrender their arms. Troops were marched to Ludlow—the largest tent colony in the strike district—and they were received with open arms, but those were not the arms which were wanted. He continues: "Many of the men were in the strange costumes of the Greek, Montenegrin, Servian and Bulgarian armies." Gen. Chase's report did not include the battle of Ludlow and other terrible affairs occurring after the withdrawal of the troops, but that he had prescience of what would occur is shown by this passage:

"We passed by Ludlow, occupied the Berwind and Hastings canons, and then returned to the colony to receive the surrender of the hundreds of high-power rifles I knew the strikers possessed. At this point occurred the first instance of bad faith on the part of the striking people. Expecting to receive hundreds, if not thousands, of arms, there were delivered into my possession some twenty or thirty weapons, many of them of obsolete pattern, the strikers topping off the humor of the situation by including in the delivery of arms a child's toy pop-gun. Since that time the recovery of the strikers' arms has been attended with the greatest difficulty; it has been a game of hide-and-seek, and while I have been able to recover, from various hiding places, a large number of high-power weapons belonging to the union, I will state that there are hundreds of guns still concealed and waiting occasion for use. Such weapons as I have received from this source came in always a few at a time."

THE ATTACK ON UNARMED GUARDS

The troops were called into Trinidad on Oct. 31 to prevent the massacre of the mine guards who had been disarmed by General Chase, who assembled them at the Coronado Hotel preparatory to giving them safe escort out of the district. A great crowd gathered, threatening vengeance on the disarmed guards. Five or six hundred of the mob were there, and made no secret of their determination to "get" these unarmed men. General Chase says:

"Notwithstanding the promises of Mr. Lawson and other strike leaders which induced me to disarm the mine guards, they then rather gleefully assured me that they could not control their people and that the feeling among the strikers, thirsting for the blood of the mine guards, was such as could not be stayed by any influence of the leaders."

He ordered out infantry and cavalry on the streets of Trinidad and quelled an ugly riot. Against General Chase's statements are those of men imported to Colorado to stir up the spirit of class hatred, men imported to make this state the battle ground of international warfare upon society and rights of property.

GENERAL CHASE

And who is Chase? Leader of the citizen-soldiery in times of strife—he is a specialist in the treatment of the eye and ear, widely known for his skill in medicine and surgery; an occupant for a number of years of a chair in the State University Medical College; a man of scholarly attainments, of life-long devotion to the poor, to whom by the thousands in Colorado he has rendered professional services without pay—a builder in the times of peace and a soldier, every inch of him, in the time of war; a tender-hearted physician, a devoted and loving husband and father, and citizen who is peer to any other. The imperfect pacification of the coal regions was due to no fault of his.

The troops who were in the field were but few—600 at times, never more than 1200, and the territory they were compelled to pacify and hold in check is larger than the State of Connecticut. That so small a band did such successful work while it was in force in the field is a credit to its efficiency and energy.



THE PIT AT LUDLOW UNDER A TENT IN WHICH THIRTEEN WOMEN AND CHILDREN WERE SMOTHERED



TROOP OF NATIONAL GUARDSMEN WITH MAJOR HAMROCK IN COMMAND AT EXTREME RIGHT

To Seek Northern Coal

Mackenzie & Mann, of the Canadian Northern Ry., are equipping the schooner "Laddie," at St. John's, Newfoundland, to sail for Hudson Bay on a prospecting expedition in search of coal deposits. They wish to secure coal supplies in that area for utilization in connection with the Hudson Bay railroad now being built from Le Pas, Manitoba, to Port Nelson.

The Canadian Northern has a junction with the Hudson Bay road at Le Pas, and will probably also operate the latter railway when it is completed. The discovery and opening up of coal deposits in the Hudson Bay re-

gion would be of great importance in connection with the traffic expected to be developed by the new route. At present all the coal required by the steamship traffic to the Bay has to be taken there from Sydney, N. S., in sealing vessels. The coal required for railway construction has to be brought up via Winnipeg and Le Pas.

Provision will be made at Port Nelson for the storage of coal in large quantities, but the cost of freight from the present distant sources of supply will be heavy and the finding of coal deposits at any point comparatively accessible for ships plying on the Hudson Bay route would be of immense advantage.

A Great Coal-Stripping Operation

The accompanying view, which shows two steam shovels, is of the Elsworth-Klaner Coal Co.'s coal-stripping works, four miles south of Pittsburg, Kan. This is the most remarkable picture ever taken of the comparatively new industry of open-cut coal mining. It shows, besides the extensive works, the two largest steam shovels in the world. They are Marions, model 270, and were built especially for this work.

Compare the size of the giant shovel in the foreground with the string of cars or the two dinky engines. From the shovel in the foreground to the one farther back, it is a quarter of a mile.

The main booms of these shovels are 90 ft. long, and the dipper handles are 54 ft. long. The dippers, level full, will hold 5 cu.yd. of earth, and heaped up as they actually are at work, they hold 6 cu.yd., or 162 sq.ft. The shovels will plow a swath, at the beam's fullest swing, 105 ft. wide—will clean the coal for that distance. They each will strip a 30-ft. covering from an acre of coal in a month, and do it right along. They have been in operation nearly two years.

The shovels weigh 300 tons and cost $35,000 each. The freight on each one was $3000, and it cost $2000 to set them up and start to work. A crew of four men on the shovel and two ground men are required to run them. The coal they strip is from 3 to 3½ ft. thick. The picture was taken from the tipple.



Strip Pit of Elsworth-Klaner Coal Co., Pittsburg, Kansas

Firebrick Work

Writing in *Power,* Frederick L. Ray gives the following specifications for firebrick work:

All firebrick shall be protected from moisture, and shall be dry when used. Each brick shall be dipped in a thin fine clay wash, rubbed and shoved into its final place, and then tapped with a wooden mallet until it actually touches the brick below it. The use of clay thick enough to lay with a trowel will not be permitted.

The walls of fire and red brick shall be carried up together. Furnace linings shall be laid with four courses of headers and then one stretcher backed by a firebrick header. Furnace center walls shall be of solid firebrick. Walls with 4½-in. linings or all red brick walls shall be laid with each header course on the inside of the wall lapping over a header course in the center of the wall, which in turn laps above a header course on the outside.

Points to Be Observed in the Building of Fire Arches

If fire arches are called for by the drawings, the skewbacks shall be laid off parallel and at the same height with a straight-edge as long as the arch. The skew shall be a true surface, cut only on the ends of the brick. There shall be firebrick back to the buckstays on single settings, and entirely through the center wall on battery settings.

Batten strips for the arch centers shall not be more than 2 in. wide. Selected brick only, smooth, straight and uniform, shall be used in the arches. Brick shall be laid dry without any clay; and shall be shoved together close and tapped with a wooden mallet on the flat side only of the brick. They shall be laid in courses along the arch center, beginning at the rear end of the arch, not in rings, and with every joint broken, and with a bond equal to one-half of the brick.

The first course shall start at the skewback on each side with a standard brick 4½ in. wide; the second at each side with a "flat back" 6½ in. wide; the third course 4½ in. and so on. To finish the courses at the front wall, a "flat back," cut to suit when necessary, shall be used. Each course shall be tried in place dry, and shall be checked with a straight-edge to insure all the brick of one course being the same thickness.

Bricks not of even thickness must be cut and rubbed. A course of wedges shall be used only when necessary to keep the bottoms of the straight brick in even contact with the arch center. If the use of wedges does in every case bring a straight brick to an even bottom the straight brick should lean away from the center of the furnace rather than toward it.

The Keying Course Should Be a Trifle above Arch Ring

A trial ring shall be laid, when about two-thirds of the arch has been completed, to determine if the keying course will fit. If cutting is necessary to fit the keying course, the key brick shall not be cut, but instead, the two adjacent courses on the side of the brick away from the key. The keying course shall be a true fit from top to bottom, of such thickness that when driven it shall not be below the surface of the arch, and shall preferably stand about ¼ in. above it. The keys should drive from 1 to 2½ in.

After fitting, the keys shall be loosely replaced, and then with a piece of wood, at least 2x4 in., extending the full length of the keying course, shall be driven uniformly to place with a heavy hammer, used along the entire length of the timber. After driving, the keys shall not show any crushing. When keyed up the top of the arch shall be thoroughly washed with a thin fireclay wash.

Centers shall be built so that they can be dropped down free of the arch after it is keyed, and removed from the setting without being burned out.

Itinerary of U. S. Mine Rescue Car No. 3

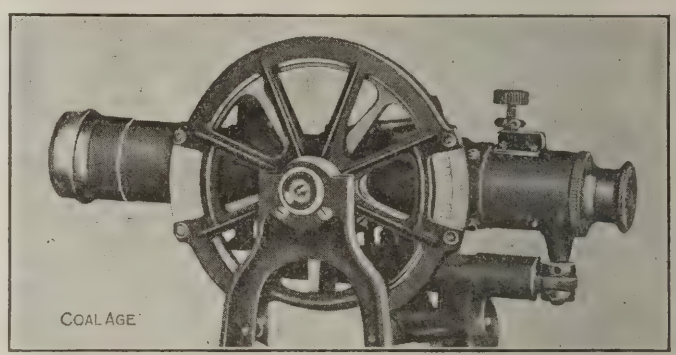
Arrive	Leave	Address
Aug. 17	Aug. 23	Paxton, Ind.
Aug. 24	Aug. 29	Sullivan, Ind.
Aug. 31	Sept. 5	Shelburn, Ind.
Sept. 7	Sept. 12	Clinton, Ind.
Sept. 14	Sept. 19	Terre Haute, Ind.

The New K & E Stadia Circle

The subsequent computations necessary to reduce observed stadia readings to the correct horizontal and vertical distances have long been a source of trouble and labor to the surveyor. Many arrangements, such as charts, tables and slide rules, have been devised to minimize this work, but all have been somewhat complicated and have presented a fruitful source of error. For this reason, stadia measurements have not found the universal application which their accuracy and convenience would presuppose.

In the new K & E stadia circle, an arrangement is presented which will undoubtedly stimulate the use of stadia measurements in all branches of surveying. Not only does it facilitate the taking of field notes, but it reduces the calculations of these notes to the simplest arithmetical processes, and, furthermore, the arrangement does not encumber the instrument with complicated and delicate equipment.

The usual method of taking stadia measurements is to observe the interval intercepted on a rod by the stadia hairs and the angle of depression or elevation of the telescope. With this data the observer is then enabled, by using the formulas $H = S \cos^2 a$ and $V = \frac{s}{2} \sin 2a$, to compute the correct horizontal distance and elevation of the point in question. The mechanical



The New Keuffel & Esser Stadia Attachment

means devised for the solution of these formulas have greatly simplified the plotting of notes, but their use still involves considerable labor and necessitates the carrying of extra equipment into the field.

Description of the Device

The K & E stadia circle is a modification of the regular transit circle whereby the degree graduations on two opposite segments are replaced by special graduations which give directly the per cent. of the observed stadia distance represented by the horizontal and vertical components. The accompanying illustration shows the simplicity of the new arrangement.

Through an arc of approximately 60 deg. at the right- and left-hand sides of the circle, the degree graduations are replaced by the special stadia graduations. At the index marked "Hor." is read the percentage factor to be applied to the observed stadia distance to obtain the correct horizontal distance. At the index marked "Vert." is read the percentage factor to be applied to the observed stadia distance to obtain the difference in elevation between the rod and instrument. Complications in the

calculations are avoided by bringing the center cross hair of the telescope to the target or mark on the rod, which has been placed at the instrument height before reading H. and V.

Example—Suppose the observed stadia distance to be 480 ft., and the telescope, when sighted on the target, to be inclined at such an angle that the reading at the Hor. index is 0.97 and at the Vert. index 0.17. Then *the correct horizontal distance* would be $480 \times 0.97 = 465.6$ ft., and the *difference in elevation* would be $480 \times 0.17 = 81.6$ ft. The very simplicity of this arrangement would seem to raise doubts as to its accuracy, but the position of each special graduation is theoretically correct, and exhaustive tests of the instrument throughout the full range of the stadia graduations have proved it to be practically free from error.

Over a long series of tests by different observers, the average error in the reading of the horizontal correction factor was found to be 0.05, which in a 500-ft. sight would introduce an error of 0.25 ft. in the computed horizontal distance. The same trials applied in the reading of the vertical correction factor disclosed an average error of 0.02, which in a 500-ft. sight would introduce an error of 0.10 ft.

By the method of least squares the average error in reading was computed to be:

Vertical ± 0.07
Horizontal ± 0.09

These larger errors, in a 500-ft. sight, would affect the computation of the horizontal and vertical distances by ± 0.45 and ± 0.35 ft., respectively, and as the allowable error in stadia work is 1 per cent., it will be readily seen that this compares favorably with any method now used.

The greatest advantage of the device, however, lies in the rapidity with which field notes and the subsequent calculations can be made.

When dealing with a mine fire—Promptness is the cardinal virtue. An incipient blaze may sometimes be beaten out with a coat, cap or shovel. The use of water to fight even a small mine fire is generally a dangerous proceeding, as the heat turns the water to steam which blinds, scalds and otherwise hampers the fire fighters. It is also sure to cause falls of roof. Sealing a mine is the last resort as it is expensive and slow in producing results. Many coal companies find it advisable to have on hand a chemical engine for extinguishing mine fires by the use of carbon dioxide, the most efficient fire extinguisher now known. Bi-carbonate of soda dissolves easily in water, sulphuric acid added to this bi-carbonate solution generates dioxide rapidly. Such an engine may be constructed by placing two alternating 80 gal. capacity steel tanks on a mine truck. One discharge hose, 200 to 300 ft. long, gives a steady service. When one tank is empty close the discharge valve, and use the other tank, immediately recharging the empty tank. The water carries the soda to the fire where the heat liberates the gas, which, together with the large amount of free gas accompanying the steam passing from the engine, soon makes its presence felt on the fire. Keep the nozzle of the hose as near the fire as possible. Very little water is used, therefore, but little steam is generated. The heavier than air carbon dioxide remains on the surface of the fire cutting off its supply of oxygen and smothering it.



The Compass That Will Point the Wave-Tossed Ship the Right Direction

The Labor Situation

SYNOPSIS—The progress toward settlement in Ohio is the main subject of interest. In the Southwest the miners have struck against the wishes and orders of the Union. They refuse to work until a new scale is made. More mines are starting in Colorado. The shortage of men caused by the war, is not so severe as was expected.

Labor troubles in Ohio are on a fair way to settlement except in eastern Ohio, where there is still a wide gap between operators and miners. During the past week, the parties in contention in the Crooksville district settled their working conditions, and arrangements were made to resume mining Aug. 10. This district produces a large amount of coal.

The conference of operators and miners in the Pomeroy district continued during the greater part of the week, with the result that practically half the district resumed work Aug. 10. The bone of contention in those mines in the section which is still idle is a differential of 4c. on the pay for "brushing." Miners are insisting on this differential, while the operators are loath to pay it.

MASSILLON SPLITS

In the Massillon district, a split occurred in the ranks of the operators. The Peacock Coal Co., which is one of the larger operators in that district, signed up with the miners at 47c. for machine-mined coal, and work was resumed. Other operators have not yet signed up. The meeting of miners and operators at Massillon broke up Aug. 6, no day being appointed for further discussion. The miners are willing to let any operator work who will pay 71.19c. per ton for pick-mined run-of-mine coal.

In the Hocking Valley and Jackson fields, preparations are being made to put all the mines in operation. Many started last week, and the work of getting others in shape for working has been rushed. The same conditions prevail in the Cambridge district.

THE BITTER DIFFERENCES IN EASTERN OHIO

In the eastern Ohio district, a conference of operators and miners held at Wheeling, W. Va., produced no tangible results. This was a meeting of subdistrict No. 5. President C. J. Albasin renewed the demands for a rate of 47c., which was promptly refused by the operators, led by T. K. Maher, of Cleveland. President John Moore, of the Ohio miners' organization, then invited the operators to sign up individually with their miners at the 47c. scale, and this was followed by C. E. Maurer, of the Glenns Run Coal Co., inviting the miners to sign up at the last year's figures. He was hooted and threatened by the miners.

The miners, it was believed, were prepared to make concessions. It was thought that they would not have called a meeting if they had not been so disposed. But it was soon found that neither side was prepared to give way. The matter was not even submitted to a scale committee, but was discussed before all the operators and delegates. It is said that the representatives of the former numbered nearly 200, and that 300 miners' delegates were present.

The operators and miners both feel confident that the unanimity in the ranks of their opponents is only apparent The operators think several miners will go back to work for 41c., and several of the union men expect many operators to open their mines and offer their men 47c. Why there is this feeling of confidence in the lack of coherence of the opposing sides is hard to determine.

The miners are desperate. Since the strike on Apr. 1, they have received the large sum of $160,000 from various sources, but as there are 16,000 of them, that is only $10 per head, or about 8c. per day. Now their credit is gone and their sympathizers are tired of giving, they have nothing to live on and the feeling toward them has been extremely bitter, for many of the less worthy of them have not hesitated to take anything which was eatable, even livestock.

The Bergholz district in Columbiana County is expected to resume work as soon as eastern Ohio operators arrange with their men. It is said that the Fort Pitt mine is to be closed down for a year. The fires are being drawn from the boilers. The machinery in the mine will be removed and the workings will be allowed to fill with water and gas. It is said that the company fears that coal shipped to Canada will be declared contraband and that consequently coal in Ohio will be limited in sale.

Many of the foreign miners are looking hopefully to the European war to give them employment, and some have been forwarded transportation money to take them to New York City. But this only serves as a solution for those who are citizens of the fighting nations. It seems as if the rest must starve or give in. Albasin, who accepts neither as an alternative, is about to make a trip to the anthracite region on behalf of his men. A sum of $25,000 was distributed on Aug. 4, each man receiving about $1.50. Prior to that, there had not been a distribution of funds for some time.

A UNION MAN'S ACCOUNT OF THE ARKANSAS TROUBLE

There are no developments in Arkansas, but we have a letter from a union sympathizer, as just a man as you would want to meet, though he evidently regards a nonunion man as a criminal. He gives us some details of the violence. He assures us that as far as he knows the cause of the trouble was Franklin Bache's determination to run his mines nonunion. He "ordered his men to square up their places and take their tools off the premises last March. The contract between the men and the company did not expire until July 31, 1914." He does not state whether the union men had or had not kept their contract. On the degree of their fracture of contract requirements, Bache's action must receive or evade condemnation.

On Apr. 1 our informant says "the mine was opened with scab labor; the union miners captured the mine and ran the scabs away. The mine was opened again under guard, and they started to hoist coal July 15. On July 17, the union miners captured the mine again and destroyed everything in sight, including No. 1 Mammoth Vein, No. 3 Mammoth and Coronado No. 1.

"No. 4 is a shaft opening, 250 ft. deep; the coal is 7½ ft. thick; the output is 800 tons daily. No. 3 is a slope opening connected with No. 4. The two mines Nos. 3 and 4 were those being operated with scab labor. No. 1 Mammoth Vein is a slope opening 4000 ft. deep (?); the coal is 7½ ft. thick and dips about 8 deg. The output of the mine is 800 tons daily. No. 1 of the Coronado Coal Co. is a shaft opening, 200 ft. deep. The coal is 7½ ft. thick and the output 600 tons daily. The tipples were all of wood, but far better than those published on page 176 of this volume of 'Coal Age.'

NEED OF TROOP DEFENSE

"The amount of coal shipped during the time the mines were operated 'open shop' was 162 tons and the aggregate cost was about $3000 per ton. Feeling still runs high here against nonunion men, and it would not surprise me to hear of the Johnson County nonunion mines having a similar experience. This is a strong union country and I do not believe that a mine can be operated 'open shop' without a standing army to guard it. The Penn Mining Co. and the Sterling Anthracite Coal Mining Co., located at Clarksville, Johnson County, Ark., are the only mines in the state operated 'open shop.' They employ about 400 men at the two mines.

IS BACHE TO BLAME?

"My opinion is that Bache brought all this trouble on himself, by refusing to treat with his employees and summarily discharging all of them and ordering them off the premises. I believe their differences could have been settled if an attempt had been made to do so."

We quote this letter without comment, much as we regret the point of view. It reminds us of the remark facetiously placed in the mouth of a street-car magnate, who, seeing a poor fellow ground to pieces by the cars, said: "Serves him right; why was he walking?" Similarly in the view of our correspondent, "Serves Bache right; why didn't he employ United Mine Workers and thus prevent his property from arson and defend his men from rifle bullets?"

The court has reopened the case charging contempt of court against P. R. Stewart and others in connection with the attacks of the miners and their leaders on the mines of the Bache-Denman interests.

THE STRIKE IN THE SOUTHWEST

Throughout the Southwest, a strike has taken place. Only 10 mines in Kansas remain at work. The old contract expired July 31, and the men refuse to work till another takes its place, despite the efforts of the union to make its settlement without a suspension. Some weeks ago, the operators and union officials signed the interstate contract, but the district agreements have not yet been signed.

It appears that each mine will make its own settlement in Arkansas, Oklahoma and Texas, but in Kansas and Missouri, the contracts will be general and not individual.

THE ANTHRACITE CONCILIATION BOARD

In the anthracite region, the legal value of the decisions of the Anthracite Conciliation Board is in question. It seems very clear to the average bystander that men who contract without stipulated wage would get what the board provided, but that it would be possible to contract legally for more or less than the rate determined by the board.

A case before a justice of the peace of Audenried, on Aug. 4, is claimed by miners' leaders to be a test of the legality of the findings of the Anthracite Conciliation Board and of the agreements which have since been entered into by the men and companies of the anthracite region.

Two laborers of the Yorktown No. 2 colliery brought suit against the miners employing them for the difference between $2.26 a day, which they have been paid, and $2.84 per day, which they claim is the rate fixed by the commission and subsequent agreements entered into by the companies and the men.

The justice gave judgment in favor of the plaintiffs. The defendants filed an appeal. The case is of interest to all persons employed about the mines. The court will take testimony during the October term.

WEST VIRGINIA'S INTERNAL TROUBLES

In West Virginia, it is reported that a strong movement designed to displace Thomas Cairns, president of the United Mine Workers of District No. 17, and his assistants has been discovered, and that it has failed. The insurgents charged that Cairns and others did not abide by the instructions from the district convention in their dealings with the Kanawha Coal Operators' Association, and that in other ways they did not act in good faith. It is understood, however, that a convention called to take steps against the union leaders in response to their charges was not held because of a lack of sympathy with the movement on the part of the men.

MORE COLORADO MINES OPERATE

In Colorado, the Rockland mine of the Walsenburg Coal & Mining Co., employing 75 men, resumed operations on July 31 and will operate on the open-shop basis. The mine has been closed since the strike was called. The Gordon mine has started operation under a contract with the United Mine Workers of America. Both mines are graciously permitted to work under an order of the War Department, a decision having been made by the Secretary of War.

Peter Catzoulas, a leader of the Greeks, who replaced the bootblack padrone, Louis Tikas, at the Ludlow tent colony, has been arrested, charged with murder in connection with the death of nine employees of the Rocky Mountain Fuel Co. at Forbes on Apr. 28.

THE SCARCITY OF LABOR

There will probably not be a great reduction in the labor forces of the country due to the European war. The people most anxious to take part are the Serbs, Austrians and Germans. It is hard for either of these to find their way into Europe at this time, and this condition has discouraged enlistment. Most of the other foreign workmen are only too glad to be free of the necessity, and, as for the subjects of Great Britain, they could not be compelled to serve even if at home, and are little disposed to show their patriotism by active service.

The most menacing feature in the situation is the possibility that Canada, wishing to save money, for she pays larger wages to her soldiers than any other people, and anxious to spare the lives of her citizens of British birth, may establish a foreign legion and give the Serbs, Greeks, Bulgarians and a few French and Belgians a chance to serve. This has been proposed, but it seems unlikely, and even then it could not seriously affect the labor market.

In fact, with the slackness now universal, we would lose but little, and many of those lost would be those who could go without our grieving. Ludlow, for instance, might be depopulated of its trouble makers. The only fear is for the time when the return takes place. Then the work of Americanization must commence all over again, and if we have a strike at that time, these warriors may establish themselves in new tent colonies and harass those who are willing to work.

FOUR-DAY WEEK

The Scottish Miners' Union has decided that after July 27 all members must work only four days a week. The production of coal is being limited so that all will have work. The employers desire to lower wages from $1.75 to $1.46 per day; they even threaten a lockout in which 100,000 men will be involved. The wages in Scotland are not as good as those in Wales, owing to the inferior quality of the coal and the difficulties in mining.

Efficiency Contest

Officials and employees of the Lehigh Valley Coal Co., to the number of more than 700, attended the annual employees' outing at Hazle Park on Aug. 8. In the morning there was a business session. The men are organized as a social and beneficial society. The following officers were reëlected: President, Supt. G. T. Gallagher, West Pittston; vice-presidents, A. M. Allen, Hazleton, and Patrick Loughlin, Centralia; secretary, Edward McKernon, Hazleton; treasurer, W. S. Freegans, Kingston.

The rock-drilling and timber-splicing contests, the 100-yd. dash, a boat race and shotput made the most interesting part of the day's events.

The rock-drilling contest was won by the team from the Lehigh Division, August VanBlargun and John Krynak. The second team in the race was John Ryan and Edward McShea.

The timber-splicing contest was won by the team from the Mahanoy and Shamokin Division. The members of the team were William Hovenstein and Elmer Daniels. Their time was 11 min. 55 sec. The Lehigh Division team was second. The members of the team were Henry Foose and Solomon Wetzell. Their time was 12 min. 42 sec.

The surveying contest was one of the new features of the day. Various surveying corps, representing the separate divisions, worked out a given surveying problem. Time and accuracy were considered in the judging, accuracy being placed first and speed second. The corps representing the Lehigh Division was first. The members of it were Edward Bachman, William Rohrbach, H. A. Kilde and Fred Holderman. The corps' average was 93 per cent.

Edward Tudgy, of Warrior Run, Wyoming Division, won the 100-yd. dash. Edward Reese, of the Lackawanna Division, won the shotput. He threw the shot 29 ft. 4½ in. Thomas Farrell, also of the Lackawanna Division, was second.

The boat race, twice around Hazle Park in a rowboat, was won by the Lackawanna Division, with Aleck Bryden as oarsman and Frank Smith as his passenger. Edward Stevens was second.

John A. Redington, proprietor of Hotel Redington, of Wilkes-Barre, served lunch at noon. A troop of boy scouts who were on the ground were also taken in for lunch.

Splitting an Air Current

Splits should start as close to the downcast shaft and terminate as close to the upcast shaft as possible. The advantages of splitting an air current are as follows:

(1) Each district is supplied with its own air current, traveling at a reduced velocity, thus meeting with little resistance. (2) Purer, fresher air, less polluted by gases. (3) Larger volume of air with the same power on the air. (4) Each split a complete and independent ventilating system. A fire in one split cannot be carried by the ventilating current into another split. When the velocity of the air is insufficient to remove gas found in the radius of its influence or when the combined resistance of the splits exceeds that of the shafts, then splitting has been carried too far and the end sought has been defeated. Splitting should be uniform. The amount of air passing into the various sized splits should be in proper proportion or the short districts will absorb more than their share, as the quantity of air taken up by each split depends on the length and sectional area of the split.

Who's Who in Coal Mining

Frank D. Rash

Over in Kentucky is a real live Mine Owners' and Operators' Association, which breathes the breath of health and progress. It owes its rapid and successful growth chiefly to its humanitarian principles.

Safety first, forebearance, power to the weak, coöperation with the strong and partiality to none are among the ingredients of the tonic which has braced the legs of this young organization for the good race. And its broad-minded policies have, mind you, marked it as a body amply fitted to keep pace with the output of the Kentucky mines, which, by the way, have pulled on their seven-leagued boots and turned tail upon their past performances.



Frank D. Rash

At its annual meeting, not long since, the association cast a lingering eye over its membership with the intention of selecting a president for the coming year. The lightning of fate struck upon the unsuspecting head of Frank D. Rash, and approval echoed from the entire industry of the whole state.

Mr. Rash hails from one of the older coal fields of America, that of western Kentucky, and here it was that he gained his sympathetic training in the school of the square deal. Forbearing patience, advice that encourages, appreciation of service are some of the traits which have won for him a warm place in the hearts of his men.

Graduating from the Massachusetts Institute of Technology in 1901, Mr. Rash entered the engineering department of the St. Bernard Mining Co., at Earlington. Concentration and industry soon established him as chief engineer, from which position he became general manager. He now bears the title of vice-president and general manager.

As an expert on industrial legislation, he last spring took an active part in coöperating with the committee framing the new Industrial Compensation Act and the Kentucky Mining Laws as they now stand. These measures were adopted by the Kentucky Legislature.

Mr. Rash is also the first vice-president of the Kentucky Manufacturers' and Shippers' Association, and just recently relinquished the honor of being the second president of the Kentucky Mining Institute. He is also a member of the American Institute of Mining Engineers, the Engineering Association of the South and a charter member of American Mine Safety Association.

Among the most notable of Mr. Rash's contributions to the scientific press are his articles on "Forestry as Related to Mining" and "What Is Necessary to the Proper Development of the Kentucky Coal Fields."

Prize Gardens in West Virginia

With the award of prizes, for the beautifying of their homes, to the miners of the Gulf Smokeless operations, at Tams, W. Va., that company enters a movement which is rapidly spreading through the New River, Winding Gulf and Pocahontas coal fields of West Virginia.

Some time ago W. P. Tams, the general manager of the above company, announced that an inspection would be made on July 1 of the houses and yards of those miners who wished to enter the contest. The prizes were to be $15 for the best garden in that section of the town where the white miners live, $12 for the next best, $10 for the third and $8 for the fourth. For general appearance of premises there was an award of $15 for first prize, $12 for the second and $10 for the third. The same prizes were offered for the best gardens in the colored section.

On July 1 a committee of three men and two women from the town of Beckley, none of them being in any way connected with the coal business, made a thorough inspection of the premises of the contestants. It might be said, in passing, that nearly every householder in the town was a contestant.

The committee had no easy task to make the awards. Every house was clean and neat and a source of pride to the housewife and of congratulations on the part of the committee.

White Section—Best Garden

J. K. Fisher, first prize	$15.00
J. A. Mawhinney, second prize	12.00
H. T. Roberts, third prize	10.00
Premo Platti, fourth prize	8.00

For General Neatness and Appearance of Premises

W. M. Spencer, first prize	$15.00
J. K. Fisher, second prize	12.00
J. E. Sowers, third prize	10.00

Colored Section—Best Garden

Harry Franklin, first prize	$15.00
Ellis Eubanks, second prize	12.00
J. C. Burke, third prize	10.00
Daniel Ford, fourth prize	8.00

For General Neatness and Appearance of Premises

Harry Franklin, first prize	$15.00
J. J. Steel, second prize	12.00
Harry Alderson, third prize	10.00

In order to encourage the miners to enter the contest and beautify their homes and to put everybody on an equal footing, the operators furnish all the fertilizer necessary and do whatever hauling is needed. Other operating companies are making similar offers of prizes under similar conditions and many of the mining camps in the three fields are in better condition than they have ever been before.

Editorials

A Self-Sustaining Country

The dreadful events of the past few days in the European war are most depressing; however, the one fact we should not lose sight of is that we are at peace with the whole world, and we are able to supply ourselves and others with the needs of mankind. No matter what the outcome in Europe may be, the United States will continue to raise wheat, corn and cotton; we will have plenty of beef and pork and our mines will still produce iron, coal, gold and copper. Nothing could be more appalling than the calamity that has befallen the peoples of Europe, but Americans can go ahead and live and work even if the conflict abroad should last for years, which, by the way, is unlikely.

England became great largely through its isolation in a former European war; there is no reason why America should not emerge from the present world disaster with the advantage entirely on her side.

The Verner Theory

The Verner theory about the counter air current in a mine explosion has gradually gained strength, though it still has silent though powerful opponents. We have steadily published Mr. Verner's conclusions because we believed there was some evidence that they might be right even though perfect confidence in them was not possible.

Perhaps we did not feel any more certain of them when John Harger approved them, for Mr. Harger is a little disposed to be attracted by novelty for its own sake. We like him the better for that, though we are a little chary to follow his bold leads.

However, now John Verner has found at the Eskmeals station and in Samuel Dean most valiant defenders who saw visible evidences that his statements were true. We hardly believe that the procession and recession of the board in the mouth of the galley was vibratory. It seems almost certain that it had its origin in a counter draft.

We shall be pleased to hear what his opponents advance as the cause for the movements of the board. The article by Samuel Dean, "A Visit to the British Experimental Station at Eskmeals," will well repay reading, especially the short notes on the points of greatest danger in a coal mine, that is, the places where an explosion of dust may be most easily started.

Miners' Work and Wages

A study of the coal-company payrolls of today discloses interesting, not to say amazing, facts regarding the compensation of the rank and file of the mining industry. In looking over some statistical data of this nature, compiled from the records of one of the leading "hard coalers," we found some 300 men whose wages exceeded $65 for a two-week period. A large proportion of these men crossed the $100 mark, quite a number earned around $150, while one miner received the remarkable total of $190 for the two weeks' labor. These figures are net, after all deductions. They also cover a recent period with the coal markets at the low point of the year and operations consequently restricted to the minimum.

Further inquiry and analysis of the conditions under which the highest wages were earned failed to develop any satisfactory explanations. Skillful mining ability, supplemented by a moderate ingenuity and a consistent adherence to the work day by day, were the only discernible requisites. Nor does the work of these wage leaders involve the strained and continuously sustained endeavor that might be expected as the natural accompaniment of a high rate of compensation for the laborer in any walk of life. On the contrary, these men, as a rule, wind up their day at one or two o'clock in the afternoon except during slack periods, when they make up the deficiency by driving extra yardage until four o'clock.

And yet these same men are utilizing their funds, in many instances, educating their sons to become bank clerks. Inherited foremanships in the anthracite collieries have ceased to exist, as is evidenced by the fact that the company officials have been forced to the modern expedient of local mining institutes to shape up likely material for such positions. Assuredly the mining industry is rapidly losing caste.

Agricultural pursuits have in modern times been similarly forsaken for the veiled glamor of city life. But more recently, the tide has turned, and thoughtful men are awakening to a realization of the basic importance of the products of the soil in the world's commerce. How soon and by what means are we going to create a like reversal of sentiment towards the coal industry?

Turning to the purely economic aspects of the case, this relatively high remuneration makes a startling comparison with that of other classes of wage earners. The mining, or digging of coal, at its highest development scarcely falls within the scope of "skilled labor," as does that of plumbers, electricians, locomotive engineers, etc. In any event, the highly trained man in these lines would certainly resent the comparison even though it be evident that his opportunities for material gain are substantially less.

As compared with the prevailing rates of compensation for professional and scientific men, the results are even more striking. In spite of James J. Hill's pertinent apothegm: "It is not the high cost of living, but the cost of high living," it is becoming increasingly difficult for the average professional man, dependent entirely upon his salary, to maintain the appearance demanded by his position. Indeed, there is a glaring incongruity apparent here as regards the engineering profession. The engineer forms the buffer between capital and labor, the former crowding him for fatter dividends, while the latter brands him as a tentacle of the money octopus, and, in the recent increases in the cost of living, he has been too frequently overlooked.

The Bent Statement in Illinois

As related in last week's issue, Edward T. Bent, a member of the Executive Board of the First District in the Illinois Coal Operators' Association, and general manager of the Oglesby Coal Co., declared before the federal Industrial Relations Commission that the reason why working conditions in Illinois were better than in Colorado or Michigan were "because they (the union) licked us in 1896."

We do not know what made Mr. Bent and F. S. Peabody make such remarks as have recently been recorded. It may possibly be that they are seeking, as are almost all of the operators in union districts, to advance the cause of unionism in nonunion states. They feel they cannot do better than assure the public that the medicine they are taking is sweet and not bitter to the taste, so that the people, believing in its healthful qualities, will be disposed to subject the coal operators of Colorado and Michigan to a dose of it by forcible feeding. That is why they assure us that this involuntary nutrition is a joyous operation. We have known no patients who, in privacy, ever declared that they liked it. Some say, it is true, if the union were different, it would be a blessing, but no one says he enjoys it as it is.

Whatever the real opinions of Messrs. Bent and Peabody may be, and why may not some men see red and think it green? we are disposed to question the truth of their remark that the operators were licked in 1896. They were then barely making profits; they are in a perilously similar position today. Hence the increased wages of the miners did not come from profits, but from a raise in prices. In short, not Bent and Peabody, but the ultimate consumer retired discomfited in 1896.

Bent and Peabody may have carried the sword and worn the epaulettes, and they and their followers may have thought they were defeated, but the rank and file who buy coal and use materials manufactured with the aid of coal, the noncombatants, in short, were the people who were routed and have remained in that condition ever since. You cannot separate an army's interest from that of the nation which it is defending, and you cannot raise wages against the operator without injuring the consumer, unless the mine owner is really and truly robbing the public, and even then it is probable that he can go on doing it thereafter.

But perhaps it will be contended that the miners neither stole a march on the operator nor the consumer, and battled only for the right. The consumer, perhaps, had a right to suffer a defeat in 1896, for coal mining might not have been paid as much as such work merits. It is probably true that mining is not a pleasant trade; at least it is not so regarded, though miners once in it will not leave. It is true that it is considered unhealthful and dangerous, though it is probably unusually healthy and not as dangerous as generally supposed.

However, of all unskilled or partially skilled trades, it is the best paid. The rate of wage for men drawn from the working face at the will of the mine foreman is 60 per cent. higher than ordinary working wages of unskilled men on the surface. Outside daymen get at least 20 per cent. larger wages than ordinary transient day labor and have steadier jobs. There is reason to believe that organization has raised the mining wage above the average wages of workingmen of equal skill, and the ultimate consumer has been compelled to pay this larger wage.

If the mines become strongly unionized from the state of Washington to that of Pennsylvania, that price will be still further increased. We confess we have a great deal of sympathy for the deserving yet unclassified workingmen who, unlike the mine workers, are not allied with any extensive interest which can defend them.

These tradeless men, like the men in early England who were labeled "masterless" and were attached to none of the powerful guilds, are fit subjects for our pity in the midst of a number of powerful unions, numbered among which we must remember are those of doctors and the lawyers with a scale for every type of service.

Varieties of Unionism

As there is but one body of union men in the coal industry, the United Mine Workers of America, it is natural to think that there is a general character of unionism pervading the mining districts from end to end. But as a matter of fact, the difference is immense. In those districts where the union is established, men are desired by the executive who will quietly sit down on the lid and prevent discord. In such sections of the country the energy of unionism is all in the pit committees. The higher officials realize that from their men must come the special and regular assessments by which the treasury of the national organization is filled and by which attacks are made on the nonunion districts. That is why pacific men, almost statesman-like in their qualities, are favored in the pacific districts, and unquiet souls, with fiery ardor and a desire for a "scrap," are sought out for Colorado, West Virginia and like states as soon as any part is marked out to be unionized.

It is for this reason that operators like E. T. Bent prefer to deal with the men in authority rather than with the pit committee. Higher officials in the union realize that peace is forced on them if they ever hope to have the sinews of war. They know that a national strike in the industry can but mean a complete overthrow for the union, and understand well how a fund of $160,000 melts into $10 bills when 16,000 men have to draw on it, as in Ohio. This knowledge made John T. White an uncompromising foe to a strike in the central competitive districts and causes him to urge the men to keep at work in the Southwest at present.

But the pit committees and delegates see only their own immediate needs and would wreck the union to obtain their own ends. At Indianapolis, the latter declared that the leading officials were lacking in sympathy with the man at the face, and got a scale committee, as they thought, more in sympathy with their aims; only to find these men fail them as soon as the bare facts were presented. The new men proved as conservative as those they replaced.

Your chairman of the pit committee, glorying in his new-found dignity, dividing the resources of the union by the number of the men engaged in his little mine, argues for an immediate assault on the enemy. After a few weeks' travel about the country, he begins to see that the United States is very big and many men are mining coal and is told the union funds amount to little per capita. His friends hardly know him when he returns. He has the views of a capitalist and an economist.

Legal Department

Coal as Contraband of War

By A. L. H. Street*

SYNOPSIS—Coal is held by the law of nations to be contraband, and hence subject to seizure and condemnation, only when destined for military or naval, and not civil, use.

The prospect of continued war in Europe suggests several important questions of international law which have peculiar application to export shipments of coal and other fuel. As was said by Wharton, the eminent authority on the law of nations, long before the present war was foreseen, "the only points as to which we would be likely to come into collision with a European state are those concerned in the maintenance of neutral rights."

It is a well recognied principle of international law that citizens of a neutral nation may, within the bounds of their own country, sell to belligerents whatever belligerents choose to buy, subject to the exception that a neutral must not discriminate by selling to one belligerent and refusing to sell to another. (Moore's Int. Law Dig.)

Contraband goods destined to an enemy's port being subject to seizure and condemnation by a belligerent, although carried by a neutral, the question arises: Is coal contraband? Broadly defined, "contraband goods" are those which may directly aid belligerent operations, but accurate classification of contraband or not is impracticable, according to the decision of the United States Supreme Court in case of The Peterhoff, 5 Wall. 28, 58.

"But," says the court, "that which is best supported by American and English decisions may be said to divide all merchandise into three classes. Of these classes, the first consists of articles manufactured and primarily and ordinarily used for military purposes in time of war; the second, of articles which may be and are used in time of war or peace, according to the circumstances, and the third, of articles exclusively used for peaceful purposes. Merchandise of the first class destined to a belligerent country or places occupied by the army or navy of a belligerent is always contraband; merchandise of the second class is contraband only when actually destined to the military or naval use of a belligerent, while merchandise of the third class is not contraband at all, though liable to seizure for violation of blockade."

By both reason and authority, coal belongs to the second class; that is, it is contraband "when destined for a naval station, a port of call, or a ship or ships of the enemy." (Moore's Int. Law Dig.) In the case of Balfour, Guthrie & Co. vs. Portland & Asiatic S. S. Co., 167 Federal Reporter, 1010, the United States District Court for the District of Oregon cited a decision on the point that commodities of the second class, if destined to a commercial port, will be presumed to be going there for civil use; but not if they are going to a port of military equipment, and especially if there be a hostile armament then preparing there. Coal, if from the nature of the locality in the enemy's territory to which it was destined, might be considered to be intended for the use of the enemy's army or navy, was declared to be contraband under an order issued by Japan during that nation's war with Russia. And a retaliatory order of Russia declared that all fuel should be deemed to be contraband.

The following statement from the Oregon case above cited would seem to be applicable to coal as well as to provisions:

"Perhaps a mere declaration by a belligerent nation that articles of commerce are contraband, when by the rules of international law they are not, would not make them so. But here is a proclamation touching provisions that rest upon the border line, and depend for their real character upon the particular state of the port of their destination, whether engaged in civil pursuits only, or in equipping the army or the navy with war supplies. It would seem that, under such conditions, the proclamation of one of the governments at war would be effective to impress the provisions with the character of contraband."

*Attorney-at-law, St. Paul, Minn.

Recent Judicial Decisions

When Is Mine Owner Liable for Improvements by Lessee?—Where a lessee contracts with outsiders for unwatering of a mine, the owner is not liable for work done or materials furnished under the contract, unless he knew or had reason to know that the persons doing the work and furnishing the materials were relying upon him for pay. (Colorado Supreme Court, Reynolds vs. Norman, 141 "Pacific Reporter, 466.)

Shipper Chargeable with Notice Concerning Freight Rates—When a railroad company has published its freight rates on shipments between points in different states, a shipper is presumed to know what the true rate is in a particular instance, and cannot recover damages from the company for misquoting the rate. (United States District Court, Eastern District of Arkansas; J. H. Hamlen & Sons Co. vs. Illinois Central R.R. Co.; 212 Federal Reporter 324.)

When Offer Is Accepted—Where an offer to buy or sell is submitted by letter, an acceptance is conclusive and binding when a letter is deposited in the post office accepting the same. The delivery to the one making the offer is not the test; for when the offer is submitted in that way it is equivalent to an invitation to accept by the same means, and when the acceptance is delivered to the agency chosen by the one making the offer the contract is complete. And so, where the offer is by telegram, and the answer is by the same means, the contract is then complete. The risk of prompt delivery is upon the one selecting the agency. (Texas Court of Civil Appeals, Kenedy Mercantile Co. vs. Western Union Telegraph Co., 167 "Southwestern Reporter," 1904.)

Responsibility for Injury to Employee While Riding on Train—A mine repairman who was injured in a collision between trains operated by his employer, while riding with his legs hanging over the front end of a car, in violation of the employer's rules and of the Pennsylvania Anthracite Coal Act, cannot recover damages on account of the injury. Nor is the employer liable if the collision resulted from movement of the trains without authority from the foreman in charge thereof. It is further held that the mere happening of an accident, from which negligence of the employer might be inferred, does not establish liability on his part; an employee suing for injuries received must prove the specific act of negligence relied upon. (Pennsylvania Supreme Court, Dugan vs. Susquehanna Coal Co., 88 "Atlantic Reporter," 787.)

Somerset County, Penn., First-Aid Meet

The second annual Somerset County Miners' First Aid Meet was held on July 22 at Somerset, Penn., under the direction of the State Young Men's Christian Association, George B. Landis, of Harrisburg and A. W. Harris, of the Bureau of Mines being in charge. The use of oxygen helmets in rescuing miners from explosions was demonstrated in a brattice-cloth mine heading constructed for the purpose. In the three-man event, six teams tied on the first problem. Of these four remained after the second and on the third trial the Meyersdale team won. Messrs. Elmer Barnhart, David R. Spence and Clay Beynon demonstrating.

As is natural the greatest interest was shown in the team competition. The problems given were:

Shot-firer caught by flying coal, right eye injured, right collarbone broken, cut on right forearm. Improvise stretcher and carry.

Powder keg exploded, burning miner severely on face, neck, chest, back and both arms. Carry 50 ft. with improvised stretcher.

Man has a broken back from fall of roof. Improvise stretcher and treat.

In the average for these events the teams stand as follows:

1.	Somerset Smokeless, Boswell No 2	100
2.	Jenner-Quemahoning, Jerome No. 1	99⅝
3.	Consolidation Coal Co., Acosta No. 1	99⅝
4.	Jenner-Quemahoning, Jerome No. 2	98⅝
5.	Somerset Smokeless, Boswell No. 1	98½
6.	Consolidation Coal Co, Acosta No. 2	98⅛
7.	Consolidation Coal Co., Meyersdale No. 1	97⅝
7.	Consolidation Coal Co., Meyersdale No. 2	97⅝
8.	Quemahoning Coal Co., Ralphton	94⅝

Prizes were won as follows: One-man event, Ralphton team of Quemahoning Coal Co.; two- and three-man events, Meyersdale team No. 1 of the Consolidation Coal Co.; team event, first prize to Orenda No. 2 team of Somerset Smokeless Coal Co., of Boswell; second prize to Jerome No. 2 team of Jenner Quemahoning Coal Co. The first prize for the team contest was a silver cup, presented by the E. I. duPont de Nemours Powder Co., and the second prize was six sets of Seddon's Self-Help series of mining lessons. The American Red Cross secretary awarded certificates to the winners of the other events. The Y. M. C. A. presented bronze buttons to all of the contestants. The American Mine Safety Association awarded medals to the winning team. The judges, all of whom were doctors approved by the American Red Cross, were Dr. Edward Pardee, South Fork; Dr. S. J. H. Louther, Somerset; Dr. J. W. Hawes, Windber; Dr. Henry Hertzler, Jenners, and Dr. George F. Speicher, Rockwood.

Western Fuel Co.'s Rescue Corps

By J. W. Jemson*

The Western Fuel Co. is the holder of the silver cup and championship of Vancouver Island, Canada, for the years 1912 and 1913. The photographs show the personnel of the St. Johns Ambulance and mine-rescue teams for 1914. Three teams will represent the company at the St. John's Ambulance Demonstration to be held in Vancouver, Aug. 17, on which occasion the Duke and Duchess of Connaught will be present. The Duke, who is Governor-General of Canada, is an enthusiastic adherent of the Ambulance association and on his previous visit to Nanaimo, two years ago, commented most highly on an improvised stretcher made by the Western Fuel Co.'s men with articles found in the mines, consisting of three coats and long-handled shovels, such as are used for removing undercuttings after machines.

*Box 478, Nanaimo, B. C., Canada.

Bringing the Man and the Job Together

There are a number of coal companies in this country in need of men with special training to fill positions in and about the mines. Coal Age believes that it is the natural medium whereby competent mining men and companies needing the services of such men can be brought together. We are, therefore, encouraging coal companies to inform us of their needs so that we can put them in touch with experienced men, capable of rendering satisfactory service.

Here is part of a letter we received this morning, and which comes to us after the page in our paper containing "Want Advertisements" had been closed for this week's issue. The company in question is operating in West Virginia and writes as follows:

> The returns from advertisement you inserted for mine foreman were so satisfactory that we should like to have you print a similar advertisement, to secure for us a general electrician, or master mechanic, to have general charge of the repair work and inspection of machinery of our several mine equipments, machine-driven tipples and power houses. This man should have sufficient technical information to intelligently work after A. C. and D. C. current. The man must be a hustler, as this is not an office position in any sense. He should be familiar with mine haulage and equipment.

Any Coal Age readers who are interested in the above position will please send their application to Coal Age, addressing it P, 292. When applications are accompanied by letters of recommendation, the latter should always be copies of the originals and not the original letters themselves. For reasons that are obvious, the identity of the coal companies advertising for men will not be divulged. It is also impossible for us to guarantee that all applications will be acknowledged or answered. If there were only five or six applications for any particular job, there is no doubt but that the coal company desiring a man would extend to each applicant the courtesy of an acknowledgment, but where the applications number anywhere from 50 to 200, it is unreasonable to expect that every application will receive a personal reply.



Two Mine Rescue and St. Johns Ambulance Corps of the Western Fuel Co.

Discussion By Readers

Checkweighmen

I am pleased to say that the foreword, COAL AGE, July 11, p. 51, on the subject of checkweighmen, has been read with considerable interest in this section. All of the mines in this part of Kentucky are nonunion, and 90 per cent. of them will not operate without a checkweighman.

Although the state law of Kentucky provides for a checkweighman at mines, the act is not compulsory further than compelling the operator to permit the employment of a checkweighman by the miners, upon the request of a majority of their number.

I am glad to be able to indorse the views expressed in your foreword, that coal operators are not generally opposed to the employment by the miners of a checkweighman. As there stated, in reference to the large coal companies of Alabama following the strike of 1908, our company favors the employment of a checkweighman, and insists on the men electing a person to serve in that capacity.

W. L. Moss, V.-P. and G. M.,
Continental Coal Corporation.

Pineville, Ky.

Conservation of Surface Values in the Extraction of Coal

The discussion of the effect of the mine-run law, COAL AGE, Aug. 8, p. 239, incidentally draws attention to a most important consideration, which until recently has not received the recognition it demands. I refer to the adoption of means and methods in coal mining that will afford adequate support to the surface overlying the seams of mineral extracted.

The United States has reached a stage of development when the conservation of its natural resources has become absolutely necessary if it is to continue for any length of time as a producer for domestic and foreign consumption. As a result of the conservation methods already enforced, the coal-mining industry is conducted on more scientific and economic principles, both with respect to production and safety.

While economic extraction is an important factor in conservation, the operation of this factor is detrimental, in many instances, to the conservation and preservation of the resources of an industry as important, if not more so, to the welfare of a nation's prosperity as mining. Many of our large coal fields underlie sections that are valuable for their natural wealth of soil. By our present methods of extraction, such territory is rendered worthless or its productiveness is greatly depreciated.

Conservation, applied to mining, has limitations not characteristic of other natural resources. If land, favorable to agricultural pursuits, be denuded of its vegetation, we can conserve the forests by planting new growths in sections that are not so favorable for this industry, and, by so doing, increase the fertility of the soil by supplying it with a natural fertilizer that will, in time, make it as adaptable for agriculture as the former. Coal, being a product of a prehistoric age when climatic conditions were specially adapted to its formation, cannot be conserved in this way. Its renewal is impossible, as the conditions that produced it will never again exist here. It can be conserved only by economical extraction, and I consider that a method of extraction that will preserve the surface fertility is a subject that should demand the serious consideration of mining men and the attention of our state and national governments.

Millions of money have been spent in the reclamation of desert wastes; thousands of happy homes and millions of wealth have been added to our national prosperity by this noble work—and its results are cumulative. Our nation has attained great commercial prestige and wealth by the products of its coal-mining industry, yet this industry has rendered sterile thousands of acres of land in the centers of greatest population, whose productiveness would have been of greater value to the present and future generations than are now the more distant areas of reclamation.

The conservation of land surfaces for agricultural and allied industries will, in the near future, become a question of the most important consideration to this nation. If the present methods of extracting our coal be continued, with the interritorial increase of the industry, the amount of land rendered nonproductive will assume abnormal proportions. Some method should be devised by which the coal can be extracted and the land surface retain its fertility.

I consider this matter to be of sufficient importance to merit earnest discussion.

I. C. PARFITT.

Jerome, Penn.

The Mine Foreman

Letter No. 8—The recent discussion of the qualifications of the successful mine foreman and his relation to the mine superintendent, COAL AGE, May 30, p. 898, was of great interest to all superintendents and foremen. I desire to add to what has already been said, a few words bearing on the unwise interference of a superintendent with the authority of his foreman, in the mines.

One of the vital conditions, in respect to maintaining perfect discipline in a mine, is that the foreman's authority shall be clearly recognized, not only by the miners and the assistant foremen and bosses, but likewise by his superior officers. It is the beginning of serious trouble in the mine when the owner or superintendent calls in question the authority of the mine foreman and countermands his orders, disapproving of his methods and deranging his plans. The law in Pennsylvania compels the operator to employ a competent mine foreman, and gives to the mine foreman the full charge of the inside workings of the mine and the men employed in the underground operations.

While it is the unquestioned right of the superintendent to draw the attention of his foreman to any observed violations of the law or to any mismanagement of the men in his charge; and, further, to discuss with him questions of economy and safety, in respect to the methods employed in operating a mine, this should be done privately in the office and not in the presence of the men in the mine. Moreover, the superintendent should remember that the mine foreman's experience and qualifications *should* be such as to render him a capable judge of the methods he employs; and, if he is to be held accountable for results, he should be permitted to pursue his own plans for their attainment. If these plans prove the foreman incapable, arrange a suitable division of the work or get another foreman.

Every true foreman will welcome suggestions from his superintendent, in reference to the improvement of the means and methods he employs; but too often it happens that the mine foreman does not exercise his best judgment, in matters in his jurisdiction, because of the fear of interference on the part of a superintendent who is his superior. While it may be true that a superintendent who is expert in mining methods may be able to dictate and criticize the work of his foreman, he should avoid the mistake of humiliating him in the mine, which cannot but prove mischievous. A wise superintendent, however capable, will always avoid allowing his authority to come between the mine foreman and the men employed in the mine. By so doing, he can supplement the foreman's ability with his own judgment and skill, whereas, the attempt of a superintendent to prescribe the methods of mining and control of the men, enforcing his dictation by personal oversight in the mine, will be acting in a manner subversive of mine discipline.

The attitude of the superintendent, in the mine, should be one of respect for the mine foreman's efforts and recognition of his authority in respect to the work in his charge. Anything else develops in the foreman a wise hesitancy to exercise a doubtful and disputed authority, which results at once in a lack of discipline. The same result is plainly evident in the case of foremen who are not well informed in regard to their authority and duty as prescribed, in most cases, by law or conferred upon them when they accept the office.

One of the strongest factors in mine discipline is the confidence that the men impose in the mine officials, as being qualified for the positions they hold. A lack of confidence discredits the official in the minds of his men. Such confidence can only be gained by the evident fitness of the foreman to conduct the work in his charge. For this reason, the selection of a mine foreman should be guided by the question of his fitness and merit alone. No personal, political or social influences should be allowed to control the selection of a man for this position. He must possess a personal magnetism or a *personality* that will make him an efficient disciplinarian, able to maintain his authority in the mine. Aside from this, he must possess a thorough knowledge of mining and familiarity with underground work and equipment. These characteristics in the man will lessen the danger of interference or outside control of matters that are within his natural jurisdiction.

It has been stated that many foremen and others, having passed a successful examination and having received a certificate of competency, have thought it was no longer necessary to read or study mining questions. As a fact, men who are the most capable are constant students of the conditions relating to their work. Doctor Arnold, of Rugby, when asked why he spent several hours daily in preparation of lessons he had taught for years, replied: "I wish my pupils to drink from a running stream and not a stagnant pool."

In the maintenance of discipline, more depends on the *certainty* of punishment, than on its *severity*. Experience has shown that *the uncertain enforcement of mining laws and regulations has operated largely to increase the dangers of mining*. A discarded or obsolete law often proves a menace rather than the safeguard it was intended. Discipline requires that a law enacted must be obeyed, and any violation must bring punishment, in proportion to the offense committed. Insubordination or disobedience to authority may not be tolerated with impunity.

A violation of law or mine regulations may merit the suspension or discharge of the guilty party; but, in no case, should a personal indignity be inflicted, such as styling the man a "dumb Dago" or a "dumb hunky," which appellations only give rise to resentment. Ridicule and sarcasm are not the weapons a mine foreman should use if he is to retain the respect of his men. There may be rare instances when a slight sarcasm or ridicule is necessary to take the natural conceit out of a man, but good judgment must be exercised at such times to avoid making an enemy of such a one.

LEHMAN G. HANGER, Asst. Mine Foreman,
Carbon Mine, Keystone Coal & Coke Co.
Greensburg, Penn.

Co-operation in the Mine

Letter No. 2—I read with much interest the remarks of Frank S. Davis, in reference to securing coöperation in the mine, COAL AGE, July 25, p. 155. Instituting weekly meetings of the mine foremen for the purpose of discussing and studying mine problems of safety and other matters of interest in mining, is a long step in the right direction; and Mr. Davis is to be commended for his efforts in this regard. If properly conducted and maintained, the plan will prove a fruitful means of training and educating all employees.

While I am in full accord with the idea expressed in the editorial item, COAL AGE, Apr. 18, p. 654, like Mr. Davis, I would eliminate the word "compulsory" and make the meetings optional, at least until such plan failed and it was found necessary to adopt more stringent measures in order to secure a full and regular attendance.

If more superintendents would follow the example of Mr. Davis, by instituting similar meetings, and insist upon the foremen urging the young men employed in and about the mines to attend such meetings, and endeavor to interest them in the study and discussion of the many perplexing problems pertaining to mining, the result would be the development of more efficient workmen; and a larger number of trained men would then be available and ready to assume the responsibilities of mine foremen.

During the three years that I have been connected with the examining board for the examination of candidates for mine foremanship, I have observed that those

applicants, coming from mines where officials have lent their assistance for the education of their men, have made higher grades than candidates coming from mines where no such assistance was available.

In my opinion, it would be a good investment for mine superintendents and mine foremen of large mines or groups of smaller mines, to establish schools of training for their young men. Many of the men now employed as miners possess more than ordinary intelligence and abilities of which they are scarcely aware. If these elements were properly cultivated and trained, the result would be to increase the efficiency in the operation of the mine. On the other hand, the neglect of such education and training produces a class of indifferent workers, having little ambition to rise above the plane of the common miner.

It is unfortunate that, in many cases, the mine superintendent assumes an attitude of superiority and holds himself at too great a distance from his men. In such cases, the miners come to feel that all the interest the superintendent has in them is their producing power, or the number of tons of cheap coal they can mine daily. While this is true in many instances, I am glad to say that it is not the case at all mines. Many superintendents now realize that the better trained and the better informed miners become, the better prepared they are and the more willing they seem to assist and coöperate with the officials in the operation of the mine.

The average coal miner knows little of the many perplexing problems with which superintendents and foremen have to contend daily. They are apt to think that all the boss has to do is to superintend the work and they regard him as having an "easy time." A weekly conference of the mine officials and the men, for the purpose of studying and discussing many of these problems in which they are equally concerned, could not fail to be of benefit to the operator and would unquestionably result in the greater safety and the betterment of the condition of the miners as well. The result would be that both miners and officials would be drawn closer together and would come to feel that their interests were mutual.

In closing, I cannot refrain from expressing the hope that many superintendents will adopt the methods pursued by Mr. Davis, in the informal organization of their men, for weekly conference, study and discussion. It is my belief that the time so spent would not be wasted; but that the officials in charge would be amply rewarded by the rapid increase in the efficiency of every mine worker.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

MEASUREMENT

The valuation and comparison of the various forms and conditions of matter and the estimation of physical phenomena are made by reference to three general standards of measurement, namely, **distance, force** and **time.** There are many modifications and combinations of these three elemental standards.

Distance—This includes the measurement of length, surface and volume, all of which are derived from the same standard of measure.

Force—All measurement of force is based on the attractive force exerted by the earth on an assumed **unit of mass** at the surface (sea level), in any given latitude. Mass thus becomes the true unit in this measurement; but being intangible, the adopted unit is the **pound,** which represents a certain definite mass, taken as the "unit of mass," for purposes of measurement. A force is measured by the effect of its action on a known mass. There are two conditions:

1. **Static** condition (mass fixed, immovable) = pressure, weight.
2. **Dynamic** condition (mass free to move) = motion, velocity.

Under these two conditions, there are, therefore, two units of force. The unit of measure for **dynamic forces** is the force that will produce a unit of velocity in a unit of mass, in a unit of time. In other words, the force that will increase the rate of motion of a unit mass, by a unit distance, in a unit time.

Time—The element of time is important in the estimation of velocity and power. For example, to traverse the same distance in one-half the time will require twice the velocity. Likewise, to perform the same work in one-half the time will require twice the power.

Special Units—There are numerous other units of limited significance; such as units of capacity, pints, quarts, gallons, barrels, etc.; units of currency, cents, dimes, dollars, etc.; circular units, degrees, radians, etc.; electrical units, amperes, volts, ohms, watts, etc.

Compound Units—Many units of measure are composed of two or more simple units. The following are examples:

Unit velocity—(distance) ÷ (time)..Ft. per sec., or ft. per min.
Unit work—(distance) × (force).....Ft.-lb.
Unit power—(distance) × (force) ÷ (time)...Ft.-lb. per min.

The above are only given as samples of many similar compound units; such as inch-pounds; miles per hour; gallons per hour; cubic feet per minute; pounds per cubic foot; tons per acre; foot-acres, etc.

All of these, it will appear, are derived from the simple units of distance, force, time, or the special units to which reference has been made.

Application—Applying these units of measure, the weight

$$F = W \qquad (1)$$

(W) of a body, expressed in pounds, is the static force (F) acting on the body, due to gravity. Hence, in statics,

The Coal Age Pocket Book

In dynamics, the force (F_1) producing motion is measured by the mass (M) of the body and the velocity (v) produced per unit of time. Hence, in dynamics,

$$F_1 = Mv \qquad (2)$$

Assuming a falling body, the force producing motion is the weight (W) of the body, and the gain in velocity per unit of time (acceleration due to gravity, **g**) is the velocity produced in the mass (M). Hence, in falling bodies,

$$W = Mg \qquad (3)$$

and

$$M = \frac{W}{g} \qquad (4)$$

which enables the calculation of the mass of a body from its weight.

Combining formulas (2) and (3),

$$\frac{F_1}{W} = \frac{v}{g} \qquad (5)$$

Hence a force acting to produce motion in a body bears the same ratio to the weight of the body, as the acceleration due to the force bears to the acceleration due to gravity. Or, expressed as a proportion,

$$F_1 : W :: v : g$$

Energy—Energy, in physics, is **capacity to perform work.** It is the vitalizing force that is manifested in matter by the familiar agencies of heat, light, electricity, magnetism, molecular attracton, chemical affinity, etc., all of which are equally convertible, one into the other, without loss.

The physical agencies or forms of energy just mentioned are each and all convertible into mechanical motion, which, again, can be reconverted into heat, light, electricity and magnetism. This fact gives rise to what is called the **"mechanical equivalent"** in reference to heat.

Forms of Energy—Energy is of two kinds that differ from each other only in the sense that one (kinetic) is actual and present, while the other (potential) is possible only.

Kinetic energy (E) is the energy possessed by a body by virtue of its motion. The force producing an acceleration (f) in a mass (M), or the "living force" in the body **(momentum),** is **Mf.** The acceleration (f) being uniform or the velocity increasing uniformly, the distance increase, per unit of time is **f/2,** and the work performed in producing this acceleration is stored in the body as "kinetic energy," by virtue of which the body would continue to move at the velocity imparted, till restrained by an opposing force. The stored energy is

Kinetic energy, $E = Mf \times \frac{f}{2} = \frac{1}{2} Mf^2$

Potential energy is the energy that is possessed by a body by virtue of the position or state in which it is held or restrained, so that motion cannot take place till the restraining force is removed. Examples of bodies having potential energy are, a suspended ball, a confined spring, etc.

Inquiries of General Interest

Permissible Electric Mine Lamps, Schedule No. 6

I want to ask why should the Bureau of Mines issue a new schedule on portable electric lamps, in which they advise and suggest certain mechanical changes to meet the ideas of the engineers in the Bureau of Mines. Many of the suggested changes have nothing whatever to do with the safety features of the lamp, and it is difficult to understand why such details of construction should be mentioned in reference to the tests that lamps must undergo, at the government station.

It is up to the Bureau of Mines to test all lamps submitted to them, to determine their *safety* and not to recommend, for use in mines any lamp that their test shows would be unsafe. It is not up to the Bureau of Mines to suggest and much less to insist on certain methods of construction, or certain requirements regarding the life of the lamp bulbs or the size and shape of the reflectors. These matters belong entirely to the various manufacturers of portable lamps, who should be free to produce their own ideas and submit the same to the Bureau of Mines for test. The Bureau, in turn, should test these lamps for safety.

When the Bureau of Mines interferes with the progress of the manufacturers of electric lamps, they place the industry in jeopardy, due to the fact that manufacturers will, at no time, be able to standardize their outfit; and operators, in turn, will hesitate about placing orders for lamps, when the type of construction may be changed at any moment. It would be a hardship for a manufacturer to be compelled frequently to change the construction of his lamps to make them conform to the whims of the bureau engineers, except as required for safety. Such changes would compel him to keep on manufacturing supply parts for all the outfits which are at present being used, and would certainly cause much confusion and annoyance for operators.

We realize that we are living in a world where one competes with another and each is endeavoring to turn out a better outfit than another. For this reason, if for no other, it is entirely up to the manufacturers of lamps to build their outfits in the best possible manner, and it is natural to suppose that the best manufactured lamps will be installed to the greatest extent.

After consulting with several coal operators who have installed electric lamps and after talking over the matter with some manufacturers of lamps, I find they are all of the same opinion and feel that the U. S. Bureau of Mines should not interfere in the manner of construction of lamps, in any respect except as regards the *safety* of the battery and the lamp.

A Coal Age Reader.

——, Penn.

Correspondent has stated his complaint in a clear and practical manner as viewed from the standpoint of both users and manufacturers of portable electric lamps. The arguments presented are logical and call for a definite statement from the Bureau of Mines, defining their purpose in the matter of testing such lamps; and explaining the requirements outlined in the new Schedule No. 6, to which exception is taken.

It is possible that the suggested changes would render the work of testing these lamps more certain and less laborious and expensive to the government. Certainly, the bureau would have no right to ask or require changes in style or construction of lamps, other than are necessary to permit of a uniform method of testing and to insure safety for use in the mine.

The readers of Coal Age will be glad to hear from the U. S. Bureau of Mines in reference to this matter, which is recognized, at once, as being of vital importance to all users of electric mine lamps, as well as to manufacturers of the same.

Blasting in Mines Where Electricity is in Use

Having recently installed electricity in our mine, for purposes of power and lighting, I desire to ask, if the dangers due to blasting are increased thereby and, if so, in what way does the installation increase this danger?

Superintendent.

————, Wyo.

The answer to this question will naturally be confined to the dangers due to blasting as being increased by the use of electricity for power and lighting, and does not include other dangers arising from the use of electricity in the mine, such as the ignition of gas by the short-circuiting of the current or the sparking of the wires; or the danger of shock or death to men or animals from contact with live wires, although such dangers are more common than those incident to blasting.

The principal danger from electrical blasting in coal mining is that arising from a premature blast, owing to an accidental closing of the circuit by the operation of a switch by an unauthorized person or by the short-circuiting of wires. To avoid this danger the feed wires leading to the face of the coal should not be laid, except by the miner in charge of preparing the shot and when all is in readiness for the blast, the men in adjoining places having first been notified. Where a blasting machine is used, this should be under the constant supervision of the miner who prepares and fires the shot.

The use of electricity in mines, for power purposes, may offer a temptation to the miner to tap the power current for the purpose of firing a blast in his place. There should be strict regulations in order to avoid this possibility and danger. It should also be remembered that where wires are installed in a mine, for the purpose of firing shots, the danger of lightning striking the wires and causing a premature blast should be safeguarded by disconnecting the wires at a safe distance from the working face.

Examination Questions

Questions for Examination of Mine Electricians

(*Continued from last issue*)

Ques. 13—If it should happen that the two coils were bucking each other, how would you locate the trouble in a compound motor?

Ans.—Disconnect the shunt field temporarily and test the series field with a compass, to determine the direction in which the current is circulating in the series field. Again, connect the shunt field and remove one of the brushes so as to break the current in the series field. Then, test the current in the shunt field, in the same manner, to determine the direction in which that current is circulating. The information so gained will make it possible to locate and remedy the trouble.

Ques. 14—Why is the core of an armature always laminated?

Ans.—The purpose of the laminations in the core of an armature is to prevent the generation of eddy currents, which would cause the armature to heat at those points.

Ques. 15—What is the difference, if any, between brass and bronze?

Ans.—Brass is an alloy of copper and zinc, while bronze is an alloy of copper, zinc and tin.

Ques. 16—Why are wormwheels generally made of bronze?

Ans.—The sliding motion of the worm on the teeth of the wheel produces less friction when the wormwheel is made of bronze, because bronze and steel run better together than steel and steel. Cast iron is the only metal that runs well on itself. The sliding motion of the worm on the teeth of the gear makes it more important to observe this fact in a worm-gear drive.

Ques. 17—When drilling brass, would you use the same drill as when drilling steel or iron?

Ans.—No. When drilling brass, the lip of the drill should be ground off sufficiently so that the cutting edge of the tool will be normal to the surface drilled. Otherwise, the lip of the drill will tend to dig into the brass, and the tool will be broken. With a normal cutting edge the brass is scraped, rather than cut, from the body of the metal.

Ques. 18—Would you turn a commutator with a lipped tool?

Ans.—No. A lipped tool would tend to dig into the copper and streak the surface of the commutator, which should be smooth so as to yield a uniform contact of the brushes. To prevent this, the cutting edge of the tool should be normal to the surface, so as to produce a scraping effect instead of cutting into the metal.

Ques. 19—Can brass be melted in a ladle?

Ans.—The brass will melt with difficulty unless broken into small pieces. It is better to use a crucible.

Ques. 20—What is german silver?

Ans.—German silver is an alloy of copper, zinc and nickel, the composition being quite variable, depending on the purpose for which it is intended, and the price to be paid for same.

Ques. 21—Under what condition is glass a conductor of electricity?

Ans.—Glass in the molten state becomes a conductor of electricity.

Ques. 22—In the use of carbon brushes on a generator or motor, what is a "pig-tail" and what purpose does it serve?

Ans.—A "pig-tail" is a short-wire connection between the carbon brush and the commutator ring, which makes unnecessary the passing of the current through the brush holder and avoids any difficulties that might arise from the heating of the holder.

Ques. 23—Where is the neutral point on a motor?

Ans.—The neutral point of the motor is the point where the coils that are short-circuited by the brushes are exactly midway between the pole pieces.

Ques. 24—Why are the brushes set back of the neutral point on a motor?

Ans.—The coils must be short-circuited in a field that will generate in them a current that is traveling in the same direction as the current they will receive when they leave the brush.

Ques. 25—Is it well to undercut the mica on commutators?

Ans.—Yes, if the motor runs fast enough to keep the slot free from carbon and copper dust.

Ques. 26—Is carbon a good conductor?

Ans.—Carbon is a poor conductor in comparison with the metals.

Ques. 27—What is a "feather," a feather-key or spline, and what is its purpose?

Ans.—A "feather" or feather-key is a key set into a shaft that is to carry a camwheel, pulley or other rotating part. The wheel or pulley is either forced or allowed to slide endwise over the feather, which fits snugly into the keyway, so that it is immovable. The purpose of the key is to prevent the wheel or pulley from turning on the shaft.

Ques. 28—Is a spring-lock washer left- or right-handed, or does it make any difference?

Ans.—The spring-lock washer must correspond to the nut used and is commonly right-handed, otherwise the nut could not be tightened up and the washer would be ineffectual for locking the nut.

Ques. 29—What is residual magnetism?

Ans.—The magnetism remaining in the pole after the current is shut off is called "residual magnetism." The residual magnetism plays an important part in the starting of the generator.

Ques. 35—Will a motor start light with no field current?

Ans.—Yes. The residual magnetism of the poles will enable the motor to start, under no load, with some sparking at the brushes, however.

Coal and Coke News

Washington, D. C.

Government officers are expecting that as a result of the European war, there will be a material increase in the demand for American coal of various kinds. According to officers of the Department of Commerce, the chief obstacle to the immediate development of this demand is found simply in the disturbed shipping situation. However, as soon as that condition is rendered more normal, and as soon as there is a steady supply of tonnage it is believed that a heavy export movement of coal will set in.

As a matter of fact the prevalent belief, based on advices to the government from many different sources is that at least a moderate amount of transportation will be provided within a reasonably short time. The advices received here are to the effect that the British Admiralty regard the German fleet as bottled up for the present and so long as it continues in its present situation, apparently unwilling to risk a general engagement it will be possible to keep the North Atlantic routes open while some other routes such as those to South America and elsewhere are expected to be safe from now on.

Of course, this condition would be changed abruptly, according to the opinion of public officers, should an engagement occur resulting in a serious defeat to the British ships. German vessels would then have control of the situation and presumably they would render the ocean unsafe for British and American vessels, if the latter were carrying goods of a contraband nature.

Supposing that the existing conditions are maintained, it is believed that the demand for coal will be strengthened in several distinct ways. In the first place, exports of coal from Continental countries will not be possible and those who have been depending on these supplies will naturally look to England and the United States. The disturbed conditions of production in England will be likely to throw the trade to the United States provided that oversea transportation can be furnished at a reasonable rate, as it is supposed will be the case, if a considerable amount of tonnage is restored to the ocean in the way that has been indicated.

Secondly there is every reason to believe that a good deal of shipping will be diverted from the Suez Canal route to Panama, thereby necessitating the provision of large quantities of coal on the Isthmus in order to enable passing vessels to provide themselves with fuel, it being well recognized that the possibility of coaling there cheaply is one of the essentials to the development of the Canal trade.

Thirdly, a decided increase in the amount of the trade with South American countries is looked for, in case the European war continues for some time to come, those countries being obliged to turn to the United States for many articles they have heretofore obtained in Europe. The result will be a stimulus to the amount of shipping plying between the United States and South America and a consequent increase in the amount of coal required to supply its needs.

Finally the probable demand for coal domestically consumed in carrying on industrial operations will, it is believed, be rendered greater by reason of the prevalence of hostilities abroad. A good deal of study has been given to this situation by various government bureaus and the expectations that seem to prevail are as just indicated.

A Study of the Rate Decision

Further study of the 5 per cent. rate decision of the Interstate Commerce Commission is developing some decidedly interesting data with regard to the bearing of the decision upon the coal industry and the position of the coal roads. The complete text of the decision is now available and contains considerable matter bearing directly on this subject. One point of considerable interest made by the Commission is that on the coal roads the cost of operation has been greatly reduced. The Commission says:

But even if the evidence clearly established an increase in the general freight operating expense ratio, we should not be at liberty on this record to conclude that the cost of transporting each kind of freight had increased much less than it had increased proportionately. The evidence is clear that as to certain classes of bulk or heavy freight, like coal, coke, ore, cement, brick, tile, clay and plaster, the use of larger cars must have reduced operating costs, whereas in respect to expedited package freight, shipped in cars moving on a regular schedule, regardless of the quantity of their contents, the use of larger cars, involving greater unused car capacity, must have increased the operating costs. Similarly the extension of the expedited service in carload freight must have increased the cost, while the heavier train loading of the slow train, in which the heavy or bulk freight usually moves, has tended to decrease the cost.

Eight systems in official classification territory, each of which shows for 1913 an operating ratio of less than 66⅔ per cent., are known as coal or ore carrying roads; namely, the anthracite coal carriers, the Central of New Jersey, Delaware & Hudson, Delaware, Lackawanna & Western, and the Reading, and the bituminous coal and ore carriers, the Hocking Valley, Kanawha & Michigan, Norfolk & Western and Bessemer & Lake Erie.

The tonnage of each of these roads consists in large part of the products of mines, and all of them are very prosperous. Each of the bituminous roads has an exceptionally low yield per ton mile for all traffic, and yet the representative yield per ton for carrying bituminous coal is lower, and on most of these lines much lower, than their average per ton mile revenue.

The Commission goes on to demonstrate this fact by citing figures for the traffic and returns of the bituminous coal roads showing that the percentage of the tonnage of the products of mines to the total tonnage is 79.78 per cent. in the case of the Hocking Valley R.R., 82.60 per cent. in that of the Kanawha & Michigan, 76.05 per cent. in that of the Norfolk & Western and 87.95 per cent. in that of the Bessemer & Lake Erie R.R. The representative bituminous coal net yield per ton per mile in the case of these roads is respectively 2.56 mills, 3.03, 2.88 and 4.50 mills. A comparison of the operating results of the New York Central R.R. and the Pennsylvania R. R. with the leading coal carrying subsidiary of each tends to the same general conclusion.

No Discrimination against Bowling Green

The Interstate Commerce Commission has just handed down an important decision in the case of the Bowling Green Business Men's Protective Assn. vs. the Louisville & Nashville Ry. in a case involving among other things a considerable tonnage of coal.

In this case it is held that the construction of through rates from Chicago and Milwaukee territories to Nashville, Tenn., by the addition of proportional rates from points of origin to the Ohio River to the local rates from the river to Nashville, contrasted with the construction of rates to Bowling Green by the addition of the local rates to and from the river crossings does not result in undue discrimination. The construction of through rates from Indianapolis territory to Louisville in a similar way is, however, found to constitute undue discrimination against intermediate points.

HARRISBURG, PENN.

No railroad or other carrier of coal may transport this commodity in cars owned by the producer at a lower rate than is charged for carrying the same commodity in cars not so owned. This decision was made on Aug. 7 by the Public Service Commission in disposing of a complaint that interested the entire bituminous region of the state.

The gist of the commission's decision is that to permit a lower rate to be charged when coal is carried in the producers' cars will open the way to actual discrimination in favor of certain customers because the producing company could thus sell coal to such customers for less than would be charged those who got coal on which the full freight rate was charged.

The Pennsylvania R.R. Co. is the respondent in the case, the complainants being the Pennsylvania Rubber Co., the Westmoreland Specialty Co., the Pittsburgh Lamp, Brass & Glass Co., the McKee Glass Co. and the American Window Glass Co. The complaint involved rates on coal from Penn, Biddle, Irwin, Hahnton, Jeannette and Grapeville.

New rates were put into effect by the Pennsylvania R.R. June 1, and most of them were declared to be reasonable, but it is ordered that the rate from Biddle to Grapeville be reduced from 25c. to 20c. a ton, the same as the rate to Jeannette, and that from Hahnton to Jeannette be reduced from 30c. to 25c. The 15c. rate from Penn to Jeannette and Grapeville and the 20c. rate from Biddle to Jeannette are held to be reasonable.

Notice has also been served by the commission that it has reason to believe that considerable disregard, deliberate or otherwise, exists of the provisions of the public service company law requiring all companies subject to the jurisdiction

of the commission to publish, post and file tariffs of charges which they assess and collect.

The commission added that it purposes to institute a vigorous inquiry into the matter and to compel delinquents to comply with the act of 1913.

Foreign Nations Buy Coal

Orders for coal aggregating more than 1,000,000 tons have been placed with dealers throughout the state during the last few days (up to Aug. 8) by business agents representing the governments of France, Italy, Germany, Austria and Russia. So strong is the demand, it is said, that practically any reasonable price is given, provided the dealers will promise to begin loading for shipment within 10 days.

Italy has taken 400,000 tons and has options on an additional 150,000 tons for future delivery. The supply is holding out well because of the withdrawal of so many steamships from active trade, and no shortage is anticipated.

In booking the orders, the exporters are facing the problem of finding vessels in which to deliver the product. Exporters believe that Germany and Austria will be forced to buy practically all of their coal in this country. In the past they have depended largely on the Welsh product. The Welsh fields will be unable to meet the demands now made upon them by England, France, Russia and Italy, and the overflow will naturally divert to this country.

PENNSYLVANIA

Anthracite

Scranton—The city controller has been compelled to hold up the bills of three mining experts, because of the lack of funds in the appropriation granted for the continuance of the mine-cave test case against the Scranton Coal Co., on which the engineers were employed.

Yorktown—The Beaver Brook colliery of C. M. Dodson & Co., which is in charge of General Superintendent John Turnbach, broke all previous records during the month of July, when over 40,000 tons of coal were prepared and shipped to market. This is a very creditable showing and is worthy of notice by reason of the fact that at this time of the year most of the other collieries are working half time.

Shenandoah—Shenandoah City and Indian Ridge collieries of the Philadelphia & Reading Coal & Iron Co. were ordered to suspend all operations on Aug. 8, indefinitely, to make general repairs, throwing 2500 men and boys out of employment.

Bituminous

Uniontown—Foreclosure proceedings have been started in the Fayette County court on an $8,000,000 mortgage held by the Colonial Trust Co. of Pittsburgh, as trustee, against the Isabella-Connellsville Coke Co. The mortgage was given Apr. 1, 1909, payable in 30 years, with interest at 5 per cent. The trust company held $8,000,000 in bonds, covering 2967 acres of 9 ft. river-vein coal in Luzerne township. It maintains the coke company defaulted in paying interest on $6,515,000 still due, and the foreclosure is for that amount and interest.

Indiana—The purchase of the holdings of the Penn-Mary Coal Co. in Indiana County by the Cambria Steel Co., of Johnstown, is reported. The operation includes nearly 25,000 acres of coal and modern plants and the mining town of Heilwood. Vice-President Slick, of the Cambria Steel Co., is in temporary charge.

Johnstown—The nine mines of the Pennsylvania Coal & Coke Corporation in Cambria County were closed indefinitely, it was stated on Aug. 4, owing to the slump in orders due to the holding up of transatlantic liners by the war. The mines of the company in this vicinity make a specialty of furnishing coal for the Atlantic liners. The mines at Beaverdale are already closed down, and it is said others will follow.

Portage—A notice was posted on Aug. 5, by the Millar Shaft Coal Co., warning all employees to remove their tools from the mine before Aug. 8, as the mine would be closed after that date. The notice is taken to mean that the workings will be closed indefinitely, owing to the rejection by the men of the company's plan to keep the shaft working pending the arbitration of the question of a checkweighman.

Dunbar—The miners employed by the Mahoning Coal & Coke Co. have struck and the mine is idle pending adjustment of the trouble. The miners say that the wagons hold 47½ bu. of coal, while they are only being paid for 40 bu. It is alleged that an employee of the company was discharged for not putting the "hump" on a wagon. Orders were issued to the effect that anyone falling short would be discharged. This was the real cause of the strike, and the miners declare they will not go back to work until they are paid for the full amount of the coal they mine.

Fayette City — The Apollo mine of the Monongahela River Consolidated Coal & Coke Co., has resumed operations after a suspension of several weeks. Approximately 300 men are employed at this operation.

Dunbar—The fire in the Atlas mine of the Cambria Steel Co., was extinguished on Aug. 3, two hours after helmet men from the Davidson and Leisenring No. 1 plants of the H. C. Frick Coke Co., a force from Johnstown, and others, had turned a hose on the blaze. Within three hours after smoke was discovered on Aug. 2, helmet men from the two Frick plants had penetrated 750 ft. into the mine and discovered the fire. How this fire started is unknown, but the damage inflicted was slight.

Connellsville—It is reported that the H. C. Frick Coke Co. has blown in nearly 400 additional ovens, and more than 200 independent ovens at the same time were blown out. As a consequence the production of coke is approximately 270,000 tons per week at the present time.

WEST VIRGINIA

Huntington—On Aug. 3, all coal loading records for one day were broken on the Chesapeake & Ohio R.R. About 110,000 tons of coal were handled by the road, this being an increase of 10,000 tons over the amount handled on any previous day in the history of the road. Officials of the company are, however, predicting that this record will be broken again during the current month.

Eccles—The coal mines of the New River Collieries Co. at this point, which were wrecked by an explosion on Apr. 28 with heavy loss of life, have been repaired, and it is said that operations will be resumed shortly. The intention now is to make the Eccles Mine the safest and best in the country.

Bluefield—It was thought when war was declared in Europe, that the Norfolk & Western R.R. would be called upon to handle large quantities of coal to Norfolk to load on ships for Europe. Up to the present time, however, instead of the coal tonnage having been increased it has fallen off. This is due to the fact that few ships are now calling at Norfolk or Hampton Roads for cargoes of coal.

ALABAMA

Birmingham—Coal operators in the Birmingham district are anxiously awaiting instructions from Washington relieving the situation at Pensacola, Mobile and New Orleans as to loading bunker and other coals on ships touching at those points. When these matters are settled, no less than 1,250,000 tons will be shipped down as fast as transportation arrangements can be made.

KENTUCKY

Pineville—The main offices of the Continental Coal Corporation, which have been located here since the organization of the company, are being moved to Straight Creek. It was desired to have the offices nearer the actual workings.

Greenville—The Greenville Coal Co. bought the Browder mine and equipment of the Caldwell Coal Co. and New York parties paid $5000 for the Peanut mine of the same company when the property was sold at auction recently. The price paid for the Browder mine was $75,000. The Greenville company about four years ago sold the Browder mine to the Caldwell company for $250,000. Soon afterward the Browder mine disaster occurred, and the tipple and machinery were destroyed. It is not announced whether the Greenville company will operate the property.

Pikeville—The Elkhorn field has been quiet of late, owing to something of a stringency in the coal market, and, though all the mines in this district have been working, they are on part time. Immediate resumption of full-time operations is said to be in prospect.

OHIO

Shadyside—With no prospect in sight as yet for an agreement between the miners and operators of the Belmont County coal districts, one of the largest mines has been closed down and will not open again for at least one year, while it is thought that several others will follow. On Aug. 7, the Fort Pitt mine was ordered completely shut down as soon as possible.

Columbus—The Franklin County Court of Appeals has upheld the ruling of the Ohio Utilities Commission made two years ago in reducing the freight rate on coal from Nelsonville to Toledo from $1 to 85c. per ton. At the time the decision was given by the commission upon the complaint

of the New York Coal Co., the case was appealed to the state courts. It is likely the case will be carried up to the Ohio Supreme Court.

ILLINOIS

Marion—Reports from several of the mines in the Williamson and Franklin County field, particularly at Johnston City, Herrin, Bush, Christopher, Benton, West Frankfort and a few of the smaller mining towns, are that large numbers of foreigners are preparing to quit work to go back to their respective countries now engaged in war, in answer to the call for reserves. This movement will afford considerable relief to the United Mine Workers, inasmuch as there are more men now in the southern Illinois field than there is work for, and the retiring of a few thousand would improve conditions wonderfully.

East St. Louis—Due to a strike in the Kansas field, coal is now being shipped from Illinois to the manufacturing cities of southeastern Kansas, while miners in the adjoining districts are idle. Railroads now have the wheat crop to move and find it difficult to keep these districts in coal, and in spite of the shipments from Illinois, have lost traffic.

Livingston—The Livingston mine of the Rutledge & Taylor Coal Co., on the Big Four R.R., recently broke all previous records of production when 4670 tons of coal were loaded in 8 hr. This is equivalent to a train of 117 forty-ton cars.

ARKANSAS

Fort Smith—A suit for $220,000 damages was filed in the United States court here Aug. 4, by Thomas Smith, a miner, against the Central Coal and Coke Co. Smith was employed in the company's mines near Hartford. On Apr. 18, 1913, he was injured by the collapse of a roof in a passageway, while he was fighting a fire. He alleges negligence on the part of the company and asks damages for injuries, for loss of future earning power, for the humiliation of his present physical condition and for the punishment because of the alleged carelessness.

The federal court here on Aug. 3 ordered the reopening of the charge of contempt of court against Peter R. Stewart, of McAlester, Okla., head of the United Mine Workers of Texas, Oklahoma and Arkansas, who was tried for violating an injunction against violence prior to the riots that resulted in the destruction of the Bache-Denman Coal Co.'s mines at Prairie Creek.

FOREIGN NEWS

Dunfermline, Scotland—Work in the coal mines in the counties of Fife, Kenross and Clackmannan, the output of which is ordinarily shipped to Continental Europe, has virtually stopped. Supplies of raw materials in the factories are also almost exhausted, and in a short time operatives as well as miners will be out of employment.

PERSONALS

Douglass Vass, for 19 years demurrage agent of the Pennsylvania R.R. at Wheeling, W. Va., recently resigned from the service of the company. He has accepted a position as sales agent of the Beech Flats Coal Co.

H. W. DePue, of Spencer, W. Va., recently closed a deal with the Muddy Valley Mining Co., by which he and others associated with him become the owners of 6000 acres of coal land under full development in southern Illinois.

F. X. Quinn, of Philadelphia, representing the bondholders, recently, bid in at $1,000,000 the Oklahoma Central R.R., running from Purcell to Lehigh in the coal fields. It is understood that the Santa Fé may lease or buy the road to secure an entrance to the coal district.

Joseph J. Walsh, state mine inspector of the 10th District of Pennsylvania is preparing a set of three text books for the help of young men engaged in mining. They are designed especially for the use of night mining schools such as have been established in various communities of the anthracite region.

OBITUARY

David Lynch, aged 66 years, formerly a coal operator at Evansville, Ind., also well known in western Kentucky, died recently at his home in Evansville. He is survived by four sons and four daughters.

William Torance, superintendent of the mine at Willock, Penn., died at the Mercy Hospital, Pittsburgh, Aug. 5, at the age of 68 years, as a result of being struck by a train. Mr. Torance was born in Scotland and came to Willock 23 years ago. He leaves four sons and two daughters.

A. P. Trautwein, organizer and former president of the Carbondale Machine Co., died Aug. 4 in his home on Lincoln Ave., Carbondale. He had been suffering from a complication of diseases for about a year, but heart trouble was given as the immediate cause of death.

Born in New York in 1857, Mr. Trautwein came to Carbondale in 1889. In 1896 he organized the Carbondale Machine Co., which has had a consistent and successful career. In addition to this concern he had been connected in an official capacity with the Los Angeles Ice & Cold Storage Co., the Spencer Heater Co., the American Acid & Alkali Co. and the Buffalo Cold Storage Co. He was an authority on the manufacture of coal illuminating gas.

Mr. Trautwein was a member of the American Society of Mechanical Engineers, the Engineers' Club of New York, the Manufacturers' Club of Philadelphia, the Engineers' Club of Scranton, and the Drug Trade Club of New York, and the Delta Tau Delta fraternity. He is survived by a wife, four daughters, three brothers and two sisters.

RECENT COAL AND COKE PATENTS

Coke Oven. F. W. Sherr, Jr., Chicago, Ill. 1,097,196. May 19, 1914. Filed Jan. 31, 1914. Serial No. 815,763.

Gas Producer. J. F. Guggolz, Teague, Texas. 1,097,715. May 26, 1914. Filed Apr. 2, 1912. Serial No. 688,071.

Coaling Device. D. Hilleman, Jr., Welleston, Mo. 1,097,434. May 19, 1914. Filed May 24, 1913. Serial No. 769,677.

Gas Producer. H. F. Smith, Lexington, Ohio. 1,098,059. May 26, 1914. Filed Sept. 20, 1912. Serial No. 721,417.

Horizontal Coke Oven. C. Still, Recklinghausen, Germany. 1,098,188. May 26, 1914. Filed Jan. 23, 1914. Serial No. 672,928.

Smoke-Consuming Heater or Boiler. E. C. Hock, Buffalo, N. Y. 1,097,718. May 26, 1914. Filed Oct. 1, 1913. Serial No. 792,793.

Circulating Tube for Steam Boilers. H. S. Vincent, Ridgewood, N. J. 1,097,830. May 26, 1914. Filed Jan. 26, 1911. Serial No. 814,357.

Process for the Production of Coke. L. Franck, Luxemburg, Luxemburg. 1,098,359. May 26, 1914. Filed Jan. 6, 1914. Serial No. 810,675.

Locomotive Furnace. F. F. Gaines, assignor to American Arch Co., New York, N. Y. 1,097,125. May 19, 1914. Filed July 24, 1913. Serial No. 780,961.

Smokeless Boiler Furnace. F. A. Shoemaker, assignor to Sturdy Smokeless Furnace Co., Buffalo, N. Y. 1,097,735. May 26, 1914. Filed July 5, 1912. Serial No. 707,722.

CONSTRUCTION NEWS

Barbourville, Ky.—The Dean Coal Co., with mines in the Brush Creek field, is preparing to electrify its mines. Contracts have been let and it is said the installation work will begin at once.

Huntington, W. Va.—Practically all of the electric apparatus at the Island Creek tipple has been dismantled and is being placed on barges to be shipped to Secatan, Ind., this being the lower loading station of the Island Creek Co.

Pikeville, Ky.—The Allegheny Coke Co. is preparing to build a number of steel coke ovens at an expenditure of $20,000, to be used as equalizers between the mine output and shipments, as it frequently has happened that the output

exceeds the capacity of the 150 ovens now in use, or that both exceed the market orders, and conversely.

Huntington, W. Va.—According to an authoritative report, the Baltimore & Ohio R.R. is making active preparations to extend its line from Kenova up the Big Sandy River to the mouth of Shelby Creek, just below Pikeville. This line has been contemplated for some time. The route has already been surveyed, and it is believed that work will start in the near future.

Bluefield, W. Va.—Two new operations are being opened on tributaries of Widemouth Creek, the operators being the Modoc Coal Co. and the Pocahontas Co. The Norfolk & Western now has under construction a two-mile track leading up the hollow to the new operations, the steel for which is now being laid. It is expected that coal shipments will begin in a few weeks.

Houston, Texas—Plans are being worked out for a large coal wharf to be built on the south bank of the Houston ship channel at Magnolia Park. This wharf will be equipped with all modern appliances for rapid and economical handling of cargoes from ships to cars for distribution throughout Texas from the Southwest.

Harrisburg, Penn.—An ordinance providing for the construction of the proposed electric hoist to handle the great quantity of river coal on the Susquehanna River wall wharf will likely be passed by the Council in a short time. The plans were given to Warren H. Manning, the park expert, on Aug. 6, for approval. The Harrisburg Light and Power Co. wishes to erect the elevator.

New Albany, Ind.—Extensive coal chutes are to be erected in this city by the Monon Ry. Co., and the engines which heretofore have been coaled in Louisville will receive a supply of fuel in this city. The contract for the new chute has been let, and it is expected that work on the structure will begin within a short time. It is understood that all machinery will be electrically operated.

Charleston, S. C.—Plans are being prepared by the Southern Ry. for the construction of a large coal terminal at Charleston. A tract of 114 acres with 4000 ft. river frontage has been purchased from the Stonega Coal & Coke Co. This improvement will afford coal operators on the Southern Ry. an opportunity to engage in the coal export trade. The total amount to be spent by the railway will exceed four million dollars.

War, W. Va.—The Link Belt Co., of Philadelphia, was recently awarded the contract for a complete shaking screen tipple by the Warrior Coal & Coke Co. This equipment consists of a dump hopper at the drift mouth, into which the coal will be discharged from the mine cars, and from which it will be fed through a long apron conveyor which makes delivery to the shaking screen tipple at the foot of the hill. Here it will be sized into the various grades, the lump and egg being loaded to the cars by means of a loading boom.

NEW INCORPORATIONS

Cleveland, Ohio.—Papers have been filed by the Standard Pocahontas Coal Co. increasing its authorized capital from $400,000 to $500,000.

Mt. Stirling, Ky.—The Rush Branch Cannel Coal Co. has been organized, with a capital stock of $10,000. The incorporators are R. H. Winn, John A. Judy and Lewis Apperson.

Cleveland, Ohio—The Northumberland Collieries Co. has been organized with a capital stock of $10,000. The incorporators are C. C. Owens, H. T. Clark, W. S. Fleming, E. R. Diehm and F. S. Whitcomb.

Nashville, Tenn.—The Red Moon Coal Co. has been organized in Campbell County, with a capital of $15,000. The incorporators are J. L. Hefferman, S. B. Hefferman, B. F. Shuck, C. J. Cross and Charles Hughes.

Charleston, W. Va.—The Gaymont Coal Co. has been organized to operate in the Mountain Cove district of Fayette County. The authorized capital is $2000 and the incorporators are C. C. Beury, J. P. Vaughn, A. S. Guthrie, C. C. Lewis, Jr., and D. V. Reese, all of Charleston.

Central City, Ky.—People interested in the Central Coal & Iron Co. have filed articles of incorporation for the Green River Power Co., which projects an electric plant and an electric railway, a gas company and a land company. A carload of scrapers has been received and it is understood that actual construction of the railway will be begun at once.

INDUSTRIAL NEWS

New York, N. Y.—The John Simmons Co., manufacturers of the Baldwin carbide lamp, has gotten out for the use of engineers using its lamps, a table of natural sines and cosines, on heavy celluloid of a size that can be conveniently carried in the note book.

Columbus, Ohio—The National Coal and Fuel Supply Co. has moved its headquarters from Lancaster, Ohio, to Columbus and opened offices in the Hayden Bank Bldg. The company has a large acreage of coal lands in Noble and Monroe counties under lease.

Rochelle, Ill.—The Geo. D. Whitcomb Co. has taken over the busines of the C. K. Davis Mfg. Co., of Detroit, covering electric storage battery locomotives. Owing to his condition of health and his many other ventures Mr. C. K. Davis decided to dispose of his interests in this business.

Birmingham, Ala.—As a direct result of the European war a local coal broker received recently an inquiry for quotations on an order for coal up to 50.000 tons. It is expected that the inquiry will be followed by other requests for quotations on coal from this district, and the result will be a wonderful business from this unexpected source.

Columbus, Ohio—Apparently the war has no effect upon the coal trade. In all districts of Ohio, both steam and domestic users are buying as well as can be expected and it is believed by Columbus coal men that the war if continued for some time will have the effect of helping the situation as it will take much Pocahontas coal to the seaboard for bunker purposes and thus widen the market for other grades.

Tuscaloosa, Ala.—On account of the failure of Congress to pass the Rivers and Harbors appropriation bill, all work on Lock 17, situated nearly 20 miles above Tuscaloosa, on the Warrior River, has been stopped. As work on Locks 2 and 3 will not be stopped, this will not interfere with present development of mines on the Warrior up to Tuscaloosa, but the failure to continue work on Lock 17 means that the development of mines above that point and the proposed barge line, will be delayed at least a year.

Spartanburg, S. C.—The Clinchfield Fuel Co. has been awarded the contract to furnish the fleet of the United Fruit Co. with coal for a period of three years. This will be placed on board the steamers at Galveston, Texas, where the company is planning to build a large storage pier. Contracts have also been made with many different steamship lines for furnishing Clinchfield coal for bunker use at Galveston and Savannah. These contracts exceed 2,000,000 tons, and are over 500,000 tons more than last year's business thus far.

Birmingham, Ala.—A petition for authority to advance the coal rate from all of its Alabama mines to Birmingham points 10c. per ton, and to advance its present rate on coal to certain manufacturing industries located at Anniston, Gadsden, Alabama City, Attalla, Sylacauga and Talladega, Ala., from 50c. to 70c. per ton, has been filed with the Railroad Commission of Alabama by the Louisville & Nashville R. R. A similar request to advance rates was made by the Frisco R. R. These petitions are considered among the most important the Railroad Commission has ever had to consider.

Harrisburg, Penn.—Anthracite coal shipments in July aggregated 5,391,857 tons, a decrease of 95,995 tons from the same month last year. For the calendar year to date shipments total 38,337,646 tons, or 2,002,000 tons less than last year. Delaware and Hudson, Erie, and Lehigh Valley were the only companies to show an increased tonnage for July. Shipments of the first named showed the unusual increase of 82,093. Lehigh Valley tonnage was larger by 14,238 tons. Reading's shipments fell off 70,798 tons and Central R.R. of New Jersey's 66,659 tons. All companies except the Pennsylvania show decreases for the seven months ending with July, and the increase there is small.

Cincinnati, Ohio—According to Judson Harmon, one of the receivers of the Cincinnati, Hamilton & Dayton R. R., the road is carrying considerably more coal this year than last, and at less expense. Last year the road hauled 1,300,000 tons of coal during the season, from Apr. 1 to Nov. 20. Up to Aug. 1 of this year, however, the figure had already passed the million-ton mark, in spite of an extraordinary dull season, making it seem fairly certain that the 1913 record would be broken by a wide margin, and that the road would earn a much larger revenue per ton hauled, as the expense of handling the traffic has been reduced. This is an encouraging indication of better times for the road.

Coal Trade Reviews

General Review

Anthracite at the low point of the year with individuals making heavy cuts in the circular. Bituminous market replete with conflicting reports. Sentiment generally better. Negotiations for future delivery are at a higher level. Lake shipping continues unsatisfactory.

The anthracite market continues dull and flat. The steam sizes are moderately short because of the rigid curtailment in the mining regions and as a result the better grades are steady at the full circular, though concessions are still obtainable on the off qualities. Egg coal is under heavy pressure, and stove is firm. Anthracite has not been affected by the European war, with the possible exception of at the Canadian border, where it is feared that treaty complications may arise, cutting off shipments, and a heavy stocking movement is under way in anticipation thereof. As a rule the individuals are forcing the market with substantial concessions on the regular circulars.

While the current bituminous market continues relatively heavy, the situation is rather mixed, and replete with portentious possibilities. So far the European war has only interfered with shipments, several foreign vessels calling at Hampton Roads for cargoes, having turned back again rather than risk capture. Steamers sailing out of New York Harbor, however, are said to be taking large surplus tonnages, and the fact that the leading bunkering and export company at that point is working full capacity and holding all production close is significant evidence of the trend of conditions. Conservative members of the trade are inclined to go slow, but some companies are beginning to speed up operations, thoroughly convinced that the turning point has been reached. Premiums on future deliveries are already being offered.

The situation in the Pittsburgh district is even more discouraging, with the line trade still further reduced, and the movement in the Lakes disappointing, though an improvement is expected before the end of the month. Pittsburgh operators will not benefit by any increase in the export trade as a result of the foreign war, except as they may be called upon to make up deficiencies created by such demand. There is a general feeling that stocks in the hands of consumers are at a low point ,and the development of any extra outside demand would create an active situation.

The approach of the stocking up season is bringing out many inquiries in Ohio, and operations are being rapidly resumed. The steam business is also opening up better, while the Lake shipping is one of the best features of the market; chartering is active, and large tonnages are being moved though it is clear that the total for the year will not equal last season's. The market is quiet at the present, and some difficulty is experienced in maintaining the circular.

Though Southern consumers continue holding off in anticipation of a break in the market, the situation is becoming steadily stronger, with the approach of the fall buying season. The possibility of a heavy demand for foreign shipments at the Southern ports is also having a beneficial effect. Many inquiries are being received in the Middle Western. trade which, supplemented by advances in the circular, indicate a strong situation shortly. The Ohio coals are in conspicuously strong demand, and it may be some time before any of these can be received. Prices are steady to firm.

ATLANTIC SEABOARD

BOSTON

A broad market expected shortly, but chiefly for export; summer tieup regarded as only temporary. Premiums paid for future shipments. Local situation improves, but no great demand anticipated. Outlook favorable for Georges Creek and Pennsylvania grades. Anthracite quiet.

Bituminous—There are all kinds of opinion in the trade as to the effect of the European war on early fall business, but most people are agreed that by October or November there will probably be a broad market for coal, especially off shore. The tieup of transatlantic business threatened for a few days to flood the tidewater trade with the coal brought down for bunker use, but that situation has been pretty well adjusted by increased requisitions from the ships that are still in the service. The Hampton Roads situation has also changed within a few days. Some of the shippers, who are closely in touch with foreign buyers, are looking to heavy business, and are very cautious about commitments coastwise for September and October. Already, premiums are said to have been paid for futures; up to $3 f.o.b. has been rumored, and there can be no doubt now of a fairly active market as the season advances. In other lines there is much confidence of heavy dealings with other countries by reason of the war, and particularly with South America.

Locally the Pocahontas and New River market has continued to improve, especially as regards prices obtained. The "market-cargo" menace seems to have been pretty well ironed out. Stocks are large everywhere, and it is not expected there will be a very insistent call from this section for the West Virginia coals, even if prices do advance materially. In other words, conditions in New England are not likely to be affected very much, whatever price development there may be the next two or three months.

The demand for Georges Creek continues to improve and shippers of this grade are also anticipating an extra demand off-shore. The "Kronprinzessin Cecille," at Bar Harbor, Me., is taking aboard two cargoes of that grade.

If there is a material advance in prices at Hampton Roads, there will certainly be a wider market for the soft-coal output of Pennsylvania. Many of the shippers are now well supplied with orders and feel confident that there will be ample business the balance of the year. The all-rail trade shows a gain, particularly in the sections where low-priced tidewater coal is no longer a factor.

Anthracite—The mines are still under curtailment and will remain so until the fall demand opens up. With several of the companies, stove is still the size in shortest supply, and boats are occasionally detained for that reason. The movement to the consumer is rather slow beginning this season, but by September dealers are expected to be calling for fresh supplies. The prospect is good for a strong market during the fall and winter. The efforts of independents to sell at prices well below the company circular have so far had only a negligible result.

Retail prices in Boston were advanced 25c. Aug. 10, making stove and egg now $7.75 per net ton delivered.

Wholesale prices on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.45	$1.20@1.70	$1.67@1.77	
Philadelphia*	2.15@2.70	2.4 @2.95	2.92@3.02	
New York*	2.45@3.00	2.7 @3.25	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.80@2.95
Boston†	.....	.....	.....	3.58@3.78
Providence†	.....	.....	.....	3.53@3.68

* F.o.b. †On cars.

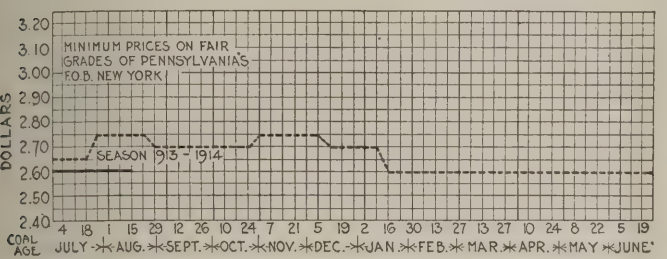
NEW YORK

Bituminous situation full of uncertainties. Indications point to a sharp advance. Bunkering and export business erratic. Numerous inquiries of all kinds. Anthracite heavy and dull.

Bituminous—The local situation is distinctly mixed, business being conducted on a day to day basis, the general tendency being to hold off pending further developments. Predictions as to the future trend of conditions are conflicting almost to extremes. The more conservative old-line companies entertain great doubts as to the future while the more aggressive factions assert positively that the market is on the verge of a sharp advance of from 50c. to $1 per ton within the next 30 to 60 days at least. It is agreed by all that there are foreign and domestic inquiries for enormous tonnages in the hands of the agencies, and should these develop into actual business and the problem of securing water transportation be solved, an active situation will result. That our government will work out some method whereby foreign vessels can be utilized for shipment to neutral ports is the firm belief of the trade.

Generally speaking there has been a complete disruption of the bunkering and export trade at Tidewater though it is a significant fact that there is little accumulation of surplus coal; in fact one company reports current supplies now at the lowest price for several years. The Berwind-White Co., who practically control the export and bunkering business in New York Harbor, are working their mines at full capacity ,and holding their coal closely. It is stated that the liner "Olympic," which sailed the early part of the week, carried 25,000 tons of coal, and that all other vessels are loading heavily.

In spite of the many uncertainties now prevailing, the current market is not quotably changed from the past few weeks which we continue as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.



Anthracite—The hard-coal market continues dull and uninteresting. Unlike bituminous it will not be effected by the European wars except insofar as some tonnages are used to replace bituminous coal diverted into other channels. It is believed that consumers as a rule have bought less than in former years, and the stocks at Tidewater are somewhat lighter than customary at this period.

Broken and egg coal are about holding their own as regards supply and demand although there is possibly somewhat of a surplus of egg coal. Stove is in short supply but not sufficiently so to command a premium on average business. Chestnut is by far the weakest of the domestic grades; it is offered at concessions ranging from 25 to 50c. from the regular circular, and is even then difficult to move.

The restricted operations in the mining regions have had a steadying effect upon the steam sizes, the better qualities being in more demand at the full circular. The poorer grades are in excess supply, and are obtainable at less than the circular. The line trade in anthracite as a rule is improving.

The New York hard coal market is quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	$4.60@5.00	$4.95	$4.55@4.95
Egg	5.25	4.90@5.25	5.20	4.85@5.20
Stove	5.25	5.15@5.25	5.20	5.00@5.20
Chestnut	5.50	4.95@5.50	5.45	4.75@5.45
Pea	3.55	3.40@3.55	3.50	3.25@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	1.90@2.75
Rice	2.30	2.15@2.30	2.00@2.25	1.50@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

PHILADELPHIA

Anthracite continues stagnant, although inquiry is improving and prospects better. Early fall demand is expected soon. Bituminous prices unchanged, and demand about the same.

Anthracite—There seems to be an undercurrent of better feeling, due to the fact that there is considerably more inquiry. It is expected that the fall business will open up more favorably than is usually the case, and this is already indicated in the tidewater business. Quite a volume of business is already coming in for late August delivery.

Locally the trade still continues stagnant. There is very little coal being consumed, and as the price is but 10c. below the maximum for the year, inducements to buy are not particularly strong. The individual operators still force business with attractive prices. Egg and chestnut are offered at the April circular, and on the medium grades, concessions from the circular on stove are obtainable. Pea is selling at most any price to move it; as a matter of fact, chestnut and pea seem to be the stumbling blocks in the way of an increased production. Prices are:

	Circular	Individual
Broken	$4.65	$4.65
Egg	4.90	4.60 @ 4.70
Stove	4.90	4.90
Chestnut	5.15	4.90 @ 5.00
Pea	3.25	3.00

Bituminous—There is considerable speculation as to the probable result of the Continental war on the bituminous trade. Up to the present time, very little in the way of tangible business has been received. The tieing up of numerous ocean vessels has caused some congestion at tidewater points, but the actual domestic market has not changed.

BALTIMORE

Attention centering on the export trade and inquiries arriving. Anthracite and bituminous business on domestic account very flat.

With the Welsh mines closed to outside markets, and with the growing demand for American coal indicated in cable inquiries that are being received in this country, the trade is wondering just how much of this will develop into actual business. Even if unable to build up trade with the warring nations themselves, the American producers and agencies may find it possible to break into the South American and Mediterranean business. The transportation question is the main problem, but this will surely be solved as the demand from the other side is so urgent that purchasers will assume all risks. It may be some weeks, however, before this situation develops into actual business.

In the domestic trade there is little of interest. Demand is poor and prices on the same level. There is more of a congestion at tide than has been noted for some time past, and it would not take much to start more price cutting. An increasing export trade now would indeed prove a blessing.

Slack continues falling off, West Virginia products being sold as low as 50c., with three-quarter gas offering at 85c. Pennsylvania coals held steady, cheaper grades being on the market at slightly below the dollar mark, and the better fuels running from $1.15 to $1.35.

Anthracite—Companies report a free movement on contracts, but very little doing in the way of new demand.

Coastwise Charters hold firm, and shipping interests are figuring that if there is a growing South American demand for our fuel, rates will advance. Many vessels of the strictly domestic fleet could be used for more distant delivery.

HAMPTON ROADS

Dumpings at Hampton Roads piers only about fair; war in Europe interfering with the bunker trade. Prices continue unchanged.

Dumpings for the week have been fair. Coastwise shipments have improved, perhaps, to some extent, although little coal is moving except by steamers. A large number of schooners in this trade have been taken off and are remaining idle until conditions improve. The largest coastwise shipment to leave this port for some time was loaded during the week into the American S. S. "Arizonan," which took 11,183 tons from Lamberts Point for the U. S. Naval Station at Mare Island, Calif. The bulk of the coal for the New England market went to Boston, although some shipments moved to Portland, Allyns Point, Bangor and Fall River.

Prices on New River and Pocahontas as well as on the high volatiles remain about the same as they have been for some weeks, with little demand for spot shipments on either grade.

War between the European countries is causing the bunker trade to suffer, as few cargo vessels are leaving the Southern ports. Such bunkers as are arriving here, in a majority of cases, are remaining in port, although some few are risking capture and taking the chance of reaching their European destination.

Foreign cargoes for the week have been loaded for Canal Zone, St. Lucia, Fray Bento, Santiago, Venice, Naples and La Plata. Some of these vessels were loaded before war was declared between England and Germany. It is understood that one of the British steamers which has a cargo for Italy will remain in port for some time or until there is less danger of capture.

LAKE MARKETS

PITTSBURGH

Mine operations unchanged, at close to 70% of nominal capacity. Prices continue very irregular. No definite influence felt in the district on account of the war thus far.

The coal trade of the Pittsburgh district has not been particularly affected by the war thus far, though doubtless it is going to be affected indirectly, through the influences of other markets, which have to do with Tidewater shipments. Line demand has experienced a slight further decrease in the week, stocks being reduced and operations in the steel

industry increasing slightly. The steel trade expects considerably more activity than would have been the case without the war. Ocean freight movement is expected to be restored shortly, at least in a way, and there ought to be a very heavy export movement, seeing that the United States has hitherto been exporting only about 2,500,000 tons of iron and steel a year, while England, France, Belgium and Germany have had the rest of the international market, about 10,000,000 tons a year and are now practically shut off from shipping at all.

The lake coal movement continues disappointing but there are still predictions that shipments will be heavier before the end of the month. Satisfaction is expressed that the decision in the rate case eliminates any possibility of coal freight rates being advanced. Mines are operating at close to 70% of nominal capacity and prices continue very irregular. Circular prices, which are nominal even as to contracts, are as follows: Slack, 80@90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Slight improvement in bituminous, but no real activity as yet. Excess supplies still in consumers' hands. Anthracite finds a rushing war sale in Canada, but little elsewhere.

Bituminous—There is a somewhat better movement all along the line and fewer reports of coal selling at sacrifice prices. It is not expected that there will be any improvement of account till the worst of the war scare is past, as some factories are shutting down, especially in Canada. The effect of the war will be serious on all industries, though it may not last long.

It is becoming more evident each week that the coal in consumers' hands is steadily disappearing, whether the consumption is increasing or not. More coal must be bought from this time on if business is to continue as usual. At present everybody is feeling the effect of the war in one way or another. It is the uncertainty as to the duration of the war that is making most of the trouble.

One or two of the larger companies with headquarters in this district are running their mines at full capacity, on the supposition that there will soon be a heavy European demand for coal, but actual orders are still lacking.

Prices of bituminous are possibly a trifle stronger, on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run, and $2.15 for slack, with slack not as active as formerly. Allegheny Valley sizes are about 25c. lower than Pittsburgh. Only the very best coal can be sold at quoted rates.

Anthracite—There is no improvement in the local or line trade and none is anticipated at present, but Canada is buying urgently. Orders are coming in for hundreds of cars from single concerns in Toronto, while other towns on that side of the border are buying briskly. The idea is that something may happen that will in some way shut off the supply. The International (Grand Trunk) bridge opposite this city is guarded by troops, and it is suggested that the Buffalo end should be guarded also.

The Lake shipment of anthracite has fallen off somewhat for the reason that the agents of the companies cannot get the coal freely, and since the Canadian demand has set in it cut down receipts materially. Shipments for the week were 144,000 tons, which is quite below the Lake average for the past two months. It is said that the dock capacity at Upper-Lake ports is not what it was, and that some of the shipping companies at least will not long be able to keep up the former pace.

TOLEDO

Canadian and Lake shipments not effected by neutrality laws. Possibilities of the European war. Market quiet at the moment but with an excellent undertone.

Shipment on the Lakes is not included in the neutrality laws according to advices to the Toledo customs office from Washington, D. C. This will release considerable delayed coal. Opinions concerning the effect of the European war on the local markets vary but it is generally thought that should the war be a long drawn out affair the coal business of the United States will be benefitted although the first effects will be a slowing up.

It is probable that considerable American coal will be sent to Canada and the demand there will be largely for the smokeless variety. Just at present slack is a drug on the Toledo market and dealers are finding trouble disposing of stocks. Business is reported somewhat dull in some sections but showing improvement in others. Dealers seem to be buying a little more freely. A car shortage is looming up in the near future and in fact some complaints are already sifting in.

COLUMBUS

Operation of mines in most districts is being resumed. Eastern Ohio operators fail to agree with the miners. Coal now being shipped to the Lakes.

The past week has seen a general resumption of mining in the Hocking Valley, Jackson, Cambridge and Pomeroy districts. In the Crooksville section, the scale was also adjusted, and preparations have been made to resume work Aug. 10. On every hand, the situation is clarifying with the exception of eastern Ohio.

Sales managers report a good demand for both domestic and steam grades. Dealers are getting ready for the stocking-up season, which is expected to be active towards the latter part of the present month. Buying of domestic sizes is going on actively and most of the orders are for immediate shipment. It is expected that domestic prices will be advanced after Sept. 1. There is a marked preference shown in the domestic trade for Pocahontas and rescreened varieties.

The Steam Trade is active, although West Virginia coal in the local trade affects quotations. Manufacturing plants have little surplus on hand and they have been waiting for the settlement of the strike before entering into contracts. Very few contracts have yet been closed, but negotiations are progressing. Prices on steam contracts are expected to be about the same as the previous year.

The Lake Trade is now one of the best features of the industry. Some of the larger operators in the Hocking Valley are shipping a heavy tonnage to Lake ports for passage to the Northwest. While the shipments this year will not be equal to last season, a good trade is expected from this time until the close of navigation. Chartering of boats is going on actively and the supply is adequate. The Toledo docks of the Hocking Valley Ry. have hauled 1,281,000 tons since the start of the present season.

Prices in the Ohio fields:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Rescreened lump	$1.60		$1.65	$1.50
1¼ inch	1.50		1.50	1.50
¾-inch	1.30	$1.20	1.35	1.30
Nut	1.15		1.35	1.15
Mine-run	1.10	1.05	1.15	1.10
Nut, pea and slack	0.65		0.65	0.60
Coarse slack	0.55	0.60	0.55	0.50

CLEVELAND

Broader inquiry, but demand is still light. Prices are barely holding on slack and larger sizes are moving slowly. The retail trade is materially improved over a week ago. Lake business does not change.

Excepting in the retail trade, the sales of coal are rather limited. Slack is selling at $1.55 to $1.60 without a large working balance on track. Steam sizes are being sold largely on orders for shipment. The demand is so light and the market in such a weak condition, consignments are not being sent here to any extent.

Pocahontas prepared sizes are short and the Pocahontas Fuel Co. is refusing orders for lump and egg for future shipment. In a letter to one of the jobbers recently, the sales manager of that company said a large South American trade is expected in the near future, which will cause an increase in prices.

Massillon operators, who failed to make a contract with the miners last week, have signed up individually and are quoting domestic sizes, lump and washed nut, at $2.50 at the mines. While no circular quotation is being made on Massillon slack, operators are tentatively naming 95c. at the mines as a fair price. The freight rate to this market is 70c.

Hocking mines have been so greatly hampered by local labor troubles that quotations have been withdrawn for two weeks by many of the companies. These and the No. 8 are the only mines now closed. The conference of the miners and operators of the No. 8 field at Wheeling failed to effect an agreement, and there are no immediate prospects of cleaning this up now. A large amount of coal has been sold to the trade regularly using No. 8 coal.

With new grain arriving at the Upper Lake ports, shipments of coal from the docks to interior points are improving. The betterment is slow, but shippers are preparing to do a larger business the latter part of this month.

Quotations are as follows:

	Pocahontas	Youghiogheny	Fairmount	W.Va. No. 8
Lump	$3.60			
Lump, 1¼ in.		$2 50		
Lump, ¾ in.		2.20@ 2.25	$2.05	$2.05@ 2.10
Egg	3.60			
Mine-run	2.60	2.15	1.95	2.00
Nut		2 20		
Slack	2.35	1.55@1.65	1.70	1.55@ 1.60

CINCINNATI

The market continues sluggish. Production increasing in the idle fields and the demand fails to pick up. Lake movement is increasing in volume. Possibilities of the war situation.

Dealers still show a marked disinclination to buy at circular prices, because of the slow demand, and while operators are firm in their refusal to make concessions, they are selling little coal. Deliveries on old contracts comprise most of the business at present, and few new contracts are now being closed. The sluggishness of the steam market even exceeds that on the domestic side; the resumption of the various steam consumers is slow, and in some cases hardly perceptible.

The European trouble is naturally the subject of much comment. The principal effect hoped for is a marked stimulation of the numerous industries which have been working on short time; on the other hand, a more pessimistic view contemplates the possibility of a still wider depression, due to inability to secure ocean carriers.

DETROIT

Market slow and quiet but generally firm. Shortage of labor. Heavy business anticipated this fall.

Bituminous—The local market has been slow, yet not particularly bad; steam trade has been passibly good in the city, the smaller sizes being in a little better demand and prices steadier than for several weeks past. The domestic trade has fallen off due to the inability of the dealers to secure labor to unload the cars as a result of the heavy demand along other lines that are now starting up.

COKE

CONNELLSVILLE

The coke market shows absolutely no signs of life. The furnaces in operation are evidently fully covered through this month at least, and it is questionable whether any fresh purchases will have to be made even for September. Idle merchant furnaces are showing no disposition to go into blast, particularly with the situation further complicated by the war. The steel mills expect larger production eventually, on account of increased exports, their competitors abroad in the international iron and steel markets being all at war, and thus eventually the consumption of coke may increase through additional steel works furnaces blowing in. Prices may be quoted nominally at the former level: Prompt furnace, $1.75; contract furnace, $1.75@2; prompt foundry, $2.25@2.35; contract foundry, $2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Aug. 1, at 269,575 tons, an increase of 1285 tons, and shipments at 269,591 tons, an increase of 2230 tons, shipments and production being balanced.

BUFFALO

The local coke trade is still "flat." Bituminous will show the first real improvement and that will make it necessary to advance coke. Some think that the iron trade will be first to start, but coal has taken the lead sometimes and may do so again. Few dealers care to handle coke, as they declare there is more difficulty with it now than there ever is when business is brisk. Quotations remain on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.25 for stock coke.

DETROIT

Connellsville foundry is bringing $3 on the local market, Semet Solvay $3.50 and gas house, $3.25, f.o.b. ovens.

BALTIMORE

Coke remains a drug on the market. Officials of the Maryland Steel Co. are figuring, however, that the war may bring them some increased activity in the end.

BIRMINGHAM

While the actual business being done in furnace and foundry coke has not materially improved, still, the operators believe that conditions are better.

CHICAGO

So far as coke is concerned, the situation remains about the same. Domestic is a little more active owing to a slightly better demand. Prices are: Connellsville and Wise County, $5; byproduct egg, stove and nut, $4.75; gas house, $4.25.

SOUTHERN

BIRMINGHAM

Lump coal dull. Steam grades show some improvement. European war creating much inquiry. Bunkering and export business expected to increase in next two weeks.

The market on lump coal does not seem to improve to any extent, very few orders being received, and no immediate increase is looked for in this line. The retail yards are still holding off placing orders, believing that the operators will lower prices, but with fall approaching, the producers are not inclined to reduce quotations, preferring to run on short time rather than sacrifice their lump coals.

While the demand for steam coal is just about the same as last week, the outlook is encouraging for an early resumption of full-time operations because of the European war; inquiries are being received by many of the operators for a large tonnage, approximating 1,500,000, for shipment to Mobile and Pensacola. While it is not certain that this business will be obtained, it is evident that this section will be called upon to supply a large amount of coal through the Gulf ports should the war last long. Birmingham operators expect this business will materialize within the next two weeks.

LOUISVILLE

Increases and decreases caused by foreign wars will about equalize each other. Some improvement with the approach of fall.

Kentucky coals are in better demand than they have been for some time. Some of the operators are of the opinion that the war in Europe, provided it is prolonged, will very largely increase the demand upon the American mines; others figure that increased requirements will be more than offset by similar decreases, so that one will balance the other.

The results from the war on this market will be generally indirect. It is admitted that a large demand on the Eastern coals would have the effect of diverting local fuels into new channels, although but little will reach to the coast. On the other hand, some Kentucky manufacturing enterprises, notably tobacco plants, the entire output of which goes abroad, have shut down altogether to await developments.

Most of the improvement in the demand is normal so far, due to the fact that the summer is drawing to a close and that dealers are stocking up. Prices remain unchanged from a week ago.

MIDDLE WESTERN

INDIANAPOLIS

Mining slightly improved, due to increased domestic demand for winter storage. Inquiries from factories better. Indianapolis retailers make their second summer advance in the circular.

There is little change in the Indiana situation. The demand for domestic grades shows some improvement, as retailers have made their second summer advance, and it has stimulated the buying of the winter stores. Railroad buying is somewhat better, but not up to expectations.

There has been a little gain in mining operations, more particularly in the Brazil block field, but there are signs of slackening again, now that threshing of wheat and oats is practically over. The mines have had a month of continuous work, and there will now be a lull until the regular fall rush opens. The southern Indiana mines report more inquiry from factories, which seem to be preparing for larger operations.

Indianapolis retailers have advanced prices 25c. a ton and guarantee only August delivery at the new basis, though it may remain longer.

The new schedule of retail prices in this city is:

Anthracite, chestnut	$8.25	Winifred, lump	$4.50
Anthracite, stove and egg	8.00	Hocking Valley, lump	4.50
Anthracite, grate	7.75	Luhrig, lump	4.50
Pocahontas, forked lump	6.00	Luhrig, washed egg	4.75
Pocahontas, shoveled lump	5.50	Cannel	6.00
Pocahontas, mine run	4.50	Linton No. 4 lump	3.50
Pocahontas nut and slack	3.75	Linton No. 4 egg	3.50
Blossburg	5.50	Sullivan No. 6	3.50
Jackson (Ohio)	5.25	Indiana washed egg	3.75
Kanawha, lump	4.50	Brazil block	4.50
Kanawha, egg and nut	4.25	Connelsville coke	6.00
Pittsburg, lump	4.50	Citizens egg coke	6.00
Raymond, lump	4.50	Citizens nut coke	6.00

CHICAGO

Local operators cautious over future commitments. European war seriously affecting the situation. Large shortage of Hocking grades.

Carterville operators are expecting a good demand from the domestic buyers. On lump and egg coal, the larger producers are holding for $1.50 at the mines and accept lower prices only on orders placed prior to Aug. 1. Smaller operators have fixed $1.35 as the minimum on lump and egg. A few of the larger companies in the Franklin County field report that they are obtaining $1.60 for lump and egg. In the central Illinois field, screenings are on a decline.

The Anthracite situation shows slight improvement. The leading companies report that the market is considerably behind what it was at this time last year, some estimates placing it at 20 per cent. less.

Small shipments of Hocking coal are being received but orders are probably already in excess of what can be obtained for some time. The opening price is $1.50, the same as the market closed at on Apr. 1.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07	$2.45@2.65	$2.12	
Steam lump	1.87@1.92		1.97	
Egg		2.45@2.65		$4.05
Mine run	1.87	2.15@2.25	1.87	3.30
Screenings	1.52@1.57	1.75@1.80	1.52@1.57	

Quotations on Harrisburg coal are: Domestic lump and egg, $2.40@2.55; steam lump, $2.25; mine-run, $2.15@2.25; screenings, $1.75@1.80; No. 1 nut, $2.55; No. 2 nut, $2.40.

Carterville prices are: Lump and egg, $2.40@2.55; No. 1 washed, $2.55@2.70; No. 2 washed, $2.35@2.40.

ST. LOUIS

Market generally buoyant on most lines. Demand stronger and advances in the circulars. Exceptionally heavy business anticipated this fall.

Many inquiries, with prices advancing, indicates what may be expected in the next three or four weeks. Lump and egg is extraordinarily strong in the high grade market, while nut and screenings and the steam sizes are slow. No. 1 washed has picked up a little in some places, but in a general way it has not improved since last week. In the Standard market, screenings are still on the downward path, with lump advancing slightly. High grade screenings are also dropping off.

Anthracite still continues to move promptly and there is nothing to complain about in the coke market. Smokeless, however, is still slow.

The retailers report exceptionally heavy business for August, and especially on the high-grade coals. Manufacturing plants are not in the market now for various reasons, and this has caused a surplus of steam sizes to accumulate.

In a general way there is nothing to complain of at this time in the local market. The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump				$0.90@1.00	$1.10
3-in. lump			$1.30		
6-in. lump	$1.30@1.60		1.40	1.05@1.15	1.20
Lump and egg	1.85@2.15	$2.15			1.15
No. 1 nut	1.10@1.30				
Screenings	0.70@0.75		0.80@0.85	0.55@0.65	0.60
Mine-run	1.00@1.15			0.75@0.80	
No. 1 washed nut	1.40@1.50	2.25	1.50		
No. 2 washed nut	1.25@1.30		1.35		
No. 3 washed nut	1.15@1.20				
No. 4 washed nut	1.10@1.15				
No. 5 washed nut	0.70@0.75				

The Williamson and Franklin County coals take a rate of 67c. to St. Louis, and the retail price is $3.25 to 3.50 per ton. Murphysboro coal takes a 2½c. lower freight rate, and retails at $4 a ton. All other coals take a rate of 52c. a ton to St. Louis. Sparta retails at 11c., Mt. Olive at 11c., and Standard at 9 and 10c. a bushel; 25 bushels to the ton.

The August Anthracite circular (wholesale is: Chestnut, $7.45; egg and stove, $7.20; grate, $6.95. Retail prices are 95c. higher.

KANSAS CITY

Domestic trade a little slow, due to the strike last week. Local and outside trade has profited already by the large wheat crop.

Coal trade in Kansas City was improving to a marked extent until the strike in the Kansas district, Aug. 3. The wheat crop made large business for the thrashing. The temporary financial uneasiness affected the city trade. The most noticeable effect of the strike locally is in steam plants usually burning Cherokee products; those not having any surplus are employing Missouri screenings which are cheaper and satisfactory in an emergency.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for July and the first seven months of this year and last year were as follows:

	July		7 Months	
	1914	1913	1914	1913
Phila. & Reading	831,965	902,763	6,863,613	7,761,147
Lehigh Valley	1,026,225	1,011,987	7,181,300	7,604,118
Cent. R.R. N.J.	708,891	775,550	5,097,978	5,351,214
Del. Lack. & West.	826,771	871,677	5,425,277	5,661,037
Del. & Hudson	671,682	589,589	4,087,557	4,094,128
Pennsylvania	406,769	439,912	3,623,848	3,607,018
Erie	717,201	683,161	4,707,228	4,762,953
Ont. & Western	202,362	213,213	1,350,845	1,498,091
Total	5,391,857	5,487,852	38,337,646	40,339,706

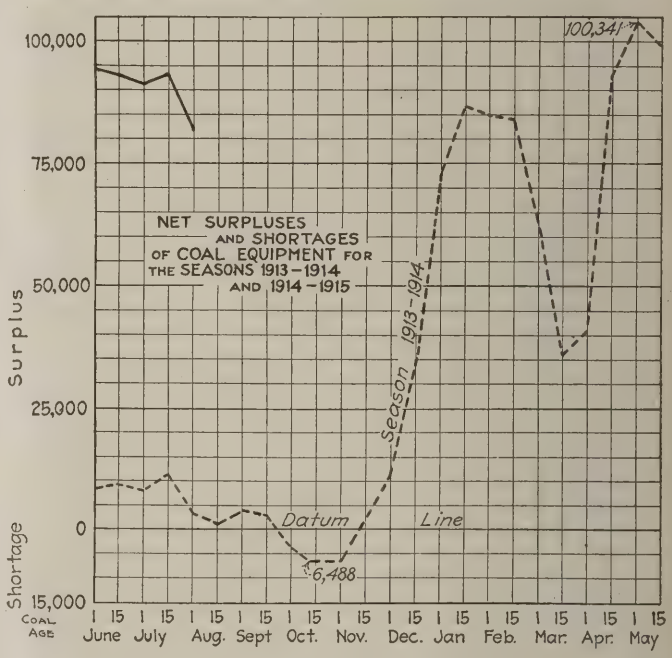
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Aug. 1, as follows:

	Surplus	Shortage	Net*
New England Lines	1,281	0	**1,281**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	17,718	0	**17,718**
Ohio; Indiana; Michigan; Western Pennsylvania	41,557	0	**41,557**
West Virginia, Virginia, North & South Carolina	5,447	0	**5,447**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	3,965	0	**3,965**
Iowa, Illinois, Wis., Minn.; North & South Dakota	6,135	0	**6,135**
Montana, Wyoming, Nebraska	984	0	**984**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,807	82	**1,725**
Texas, Louisiana, New Mexico	275	28	**247**
Oregon, Idaho, California, Arizona	3,115	0	**3,115**
Canadian Lines	0	0	**0**
Total	82,284	110	**82,174**

	Apr. 1	Apr. 15	May 1	May 15	June 1	June 15	July 1	July 15
Surplus	41,055	92,139	100,370	99,664	94,770	93,520	91,280	93,509
Shortage	615	24	29	313	7	49	430	292
Net*	**35,851**	**40,440**	**92,115**	**100,341**	**99,351**	**94,763**	**90,850**	**93,217**

***Bold face** type indicates a surplus.



FOREIGN MARKETS

GREAT BRITAIN

Business is practically at a standstill owing to the European crisis. The British Admiralty authorities have practically placed a lien on the collieries producing Admiralty-List coals.

Quotations are, nominally:

Best Welsh steam	$5.16@5.40	Best Mountainshires	$4.08
Best seconds	4.56@4.80	Seconds	3.84@3.96
Seconds	4.20@4.32	Best Cardiff small	2.58
Best dry coals	4.20@4.32	Seconds	2.46

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those of Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash.

COAL AGE

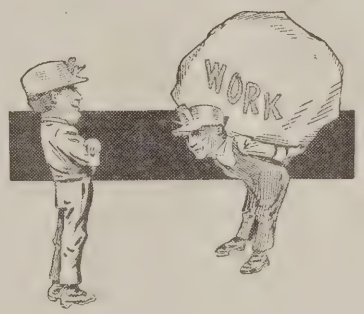
Vol. 6 NEW YORK, AUGUST 22, 1914 No. 8

To the Beginner

By Berton Braley

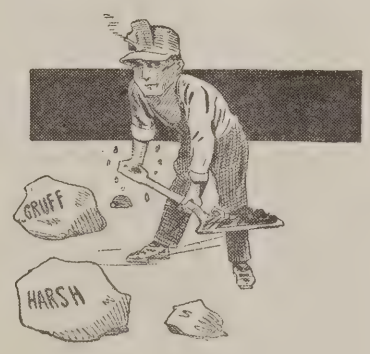
Written expressly for Coal Age

So you think the work is heavy
In the coal mine dark?
Well, it ain't no bloomin' picnic
In the public park;
But you'll find it ain't so awful
As it first appears,
Though it sure is mighty wearin'
For the FIRST TEN YEARS.



To the guy who's just beginnin'
It's a durn tough job,
To be underground a toilin'
With the coal-streaked mob;
But when you're hardened to it
Why, the prospect clears,
Though it's mighty lumpy pickin'
For the FIRST TEN YEARS!

You'll find the work is dirty
An' the coal is rough,
An' the pitboss has a manner
That is harsh an' gruff;
With the perspiration drippin'
From yer nose an' ears,
You'll think your job's a hard 'un
For the FIRST TEN YEARS.



An' will it grow more easy
As the long days flit?
Well, if it don't get easy
You'll get used to it;
So drill away contented
An' we'll give three cheers,
Though it's hard to be a miner
For the FIRST TEN YEARS.

Ideas and Suggestions

Environment as a Factor in Individual Efficiency

Do you mine owners realize that environment is a great factor in the cost of your operations? Have you ever looked over your men to see if you are not allowing some of the best of them to grow stale for lack of a change or promotion to increased responsibility?

Listen to this!

For ten years a man held a relatively important position as manager at one of the offices of a big coal-mining concern. He was finally promoted and placed in the general office. His duties required him to visit the mines in the capacity of a general inspector to observe and study conditions and especially to see that too many men were not employed in any department.

One day he visited the office where he had been manager for so many years. One of his old men was now in charge. The rest were in the same relative places. The desk arrangement was the same and there were the same number of men.

Something struck him as strange amid all the familiar scenes. What was it! The men didn't seem to be busy. Why? It seemed to him he used to keep them busy. Now there seemed to be too many of them. How was that? He could remember that some of them used to have to stay at night to get out the work. He observed that a few were rolling cigarettes and for periods of twenty or even thirty minutes there were general conversations about politics, war or religion—all foreign to the work in hand. What was the matter with the place? It was just the same as he left it and yet it didn't look right.

The Value of System

A week later it dawned on him. In the general offices he observed there was a systematic arrangement of work. The men worked shorter hours, got away in the summer months in time to see most of the ball game and had Saturday afternoons off—but during work hours they WORKED. Smoking was not allowed and no general conversations were in order. There was no night work. A vast amount of work was done easily and the men all seemed pleased in doing it.

Like a flash the experience of changed environment bore fruit. He saw what was wrong in his old office. The work hours there were too long and there were too many men. He had been blinded by too close contact coupled with the lack of broader experience.

Just then the general manager rang for him and said:

"We are spending too much money at X mine. Too many men there. Looks like the office force is top heavy. You worked there a long time and ought to know what is the matter. See what you can do."

It was easy for the inspector. Already awake to the occasion it required but little study to accomplish reductions in force which previous to his change he would never have considered possible. New rules and new hours were invoked. The saving per month amounted to more than his own salary. He took an inventory of his former self and how he used his own working hours. Results were seen in evidence. On one trip he saw something entirely out of his line but indirectly affecting operations which seemed worth looking into. He told the "G. M.," who was able to work out a monthly saving of several hundred dollars for the concern as the result of it.

This man from being a mere department head soon became a valuable officer to the concern and saved his employers his own salary many times over during a year. BUT REMEMBER, his talents were buried for years and might never have been developed except for a change in environment.

There's the essential fact of the story—and maybe it will serve to point a moral.

You may have just such a man in your employ. Give him a change and try him out in a new position. You know responsibilities gravitate to the fellows who can shoulder them. Those who can't get under responsibilities you don't really need anyway. The ONE or TWO you may discover who CAN, will make our effort worth dollars to you.

Don'ts for Coal-Mine Employees

The following instructions and safety regulations were taken from an interesting little book of rules gotten out by the Susquehanna Coal Co., of Wilkes-Barre, Penn. This plan of instructing employees is one that might be imitated to advantage by coal companies in every field.

1. Don't forget that the safety department is intended to assist you in protecting yourself and others, but cannot take your place.
2. Don't forget that we will appreciate any suggestions that may tend to further the safety of employees.
3. Don't try to get on a cage or car before it gets there or after it has started to leave, and use particular care in and around shafts.
4. Don't forget that it is safer to walk than to ride where separate travelingways are provided.
5. Don't try to couple or uncouple cars when in motion. It is dangerous, and you are breaking the mine law as well as a company rule.
6. Don't forget when going up or down a travelingway, or about to cross lifts or levels, to stop, look and listen.
7. Don't attempt to couple cars on the short side of a curve.
8. Don't attempt to perform unfamiliar work without previous instruction.
9. Don't stand within swing of tools in the hands of other workmen, nor in front of rivets, bolts or nuts being chiseled off.
10. Don't forget that where there is a live wire there is danger.
11. Don't think because a wire is broken it is harmless; if necessary, remove it with sticks or boards.
12. Don't fail to look out for loose or torn clothing and gloves when working around moving machinery.
13. Don't neglect, when removing cotton from a lamp, to make sure that it is thoroughly put out, and do not throw matches away carelessly.

14. Don't lose your head in case of accident; try to remember the right thing to do—it may save some serious result.
15. Don't fail to report any unusual happening about the colliery or in the mines; it will save future trouble and will be appreciated by your foreman.
16. Don't stand in back of cylinder heads or in front of a crank while engines are in motion.
17. Don't talk to any engineer while his attention is required by his machinery.
18. Don't touch electrical equipment unless it is in your line of work—it is dangerous.
19. Don't fail to observe all rules relating to electrical equipment, whether in your line of work or not.
20. Don't be satisfied with a "good enough" hitch—make it right.
21. Don't allow sharp tools of any kind to lie around carelessly; don't fail to put them in their proper places.
22. Don't fail to observe any warning given you by any person that may affect your own or another's safety.
23. Don't under any circumstances go into any unnecessary dangers.
24. Don't use tools which need dressing or repairs.
25. Don't fail to have all scaffolds erected in a secure and safe manner.
26. Don't fail to remove all dangers from hanging icicles.
27. Don't fail to keep a constant lookout for danger when walking about railroad and mine tracks.
28. Don't fail to obey the rule prohibiting smoking.
29. Don't cross over a trip of cars—walk around it.
30. Don't fail to observe all rules for the handling of explosives.
31. Don't misuse your safety lamp—it is your safeguard.
32. Don't fail to examine your safety lamp and assure yourself that it is in good condition.
33. Don't fail to extinguish the light at once and return your safety lamp to the person in charge; if it is injured or defective, reporting same.
34. Don't remove an accumulation of gas by brushing it, where it is practicable to be removed by bratticing.
35. Don't fail to immediately extinguish a feeder of gas that you may ignite; if unable to do so, notify the official in charge at once.
36. Don't fire any blast when starting batteries or chutes before notifying the men on the gangway.
37. Don't start a battery when blocked 6 or 8 ft. above the battery. Notify the official in charge of said condition and await his orders.
38. Don't travel on any gravity plane or slope while cars are being hoisted or lowered.
39. Don't fail to immediately report to the official in charge anything you may discover wrong that may lead you to suspect danger to yourself or others.
40. Don't fail to observe all provisions of the mine law.

The Guasco Toximeter

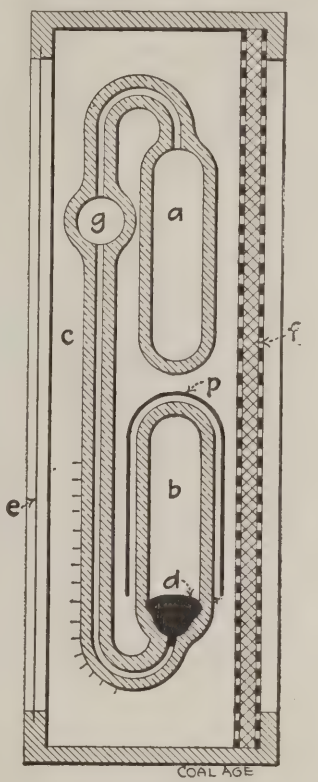
The *Journal de Physique Elementaires* recently contained an interesting article, by Monsieur Abel Buguet, on a new type of indicator made by Messrs. Guasco & Co., Paris, France, and termed the "Toximeter." Its purpose is the indication of the amount of carbon monoxide in air, particularly with relation to those amounts which may prove dangerous to human life.

The chemical analysis of the air by the ordinary methods of procedure are more useful in the laboratory than in commercial practice, and hence various attempts have been made to reduce such measurements to processes that can be carried on, as far as possible, continuously and automatically. In 1889, Pitkin and Niblett used a mercury thermometer, the reservoir of which was covered by finely divided platinum. This was installed adjacent to a second thermometer identical with the first, except that its bulb was not platinized. In this arrangement, advantage was taken of the fact that finely divided platinum becomes heated in the presence of carbon monoxide, and the difference of temperature of the two thermometers was sensibly proportional to the percentage of carbon monoxide present. Unfortunately, a dangerous amount of carbon monoxide only registers a difference of one-tenth of a degree in the readings of the two thermometers, and this is too small a difference for commercial practice.

Later, Monsieur Racine, applying the same property of platinum, obtained in the presence of carbon monoxide a temperature that caused the explosion of a filament of guncotton, the rupture of which allowed a bell to be rung. This, also, is hardly suitable for practical use, one reason being that there might be the danger of the filament not being replaced after use. Monsieur Guasco, however, has now utilized the same property of platinum, applying it to one of the bulbs of a differential thermometer similar to that of Leslie.

The device is illustrated in the accompanying diagram and consists of two glass bulbs *a* and *b* connected by a capillary tube *c*. A smaller bulb *g* is blown near the top of the capillary tube, as shown in the cut. The purpose of this bulb is to prevent the colored liquid that is forced into the capillary tube by the expansion of the air in the bulb *b* from passing over into the bulb *a*.

Both the bulbs *a* and *b* contain air. The bulb *b*, as shown in the figure, is covered with a thin film of finely divided platinum *p*, which absorbs the carbon monoxide gas when present and heats, thereby raising the temperature of the air in the bulb *b* above that in the bulb *a*. The bulb *b* contains a small portion of colored liquid, *d*, which, by the expansion of the air in this bulb, is forced upward in the capillary tube *c*. This tube is calibrated to show the difference of temperature between the two bulbs *a* and *b*.



The Guasco Toximeter

In this instrument, advantage is taken of the greater expansion of the air in *b*, due to a very slight difference of temperature between the two bulbs. Also, as in the ordinary thermometer, the effect of the expansion in the bulb is greatly magnified by the capillarity of the graduated tube *c*. The instrument is shown inclosed in a case, on one side of which is a glass window *e* for observing the reading of the thermometer; while on the other side is a porous partition *f*, which prevents strong air currents from striking the bulbs of the thermometer, but permits the diffusion of gas from the outside into the case.

It has been suggested to make this instrument automatic by replacing the colored liquid with mercury, which, ascending in the capillary tube, would close an electric circuit at a certain point or danger line. By this means, a small bell could be rung or an electric lamp made to glow and give the alarm of the presence of the gas.

A Visit to the British Experimental Station at Eskmeals

By Samuel Dean*

SYNOPSIS—The British Experimental Station accepts many of John Verner's conclusions, as published in these columns. There is an inrush of air, as well as an outrush probably throughout the duration of all explosive phenomena. The article states that narrow workings are more subject to explosions of coal dust than wide, and that the end of a blind heading is freer from that menace than a point along the rib.

A party left Blackpool by train for Fleetwood and sailed for Barrow on one of the most lovely days of an English summer. All stayed overnight in Barrow, and the rest of the party, not being interested in mining, I finished the last part of the journey alone, traveling up to Eskmeals around the edge of the Cumberland mountains, where Lakeland, the famous holiday resort, is situated, once the home of Wordsworth, Ruskin, DeQuincey and others.



The Experimental Galleries at the Eskmeals Station

The experimental station is not in an outlandish spot, being only 10 min. walk from the railway station. It is on the coast or west side of the railroad, located among sand hills. On the east side there are beautiful farms. The residents are accustomed to loud reports as Messrs. Vickers test their big guns along the shore. Sea fowl and game abound in the district.

The station is well equipped; there is excellent housing accommodation for the scientists, with well furnished offices, laboratories, etc. There are two tubes, one 800 ft. long, 7 ft. 6 in. in diameter, the other 400 ft. long and 3 ft. 3 in. in diameter. They are the same galleries that were used at Altofts by the Mining Association of Great Britain, have been taken over by the Home Office Department of the British Government.

Shale Dust of Value Where Gas Is Present

Recent efforts have been made to explode a one-to-one mixture of coal dust and shale dust in atmospheres containing 1, 2, 3, 4 and 4.5 per cent. of methane, and although I am not permitted to state the results at this time, I am glad to be able to say that the efficacy of shale dust as a preventive of explosions has been further proved, and that an explosion of firedamp alone is trifling compared with an explosion of coal dust.

As a special favor, Doctor Wheeler, who has charge of the station, prepared an experiment, which I had suggested, to prove or disprove the counter-current theory; and I may say at once that Mr. John Verner is quite correct. Mr. Verner's views may not be well understood, and on that account they are given here. He made numerous observations at close range, and this was what he found:*

When a shot is fired, say at the face of an entry, the air and what dust there may be present are driven away from the face by the expansive force of the heated and burning gases from the shot. This expelling force, however, is instantly checked apparently through the effects of a growing depression at the face, caused by the rapid cooling of the gases there and their consequent rapid shrinkage in volume. This depression is immediately filled by an inrush or backrush of air along the bottom toward the face, while the heated gases in the upper part of the entry keep on their course outby. The force and volume of the inrush of air along the bottom vary considerably in the different observations, the conditions in this respect being evidently determined by the size of the depression near the face. In view of this it might be rightly concluded that, if the inrush of air along the bottom is of sufficient volume, and carries with it sufficient dust, and if it reaches the heated gases near the face before they are cooled below the ignition point, then inflammation with explosive effects may take place.

The late Sir F. A. Abel's opinion was that a dust explosion was really made up of numerous distinct and local explosions which follow each other so quickly that the explosion may be considered continuous, and facts developed since he (Sir F. A. Abel) made his experiments and investigations show the correctness of his views in that respect. Sir Frederick further concluded that the same conditions which cause the explosive ignition of the dust in the first local explosion must be present to cause the explosive ignition of the dust in each subsequent local explosion. That being true, it follows that, if explosive inflammation is effected in the first local explosion by the injection of the air-and-dust mixture into the highly heated or burning gases, explosive inflammation must be caused in every subsequent local explosion in the same manner.

*Delagua, Colo.

*"Trans.," Inst. Mining Engineers, Vol. XLVI, Part 2.



The Open Ends of the Tubes



The Mouth of the 90-In. Tube

The question might be asked: Can the air inrush exist in the face of an explosion, and can it, against an apparently superior force, under seemingly extremely adverse conditions make sufficient headway, to produce the effects claimed? It seems difficult to believe, but nevertheless it has been shown that under favorable conditions the explosion of the shot and the starting of the air inrush may be practically simultaneous occurrences. In one of the Altofts experiments the presence of the air inrush was noted within a twentieth of a second after the explosive wave had passed a given point.

It might be difficult to establish by direct proof the presence of air inrushes during the progress of an explosion, but their existence can be established indirectly, and I believe that it can be readily shown by tests at Altofts, or at any other experimental mine or gallery, that the occurrence of a dust explosion is not probable if the conditions controlling the inrush of air are unfavorable.

Proving the Inrush Theory

The experiment mentioned above was carried out in the small gallery 3 ft. 3 in. in diameter. A mixed dust was used containing 70 per cent. coal dust and 30 per cent. incombustible dust (fuller's earth); this was done to slow down the explosion and allow more time for observing the air actions at the mouth of the gallery. Across the mouth of the tube a board, 6 in. square, was supported by four coil springs, and from the board a rod 6 ft. long projected out into the open. There was a white mark on the rod, which passed through a stationary upright painted black. The rod moved back and forth as the air movements forced the board outward or inward. Half a pound per linear foot of mixed dust was strewn along the gallery to within 20 ft. of the mouth, and 1½ lb. of black powder, stemmed with 8 in. of dry clay, was fired from the cannon placed 50 ft. from the closed end of the gallery.



Diagram Showing Variations in Pressure during Explosion

The Board Is Sucked in and Blown Out of the Adit

We observed the movements of the board and rod from a point 100 ft. from the mouth of the tube and nearly at right angles to it, being protected by curved iron plates containing small sight holes, with heavy wood ties and logs overhead.

A whistle was blown immediately before the shot was fired, and the first action we observed was a cloud of dust blown out of the mouth of the gallery. This was caused by what might be called the concussion wave from the cannon; there was no flame in this dust cloud. Then immediately there was an air inrush, then an outrush with little dust, then another inrush, then an outrush with flames, which appeared first at the top of the mouth of the tube. The final movement was an air inrush as the photograph shows. The second air inrush was very strong, accompanied by a loud sucking or whistling noise as the air rushed into the tube.

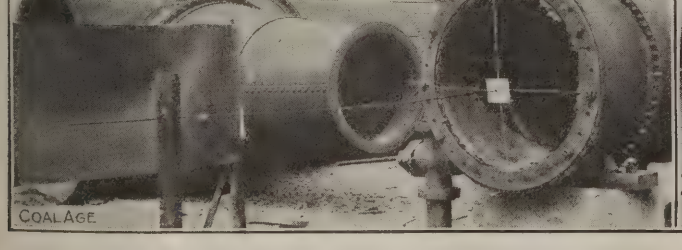
The movements were as follows:

Dust cloud.
Air inrush.
Outrush with little dust.
Strong air inrush.
Outrush with flame.
Inrush.

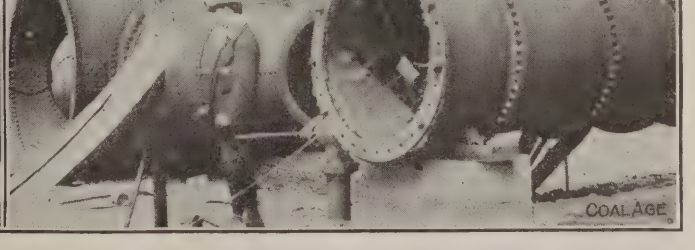
It will be noted that we were able to count two inrushes before the flame appeared, and in a longer gallery there would doubtless be many more.

No originality is claimed for this test. Doctor Wheeler could tell me exactly what would take place before the shot was fired. His pressure diagrams from violent explosions show the pulsations clearly.

It appears that during an explosion the pressures in front rise and fall in an alternating manner. The peaks of the diagrams show when the obstructing pressure is



A Small Board Supported by Springs and a Painted Rod Showed the Movements of the Air



As Is Clearly Shown, the Last Movement Was an Inrush, Drawing Board and Rod into Tube

greatest and the fall is probably caused by air rushing under the advancing explosion wave to fill the partial vacuum behind. Thin sticks of "cordite" are used to indicate the position and length of flame in explosions; this ignites easily and burns slowly.

Face Shots Least Dangerous

It has been found at Eskmeals to be extremely difficult if not impossible to start a dust explosion from a shot fired from the face or closed end of the gallery, and to assure success the shots are fired 50 ft. from the closed end. It is also much easier to start a dust explosion in a small than a large area, showing that probably the most dangerous shots fired in coal mines are those in narrow crosscuts back from the face, and, of course, shots on main haulage roads which ought not to be permitted without special precautionary measures, such as heavy shale dusting for 100 ft. each side of the shot.

The flame from a blown-out shot of 1½ lb. of black powder is 14 ft. long, and 5 lb. of coal dust placed in front of the shot increases the length of the flame to 140 feet.

Where shale dusting is relied upon, it is well to have as fine dust as possible. All should pass through a lamp-gauze mesh, and 50 per cent. through a 200-mesh sieve (200 perforations to the linear inch).

Extracts from a Superintendent's Diary

Generally our young men get "trimmed" when they match wits with the City fellows, but today some of our boys reversed the order of things.

For several days a glib-tongued young man has been sojourning in our camp introducing a new form of accident policy, designed especially (so he says) for the mining fraternity.

Before being sent out on this public-spirited mission, he was coached by the general agent of his company and now he has a set speech which he rattles off at every opportunity. The general agent undoubtedly received his information about the hazards of mining from the Sunday Supplements. At any rate, this pupil assures every miner he meets that probably tomorrow or the day after he can count on being blown into at least a thousand pieces. And the inhabitants of the camp who are fortunate enough to be able to earn their living above ground are in quite as much danger because no one can foretell the moment the entire village is to be swallowed up by a mine cave.

The first miner who encountered the agent was so amused at the "spiel" that he refused to ridicule it, but instead called all of his "buddies" within hearing distance to come and get information. Naturally there were a few points that the solicitor felt rather doubtful about, and whenever he intimated that he was willing to be educated, his audience proceeded to hand out information, much of which was of a character calculated to make even the creator of the Sunday Supplement stories envious.

One thing led to another until finally a trip into the mine was suggested to enable Mr. Agent to complete his education. Some of the men assumed that the Super's sense of humor would not allow him to interfere when permission was requested to make the trip and in that they were not disappointed. In fact the Super. found himself at the manway entrance this afternoon impatiently waiting.

The Insurance Agent Takes a Trip Underground

All the way down the manway the bewildered agent's guides supplemented the impressions which he had received from his general boss by new facts, which became purposely more terrifying as the distance from the mine mouth increased, until at last, as the bottom of the slope was reached, the wretched fellow was about of a notion to turn back. This being exactly the state of mind required to make a success of the plot, the final maneuvers were not long delayed.

Just as the party turned into the first abandoned entry off the main slope, two men hiding in one of its room necks knocked out a prop under a rather large piece of drawslate and it fell with a loud boom.

Because of the fact that I had exacted a promise from the men that the fellow should not be permanently disfigured, they did not let him run far in the darkness, but he ran far enough to get bumps on all four sides of his head and one of his eyes won't behold daylight for several weeks at least.

As he was led past me at the manway entrance on his way out, he was hardly recognizable. Even his lips were unnatural, probably because of the mine water they encountered when he stumbled into one of the small pump sumps.

I rather imagine he will shift avocations when he recovers.

Uncompressed Oxygen

The difficulty in using oxygen in the compressed state is that it must be kept charged in heavy cylinders. Instead of using strong mechanical containers, chemical constraint can be substituted. Thus oxone is a substance in which oxygen is held in chemical bonds, but is releasable by the application of water. Just as water reacts with calcium carbide and forms acetylene gas and lime, so water reacts with oxone and forms oxygen and sodium hydrate.

A pound of this reagent holds 2.2 cu.ft. of gas or 60 liters of oxygen at normal pressure and temperature. Thus a pound of oxone should furnish a man enough oxygen for 30 min. of use. The oxygen evolved is said to be 99 to 100 per cent. pure, the only impurity consisting of a slight vapor caused by the energy of reaction. This is readily absorbed by passing the gas through water. The gas is then of 100 per cent. purity.

Oxone is a commercial preparation of fused sodium peroxide of specific gravity 2.43. It is hard, but not brittle, and is capable of being cast into any convenient shape, and it is said it can be stored without danger and even without deterioration if protected from moisture.

The list price of this reagent as sold by the Roessler & Hasslacher Chemical Co., 100 William St., New York, is 45c. per lb. in 10-lb. tins.

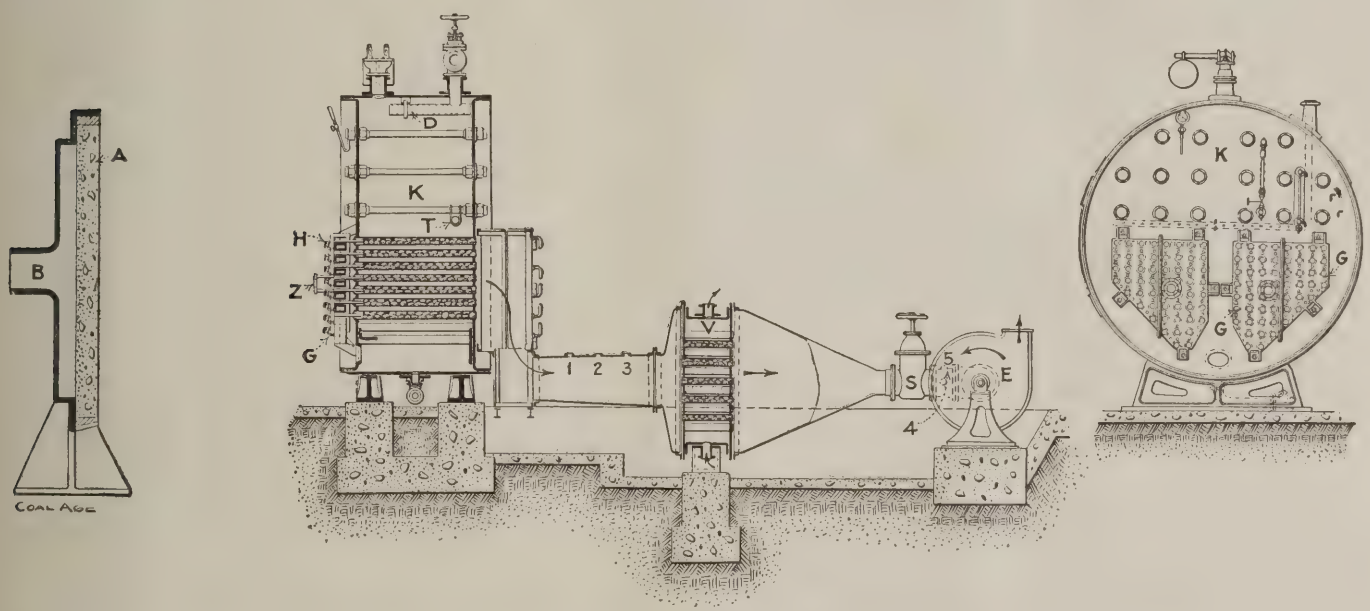
There are two unions in Germany, one socialist, the other Christian. The latter refused to order a strike in the last two big walkouts, when all the other men refused to work. The number of men in the Christian Miners' Union has fallen from 84,384 to 63,192 in the last two years. During the recent German strikes, the militia had to be called in to protect the strike-breakers and the "Christian" union men.

Flameless Surface Combustion for Boiler Heating

By O. Dobbelstein*

SYNOPSIS—Tests of a boiler designed for flameless combustion by Prof. Bone developed an average efficiency of 89 per cent. and an evaporation of 120 lb. of water per 10 sq.ft. of heating surface, the combustible employed being coke-oven gas. An experimental boiler for the combustion of tar oil developed an average efficiency of 82 per cent., with an evaporation of 240 lb. water per 10 sq.ft. of heating surface.

A discovery made, simultaneously, by Prof. W. Bone, of Leeds, England, and R. Schnabel, of Berlin, Germany, is that a mass of porous fire clay, or other refractory material, through which is passed a burning mixture of gas and air, the latter in slight excess of the amount necessary for complete combustion, soon becomes heated to incandescence, without the appearance of a flame.



Figs. 1, 2 and 3. Details of the First Experimental Boiler

In Fig. 1, *A* represents the refractory material and *B* the gas chamber for mixing the gas and air, in the correct proportions. This mixture is forced through a diaphragm, rendering the fireclay white hot, but with no flame on the surface. The combustion is concentrated in the interstices of the fireclay and is most intense at the exterior surface.

So far as the coal-mining industry is concerned, the chief interest in this discovery would seem to lie in its application to steam generation; and, with this in view, an experimental plant was constructed by the Friedrich Krupp Co., of Essen (Germany), under instructions furnished by Prof. Bone. Tests were conducted at the Hanover mine, with the assistance of the Mine Boiler Inspection Co. of Dortmund.

The boiler is shown in cross-section in Fig. 2, Fig. 3 being a front elevation. The design was that of a drum, 120 in. in diameter by 49 in. long, in which are 110 three-in. diam. tubes. In the front end of each tube is a plug of fireclay pierced by a ½-in. hole beyond which the tube is filled with refractory material.

The burnt gas, after leaving the boiler, goes through a feed-water heater provided with 103 tubes, which, also, are filled with refractory material. From the heater, the gas is drawn through an exhaust fan.

In operation, a mixture of gas and air is drawn through the boiler tubes, air being added until the flame disappears in the mass of fireclay and the latter becomes white hot. The plug protects the end of the tube, as the temperature reaches 1600° C. (2900° F.) just beyond it.

The temperature in the tube is very uneven, 70 per cent of the evaporation taking place in the first third of its length, 22 per cent. in the next third and 8 per cent., only, in the remainder. The circulation is consequently brisk. The exhaust gas leaves the boiler at a temperature of 330° to 350° F. and the feed-water heater at 200° to 230° F.

During test, the boiler was heated by the gases from the coke ovens, which had already passed through the apparatus for extracting ammonia, tar and benzol, but had not been freed from either sulphuretted hydrogen or cyanogen.

The Refractory Material Crumbled

After being in operation about three weeks, it appeared that the fire-resisting material in the tubes had crumbled or turned to cinders due to the high temperature. Moreover, the duty had fallen off perceptibly from the original amount of 120 lb. per 10 sq.ft. of heating surface at 115 lb. pressure because the granular mass in the tubes of the water heater had become sticky from leaking water and

*Essen, Westphalia.
Note—Translated and abstracted from Glückauf, of Apr. 4, 1914, by Henry B. Binsse.

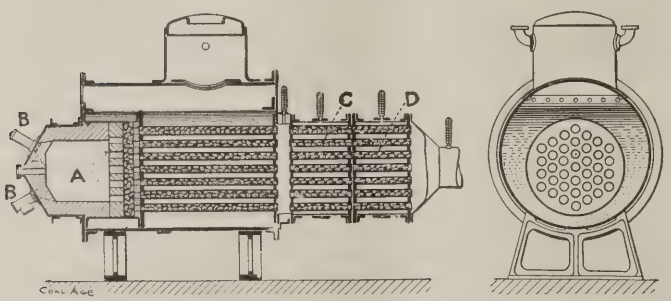
sulphur compounds, so that the exhaust fan was no longer able to draw gas enough through the steam-heating tubes.

The refractory material was renewed in both the boiler and heater and, again, the boiler worked for several days at the original efficiency. The English engineer representing Prof. Bone was dissatisfied with the tests, in which the efficiency ranged from 87 to 91 per cent., the refractory material being poor and the gas cocks too small.

Although this performance, especially the evaporation per square foot of heating surface, showed a great falling away from the published claims, still it marked a distinct step in advance in comparison with other steam-generating methods, if the process could be relied upon for steady working. Unfortunately, this had not been possible, so far. After a few weeks the tubes in the heater again became stopped up and the run was discontinued.

Another Set of Tests Were Made

In February, 1914, the trial was renewed, after an external examination of both the boiler and the heater. It was found that there was a slight scale formation upon the front end of the tubes which increased to a thickness of ⅛ in. on the rear end. The boiler had been under steam for about three months, in all. The copper



Figs. 4 and 5.—Cross-Section and End View of Second Boiler

tubes of the heater were so corroded that they had to be replaced.

At the second trial, the tubes were filled with a coarser-grained material. The results of this run demonstrated that a higher evaporation duty than 125 lb. per 10 sq.ft. of heating surface at 115 lb. pressure could not be obtained from the coke gas used and from tubes of small diameter. The boiler efficiency was 88.3 per cent.

The February trial further demonstrated that the refractory material employed was not able to meet the exactions demanded and that the boiler construction employing small-diameter tubes is not the most advantageous. It is proposed to make further experiments with an improved design of boiler.

Surface Combustion with Oil Fuel

Another trial was made by the Friedrich Krupp Co. of a boiler furnished by the Berlin-Anhalt Machine Co. for the consumption of tar oil. The construction is clearly shown in the cross-sections, Fig. 4 and Fig. 5. The dimensions are 51 in. in diameter by 67 in. long, with 37 three-in. tubes, while the total heating surface is 130 sq.ft. Two feedwater heaters, *C* and *D*, are attached directly to the rear end of the boiler.

The oil, heated to 200° F., flows into the combustion chamber *A*, through the oil burners *B*, being vaporized by a blower.

Three tests were conducted by Mr. Dobbelstein, and the engineer of the Dortmund Boiler Inspection Co. At the second test, a duty of 240 lb. steam per 10 sq.ft. of heating surface was obtained, at a steam pressure of 147 lb.

The test was abandoned after a run of 7 hr. on account of the destruction of the lining of the combustion chamber. At the third trial, on Jan. 9, the duty rose to 243 lb. of water per 10 sq.ft. of heating surface, at the same steam pressure as before. In all three tests the efficiency of the plant averaged 82 per cent.

These experiments have proved that with surface combustion of tar oil, a duty of about 24 lb. evaporation per square foot of heating surface can be obtained, although it may be questioned whether this design of boiler can long withstand being driven to this extent. The Berlin-Anhalt Machine Co. has under construction an improved design of boiler with which further tests will be made and which, it may be expected, will overcome the practical difficulties encountered with the first boiler.

An Increase of Coal in Iowa

The production of coal in Iowa in 1913, according to E. W. Parker, of the U. S. Geological Survey, was 7,490,641 short tons, valued at $13,431,061. This was an increase over 1912 of 201,112 tons in quantity, and $278,973 in value.

Operators complain of the unsatisfactory character of the mine labor of the state, not so much on account of inefficiency as of exacting demands, which they claim have increased the cost of production beyond the price which may be realized for the product. This has discouraged the opening and development of new properties.

Iowa is primarily an agricultural commonwealth, and the markets for its coal, outside of what is taken by the railroads, are chiefly in rural communities and cities of moderate size, dependent upon agricultural trade. There are no extensive manufacturing interests requiring large supplies of fuel for the generation of power.

Some coal is shipped from Iowa to Nebraska, Minnesota and other states, but an equal amount is imported from Illinois and Eastern fields. The coal beds of Iowa are thin, the thickest in the Des Moines district averaging about 5 ft. They are also somewhat irregular and faulty. The coal is of a noncoking bituminous grade somewhat high in sulphur, but making a fair steaming fuel.

The number of men employed in the mines decreased from 16,370 in 1912 to 15,679 in 1913. Consequently there was an increase in the average yearly production per man from 445 tons to 478 tons.

Iowa is no exception to the other states in the interior where shooting of coal from the solid is practiced to a reprehensible degree, and the record in that respect for 1913 was worse than in 1912. The quantity of coal shot off the solid in 1913 was 5,405,142 short tons, or 72 per cent. of the total production.

There were 26 fatal accidents in the coal mines during the year, an increase of 7 over 1912. All the fatalities occurred underground, and 18 were due to falls of roof.

The Labor Situation

SYNOPSIS—No important developments during the week in any of the states except Kansas and Missouri. A bill is introduced into the federal House of Representatives to prevent the transportation of strike-breakers from state to state. The Montana Workmen's Compensation Bill is arousing some opposition.

The labor situation in the coal fields of Ohio changed but little during the past week. A large majority of the mines in the Hocking Valley and Jackson fields are in operation and others are being placed in shape for work. It is believed that practically the full capacity of the mines in those districts will soon be reached. In the Crooksville district some coal is being produced and other mines are being put in condition for operation.

The working conditions in the Massillon field are practically settled, and all but two mines are being operated. The Massillon Coal Mining Co., of Massillon, Ohio, has signed the scale and will start operations at Navarre, Stanwood and Dalton. This company has also three new mines which it is announced will be opened in the near future. Fifteen hundred men are involved in this settlement. In the Tuscarawas field, the working conditions were finally settled in a compromise and these mines will soon be active. The Cambridge district is working and a considerable tonnage is being produced in that field.

THE POMEROY BEND FIELD STILL NOT WHOLLY SETTLED

Over half the Pomeroy field is still idle. W. W. Miller, of the Pittsburgh Mining Co., writes us as follows: "The only mines which have reached a settlement are those which produce whole-vein coal, mining the clean coal, top coal and horn coal. The oldest shippers in the district mine their coal under the horn, and these mines are still without a settlement, as the miners are demanding a differential of 4c. per ton above the mine-run rate as agreed upon in the state agreement at Columbus."

EASTERN OHIO STILL IDLE

So far no efforts have been made in eastern Ohio to bring about another conference of the scale committee of the operators and miners. A report was current that the miners were about to take a referendum vote on the proposition of accepting or rejecting the offer of the operators for 99c. for lump and 2c. for slack, or the 41.12c. scale. But this is denied by those who are in a position to know.

It is stated that President C. J. Albasin, of subdistrict No. 5 of the United Mine Workers of America, will go to Indianapolis, Ind., and make an appeal to the International Executive Board of the Union, asking that all the mines in Pennsylvania and West Virginia now operated by mine owners who have mines in Ohio where strikes are in force be closed by the union. Such an action in districts having contracts with the organization would be in violation of the agreements signed; in others it would be beyond the power of the union; so it is hardly likely that the petition will be heeded at the union headquarters.

A READING DISPUTE

The general grievance boards of all the Philadelphia & Reading Coal & Iron Co.'s collieries in the Northumberland County district, employing about 5000 men and boys, notified the officials of the United Mine Workers of America to order all the Reading men in the district to go on strike on the 17th unless the grievances at the Alaska colliery were settled by Saturday, the 15th. The employees at the colliery in question had refused to report as required at a certain point morning and evening. Such a strike would be a violation of the agreement. All disputes must be settled by the Conciliation Board without a strike of the miners. We are glad to hear that the men finally decided to keep their bargain and remain at work though the Alaska mine is idle in violation of the agreement.

CENTRAL PENNSYLVANIA

The central Pennsylvania district, No. 2, is peculiar in that it has no subdistricts. In 1900, nine subdistricts were created, but in 1906, by a vote of delegates in a convention in Du Bois, Penn., these were abolished. There is a strong sentiment against this abolition and recently an unofficial convention of protest was held at Altoona and the delegates, protesting that the action in 1906 was ultra vires, desire the International Executive Board to declare the result of that vote null and void.

The Miller Coal Co., of Portage, Penn., has sued the local union at that place, No. 570, for $5000 damages. It is alleged that when the company refused to accept a certain checkweighman elected by the men, the Union spread defamatory and damaging reports in circulars and letters, and the company lost much business as a result.

WEST VIRGINIA

It was expected that the men of the Four States Coal Co., at Dorothy, W. Va., would go on strike on Saturday, the 15th, but they did not. Approximately, 500 men are employed. The rate paid is 26c. for machine coal and 31c. for pick coal. The miners want 32½c. for machine-room coal, 37c. for machine-entry coal, and 56½c. for pick-mined coal, which are the Kanawha scale prices for work in the Coalburg seam. The Four States Coal Co. is not a member of the Kanawha Coal Operators' Association, and the union is making every endeavor to bring its scale up to that of mines nearby.

Twelve hundred men employed by the Boomer Coal Co. went on strike following the discharge of Fletcher Norman, a colored machine man. The company alleged that Norman had broken the rules and dispensed with his services. The case is taking the regular course prescribed by the agreement, and the strike is therefore in plain violation of the union rules.

At Marting, W. Va., near the Kanawha and Michigan station, F. Littleton, of Charleston, and R. L. Sprouse, of Glasgow, were assaulted by strikers with pick handles. The men were employed by the Columbia Iron & Steel Co., and had refused to join the union. After the men had been beaten up, the strikers went back to work.

THE SOUTHWESTERN AGREEMENT

On Aug. 15, an agreement was reached between the miners and operators in the state of Kansas and in Vernon and Bates Counties, in Missouri. Other joint committees of the operators in Missouri, Arkansas and Oklahoma, also in session, did not succeed in making agreements.

A bill has been presented by John W. Evans, of Montana, to the House of Representatives which will stop the passage of strike-breakers from state to state. Senator Martine has presented a similar bill to the Senate. The measure puts the burden of holding strike breakers in their respective states on the railroads and steamships. A citizen getting or buying a ticket will be subject to inquiry from the ticket seller as to whether he is a strike-breaker. The law does not require that the railroad shall knowingly offend in order to come under its provisions. Note that it says merely that "it shall be unlawful . . . to carry or transport . . . strike-breakers." This bill, we are told, follows a brief submitted to Congress by E. P. Costigan, Horace N. Hawkins and James H. Brewster, attorneys for the United Mine Workers, and further, it is in accord with the views of the present administration, which is also probable, seeing its origin.

BILL PROHIBITING IMPORTATION OF STRIKE-BREAKERS

The bill reads as follows: "A bill to prevent the transportation by interstate carriers of certain persons and articles for the alleged prevention of so called labor troubles.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that from and after the passage of this act, it shall be unlawful for any railroad, railway, steamship company, person or association or any other common carrier engaged in interstate business to carry or transport into any state or territory any men hired, employed or engaged as strike-breakers, so called, for the purpose of assisting in or interfering with any labor trouble or strike.

"Sect. 2. That it shall also be unlawful for any railway, railroad, steamship or other company, person or association engaged in interstate business to transport, handle or carry any firearms or ammunition into any state or territory for the purpose of assisting in arming or equipping such so called strike-breakers.

"Sect. 3. That a violation of this act by any railroad, railway, steamship or other company, person or association engaged in interstate business as a common carrier shall be punished by a fine not exceeding $1000 and imprisonment not exceeding one year, said fine and imprisonment to be imposed on the president, manager or other officer, agent or employee of the said interstate carrier who may be found guilty of a violation hereof.

"Sect. 4. That this act shall not apply to the organized militia of any state or territory, the officers or men of the United States army, or to any duly organized and uniformed police force or constabulary having jurisdiction of the territory embraced within such labor trouble or strike."

MONTANA COMPENSATION BILL

In Montana, the employers have formed an organization to oppose the passage of a workmen's compensation act. Just what form this opposition will take is not clear, but let us hope that the objection is not to all forms of compulsory compensation, but to certain specific provisions in the bill. Oscar Rohn, of Butte; W. B. Rodgers, of Anaconda, and J. E. Woodard, of Roundup, together form the "Committee on Metal and Coal Mining and Ores."

It is alleged by H. G. Miller, of Kalispell, that wages are already 25 per cent. higher in Montana than in Washington. Hence the compensation based on the same percentage would also be higher. It is also stated the rates of assessment are 100 per cent. higher than in Washington. Of course, this is not so important, as they would be adjusted if too high, but the liabilities for total temporary disabilities are 50 per cent. higher than in Washington state, for permanent partial disabilities 70 per cent., for total permanent disabilities 50 per cent., and for fatal accidents 50 per cent.

Moreover, in the state of Washington, 40 per cent. of all cases involved time losses of not more than 12 days. In that state, if an employee were disabled for three weeks the claims would be settled for $21. In Montana, he would receive $32 of insurance, $22.50 in cash, and in addition the hospital fees for bed and board, which would make more than the employee would receive if working. In Washington, it has been necessary to amend the law and to provide that benefits could not be paid for the first two weeks. It is likely that Montana will need some such provision.

COMPENSATION OF SALARIED OFFICIALS

In West Virginia, A. W. Calloway, of the Davis Coal & Coke Co., announces that the company will insure the lives of all those in its employ who would otherwise not receive benefits under the compensation law without any expense to them. The company will pay the beneficiary one year's salary in monthly instalments on the death of such an employee, provided he has worked for the company for a whole year. If he has worked less than a year for the Davis Coal & Coke Co., payment to the beneficiary will be equal to six months' salary.

Recent Machines for Loading and Quenching Coke*

Those who are interested in the loading and quenching of coke will find in the contribution of Mr. A. Thau, M.E., to Gluckauf, for Feb. 28, and Mar. 7, a lengthy review of the development in this branch of the industry since 1911. The writer states in conclusion that most of this work is no longer of English but of German origin; and, moreover, that German firms have greatly improved upon previous English machines.

This would seem to be one of the factors in the extremely rapid growth of German coal and coke exportation, which has nearly overtaken that of Great Britain. To appreciate how important this is, we should bear in mind that these products form about one-tenth of all the exports from the United Kingdom.

Mr. Thau divides the machinery into three classes: loading machines for horizontal or inclined, elevated or depressed platforms, quenching machines, which deliver the coke to a separator without the use of a platform and combined quenching and loading systems.

Figs. 1 and 2 show the construction of an English machine, which easily handles the output of 100 ovens. It consists of an endless elevating chain, carried by a substantial iron framework, resting on three pairs of truck wheels.

Details of Operations

The coke from the inclined platform is directed onto the guide *d*, by which it is delivered to the level part of the chain, and carried up the incline *e* over a screen, beneath which is a bunker *f*. On reaching the top, the screened coke falls into the chute *g;* and passes thence into the car. The driving mechanism and platforms are clearly indicated. Fig. 3 shows the chain cross-section.

In Fig. 4 we have a German machine built for a Belgian company to load 500 tons daily. The coke falls from the inclined platform *a* into the bucket *g*. It is hoisted by block and falls to the topmost position, as shown. Here it is dumped into the chute *p*, and passes over a shaking screen *k*.

The frame is carried on double rails at *e*, and a single rail at *d*. The driving motor and mechanism are just beneath the roof. There are two other motors just below, one to shake the screen and one to move the apparatus along the track. The chute *q* catches the ashes and small coke and delivers them into a bunker or a car.

A Combined Quenching and Loading Machine

The third example, Fig. 5, is a combined quenching and loading machine, built by the Berlin-Anhalt Machine Co., Ltd. The coke is delivered into the tubs *b*,

*Abstracted from the German by H. B. Binsse, Short Hills, N. J.

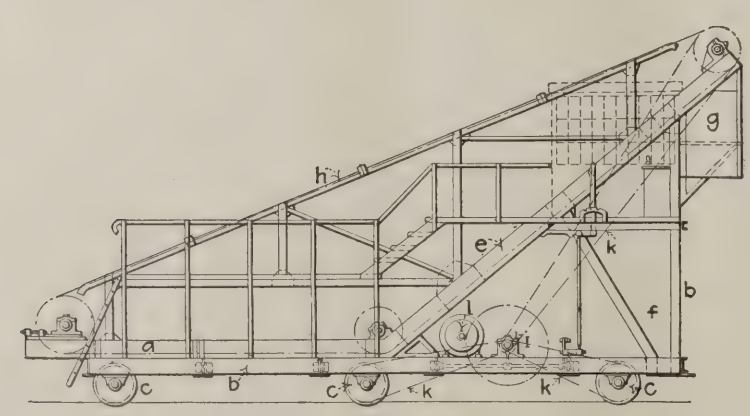


FIG 1

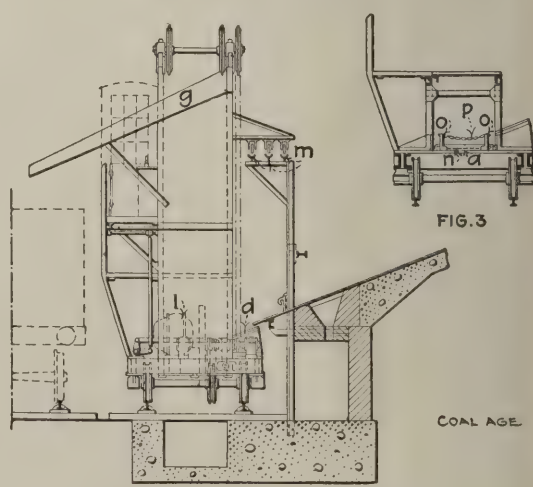


FIG.2

FIG.3

Figs. 1, 2 and 3. Side View and Cross-Sections of an English Coke-Loading Machine

under which is a water tank *a*, into which the tub sinks from the added weight of the coke, thus cooling the walls of the tub and finally opening a valve in the bottom. The water now enters, and turns into steam, which not too rapidly cools or quenches the contents.

This makes the best appearing and hardest coke. The tub is then elevated to the upper position, as shown, the water draining back into the tank through a sieve. The coke is unloaded from the tub into the bunker *i*, from which it is discharged onto the endless chain k, which acts also as a screen, allowing the finer pieces to fall through and to be dumped into the car *n*. The good coke is carried along by the chain and falls into the other car. One man operates the entire machine.

Mr. Thau's paper describes a suprising variety of machines designed for this purpose, showing the great attention Germany is now paying to labor-saving appliances.

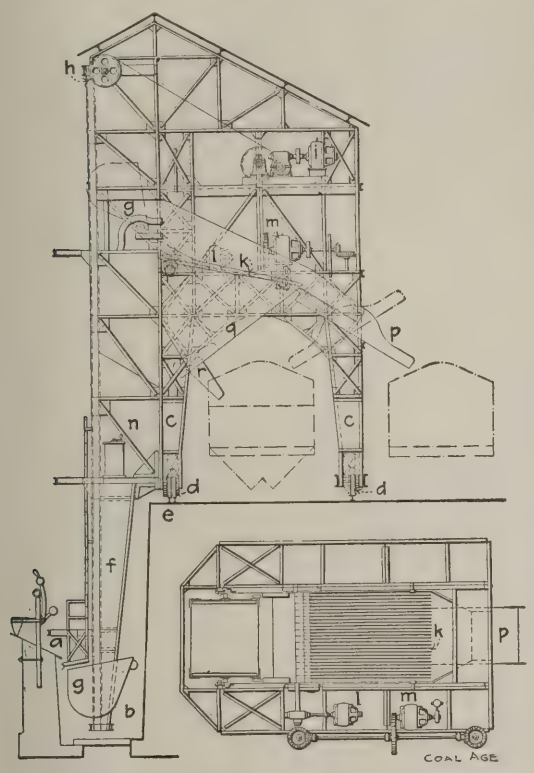


FIG. 4. A COKE-ELEVATING AND SCREENING MACHINE

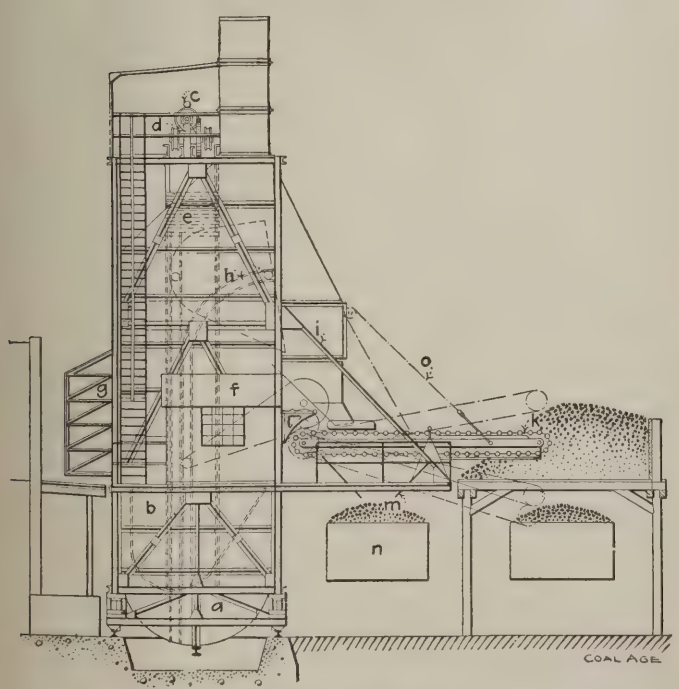


FIG. 5. A COKE-QUENCHING, ELEVATING, SCREENING AND LOADING MACHINE

Oklahoma Breaks Her Coal Record

During the year 1913, coal was mined in Oklahoma to the amount of 4,165,770 short tons, valued at $8,542,748, according to figures compiled by E. W. Parker, of the U. S. Geological Survey, in coöperation with the Geological Survey of Oklahoma.

Oklahoma more than any other of the coal-producing states in the Mississippi Valley and the Rocky Mountain region, was benefited by the labor troubles in Colorado, as is shown by the increase in production over 1912, amounting to 490,352 tons, or 13.34 per cent. The value of the product increased $675,417, or 8.6 per cent. The smaller relative gain in value in 1913 was due to the fact that in that year prices were somewhat inflated because of the rather abrupt withdrawal of fuel oil from the market, where it had been in competition with Oklahoma coal, and to a diminution in the supply of natural gas from the northern part of the mid-continent field, particularly in Kansas.

The deficiency in the Kansas production of natural gas is being made up, however, by development in Oklahoma, and the result as well as the fact that the supply of coal is catching up with the demand on account of the increased production of 1913, is exhibited in the return to lower prices, the average value per ton in 1913 being the same as in 1911. The total number of men on strike in Oklahoma in 1913 was 1696; the average time lost by each man being 80 days.

Oklahoma continues to show a high percentage of coal shot off the solid, a practice encouraged by the laws which compel the payment of wages on the basis of mine-run coal.

The number of days the men were able to work in 1913 shows a marked improvement over the two preceding years, and if no time had been lost by strikes, the average number of days worked would have exceeded 200 by a considerable margin. As it was the average time made by the 9044 men employed was 197 days, compared with 8785 men for 174 days in 1912. The average total production for a man in 1913, was 461 tons.

The fatality record of Oklahoma in 1913, according to the Bureau of Mines, shows a decided improvement over 1912, when, owing to an explosion of gas and dust in the San Bois mine, at McCutcheon, the death roll was high. In that one explosion the lives lost amounted to more than three times the total number of deaths in 1913, when 23 fatal accidents occurred.

Experience has shown that it is not wise to use one cylinder of a Draeger apparatus for the outward trip while holding the other in reserve for the return. It is safer to depend wholly upon the pressure gage and use only one valve, as the wearer may run over time with one cylinder and be overcome by lack of oxygen, without the preliminary warning of dizziness, and fall unconscious while he still has a full cylinder.

A Large Steam-Pump Installation

SYNOPSIS—Two compound steam pumps, weighing 75 tons each, are being installed in an underground pump room of an anthracite colliery. Each pump normally handles 3000 gal. per minute against a 600-ft. vertical head.

In the operation of mine pumps, efficiency is desirable but reliability is necessary. In many cases the operation of the pumps is of secondary importance only to that of the fan, for should the former cease running the pit would soon be flooded. For this reason, in order to be successful, such machines must not only be of sufficient size and capacity to handle the amount of water made by the workings, but must be so constructed as to render repairs and replacements both quick and easy, securing meanwhile as great efficiency as is consistent with reason.

In the Packer No. 4 Colliery of the Lehigh Valley Coal Co., at Lost Creek, near Shenandoah, Penn., there are being installed two Goyne, compound, duplex, steam, plunger pumps of a normal capacity of 3000 gal. per minute each against a vertical head of 600 ft. The high- and low-pressure cylinders of these machines are 25 in. and 44 in. in diameter, respectively, the diameter of the plungers is 15 in. and the stroke is 4 ft. The suctions are double, that is, composed of two 14-in. pipes, one upon either side. The discharge pipe is single, 15 in. in diameter. The steam and exhaust pipes are 7 in. and 10 in. in diameter, respectively.

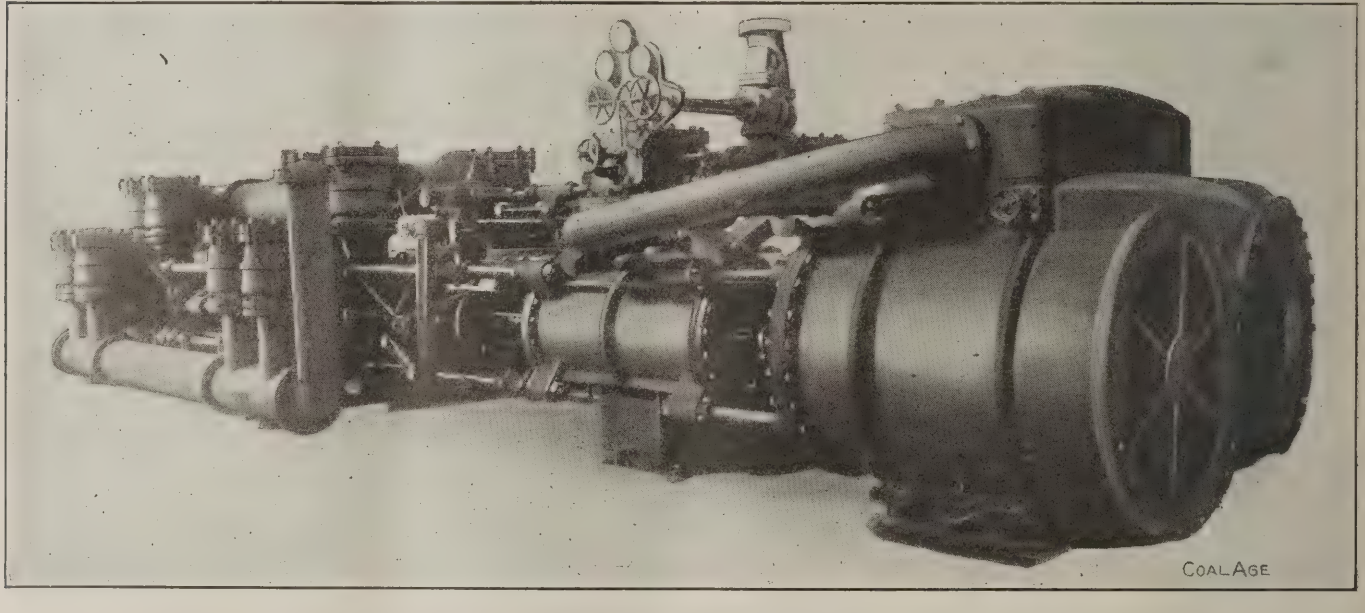
These pumps, which are 41 ft. 5 in. long over all and weigh 75 tons each, are being placed in a pump room cut out of the solid rock and provided with a traveling crane. The high-pressure cylinders are equipped with Goyne patented adjustable cut-off valves, which may be adjusted while the pump is in operation.

This cut-off device consists of two elements. The primary valve works upon a seat in the ordinary manner with a travel parallel to that of the pistons. The secondary valve is double, rides upon and is carried forward and backward with the primary valve, but has, meanwhile, a transverse travel across it.

The function of this secondary or cut-off valve is exactly analogous to that of the well known Meyer riding valve. Since in a pump the piston movement is not uniform in length, a rider with a travel in the same direction as that of the primary valve, upon which it seats, would not be applicable. This difficulty is, however, entirely overcome by causing the two valves to move at right angles to each other.

A compound pump provided with this cutoff has, on test, shown a saving of 8 per cent. on an indicated horsepower basis. On simple pumps the saving is, of course, greater.

Positive lubrication of cylinders is secured by power-driven oil pumps, and each machine is provided with steam, vacuum and water-pressure gages, as well as a stroke counter. The steam cylinders are not bolted fast in position, but the stand feet are free to move in machined guides, thus making provision for expansion and contraction.



A Photograph Showing the Steam End Particularly

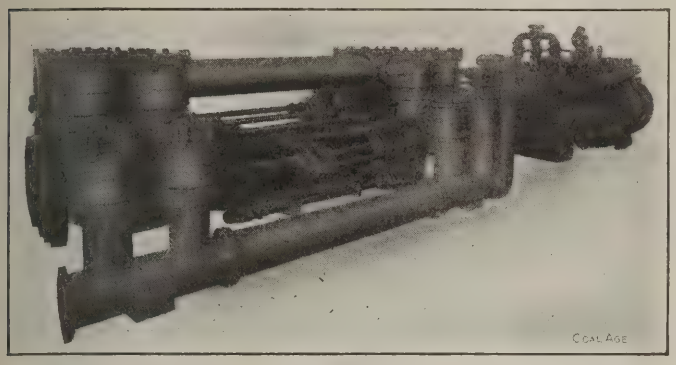
Cross exhaust is made between high- and low-pressure cylinders, the latter being provided with balanced valves. A live-steam connection is also made to the low-pressure cylinders, which permits operation of the pumps at full capacity should the steam pressure, which is normally carried at about 100 lb. at the boilers, fall appreciably. Final exhaust is made to a 12x18x18-in. Goyne, single, special jet condenser.

The water end of the pump is lined throughout with wood, bronze and composition. It is fitted with 16 valve chambers, each provided with a Goyne, hood-type, leather valve operating on a bronze seat. The plungers are outside connected center packed.

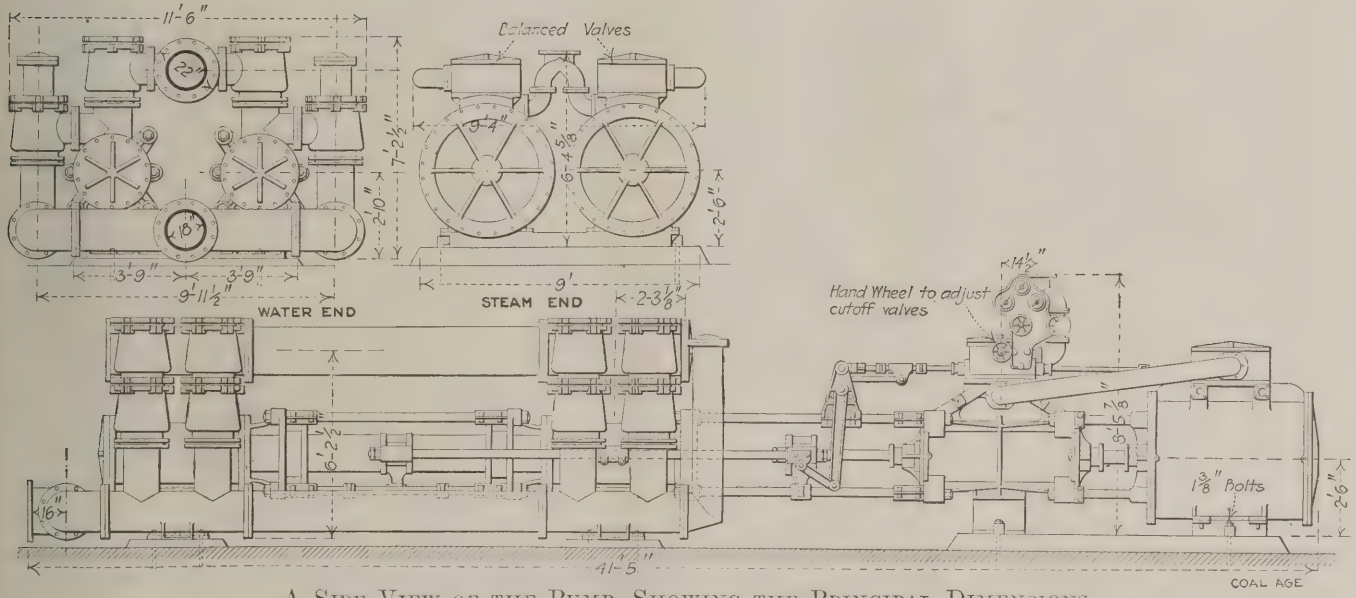
As may be seen in the accompanying drawing, each plunger is provided with a crosshead fitted with an ad-

justable wearing shoe working on a guide. The plunger's weight is, therefore, taken by the guide and not upon the packing in the stuffing-boxes.

The working barrels are connected by heavy steel tie-rods fitted with removable clamp collars to facilitate repairs or the renewal of parts. The same construction is followed in joining the steam cylinders to each other, and to the water end of the machine. This renders it possible to make many repairs quickly and with extreme



PHOTOGRAPH SHOWING THE WATER END OF THE PUMP



A SIDE VIEW OF THE PUMP, SHOWING THE PRINCIPAL DIMENSIONS

ease. For instance, the packing rings upon any piston may be renewed without removing the piston from the rod or entirely from the cylinder in which it works.

While, as stated in the beginning, a mine pump must primarily be reliable, economy is nevertheless important. Mine pumps are usually operated continuously day and night, so that even a slight lessening of the steam consumption per horsepower-hour amounts to a considerable quantity at the end of the mouth. While in the nature of things the saving secured through the use of the riding cutoff valve above described, is not as great in a compound as in a simple pump, yet this saving is like interest on money—it keeps on working day and night, Sundays and holidays, throughout the entire life of the installation.

The requirements as to the reversal of the air current are being met at some mines in England by the construction of additional fan drifts, and the erection of doors to be opened or closed as the case requires.

A Promising Thermopile

SPECIAL CORRESPONDENCE

An invention on which a German engineer, Johannes Marschall, of Dresden, has been working for some years past, holds out the prospect that domestic electric light may some day be obtained without the intervention of a central power station, by means of an apparatus which will merely require to be supplied with coal like an ordinary stove.

The fact that electricity is generated when the junctions of different metals are kept at different temperatures was noticed by Seebeck nearly a century ago, and many efforts have since been made to utilize the phenomenon on a practical scale, the thermopiles of Clamond and Hauck being examples. But various technical and manufacturing difficulties have been encountered. The current obtained being at best very weak, large numbers of elements must be combined in order to yield any serviceable effect, and alloys which gave a reasonably high electromotive force had the objection that their electrical resistance was also high.

The forming of the junctions between the metals or alloys presented another set of troubles. In some cases the parts were screwed together, but with that method of construction oxidation was apt to occur and cause an undue increase in the resistance. Soldering, and especially hard soldering, is possible only with certain metals and over small surfaces. And even where this method is employed, the junctions prove unable to resist a high temperature for any considerable period of time. Welding, again, is impracticable with many metals.

In the Marschall apparatus, an attempt has been made to overcome these difficulties. The positive electrodes are made of a special alloy, which yields a high electromotive force but has a low specific electric resistance. The negative electrodes are composed of a copper-nickel alloy, while the junctions between the two are ingeniously effected by means of electro-deposited copper.

Five of the elements thus constructed are arranged together in series to form a "section," and a number of these sections are bound together in a ring, the junc-

tions which are to be heated being all at the bottom of the sections and those which are cooled at the top. As many of these rings as may be needed to give the required output are slipped over a central heating tube and clasped firmly upon it.

The furnace is designed as a gas generator, the fuel being gasified and conveyed to the heating tube, where it is burnt with the aid of a suitable air supply from without. Outside the rings there is a casing through which cool air circulates round the cold junctions of the thermopile, the object being to maintain as great a difference of temperature as possible between the cold and the hot junctions, which latter rest on the central heating tube.

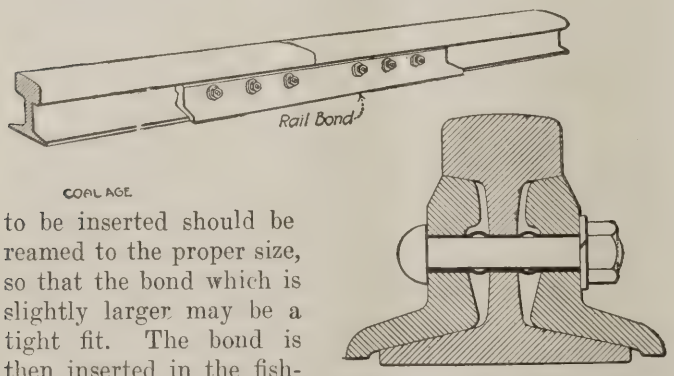
An experimental pile containing 10 elements has been tested in this country (England), and with a temperature difference of about 300 deg. C. (540 deg. F.) between the hot and cold junctions the electromotive force was found to be 0.03 volt per element. It is estimated that a plant 3 ft. in diameter and 7 ft. long, containing 1000 elements, could be constructed to give 1½ kw. at 35 volts. A plant with a capacity of about 1 kw. has been in operation for some time past in Dresden, and it is stated that so far no change has been noticed in the resistance of the hot junctions.

A New Rail Bond

The Jamison rail bond is nothing more than a bushing made of soft copper, the outside of which is slightly larger in diameter than the reamed hole in which it is to be placed. This bond is designed to be inserted in the same holes as the bolts which fasten the regulation fishplates to the rails. One or more bonds are placed on each side of the rail joint, depending on the size of the rails and the strength of the current which is to be transmitted.

Bolthole Bushings Instead of Copper Ribbons or Wires

When the rails are in place, the fishplates should be secured by at least one bolt in each rail to bring them into register, then the other holes in which the bond is to be inserted should be reamed to the proper size, so that the bond which is slightly larger may be a tight fit. The bond is then inserted in the fishplate, pressed through the rail and then through the opposing fishplate. In pressing the bond into its proper position, the holes in the rail and fishplates are coated with copper, giving a copper to copper connection.



A Bushing Rail Bond Using Fishplate as Conductor

Then a hardened-steel expanding mandrel is introduced which from the interior of the bond forces the copper into intimate contact with every particle of the surrounding steel of the rail and fishplates. Thus the bond is given a perfect contact with both the rail and the fishplates as the current can pass from rail to rail through the fishplates and bonds. The final step is to insert and tighten up the bolts.

This bond can be used for busbars on switchboards and for electric bridges but its largest use is for bonding the rails of electric railroads for the transmission of the return current. The method is alleged by the manufacturers to save 80 per cent. of the cost for material and labor in the providing of ordinary rail bonds. The fact that it is almost impossible to steal these bonds is a large item in their favor. As they are not visible when in use, they do not even tempt people to steal them.

A Durable Bond

It is stated, however, that the bond can be removed with ease by the use of a simple patented tool. As the bond fits air-tight into holes in the rail and fishplates, no moisture can enter to cause the bond to rust at the contact. Such a rusting would cause an imperfect contact, and the arcing which resulted would hasten the deteriorating action. But with such a close contact the primary steps leading to a loose and burned connection cannot occur.

The ordinary bond has two connections between copper and steel; this has four for each bond but as an offset there are connections to two fishplates and the chances of inefficient bonding are halved by that fact. Operators will be interested to note in what degree this bond is applicable to mine work.

Bond Not Sheared When Temperature Changes

The company publishes several testimonials showing that the bond has given satisfaction to street-car companies so it is evident that the expansion of the rail does not shear the bonds. This is probably due to the fact that the fishplate and rail are separated at the bolt hole and there is room for the bending of the bond between the moving surfaces.

Experiments by Wilbur A. Carrell & Co. showed that two of the bonds did not give an appreciable resistance and one with only two copper bushings gave one quarter the resistance of an equal number of ribbon bonds of the usual type. The manufacturers state that bonds placed April, 1910, in the Mifflin-Homestead line are in as good condition today as they were when placed in the rail.

The bond is made by the Jamison Rail Bond and Electrical Supply Co., 202-203 Keystone Bank Building, Fourth Ave., Pittsburgh, Penn.

Application of Fellow-Servant Rule—Employment of Minors—Amount Recoverable for Personal Injury—The rule which exempts a mine operator from liability for injuries to an employee resulting from negligence of a fellow employee does not apply to employees in charge of separate trains of mine cars. When a boy under 16 years of age is employed in a mine without his father's consent, the boy will be permitted to recover damages for injuries received by him in the course of his employment without regard to whether the employer has been guilty of negligence in the occurrence of the accident, if the employer knew that the boy was under age. Two thousand dollars is not excessive recovery for injury to such an employee, where his ankle and foot were crushed, he was confined to bed for more than a month, and was compelled to walk on crutches for several weeks after his confinement ceased. (Kentucky Court of Appeals, Stearns Coal & Lumber Co. vs. Tuggle, 161 Southwestern Reporter 1112.)

Who's Who in Coal Mining

Samuel Dean

Starting as an apprentice with a mining engineer and colliery manager in Lancashire, England, Samuel Dean has worked his way to a position of respect in the coal industry of that turbulent state, Colorado.

After serving his apprenticeship, Mr. Dean was employed at the Rainford Colliery in Lancashire, doing various kinds of work underground. Following this employment, he had charge of mines in the County of Durham and was particularly successful in sinking a mine shaft through running sand at one of the collieries where he was employed. Following this accomplishment, he had several other experiences in shaft sinking through



Samuel Dean

heavily watered strata and is today somewhat of an authority on this subject.

Mr. Dean left England in 1907, coming to this country and a little later organizing the Gallup Southwestern Coal Co., Gallup, N. M. He was the first manager of this company, Harry Lauder, the Scotch comedian being one of the stockholders. Mr. Dean joined the engineering staff of the Victor-American Fuel Co., in 1910, and probably was the first person to introduce stone-dust treatment in American mines. He is a member of the North of England Mining & Mechanical Engineers and the Rocky Mountain Coal-Mining Institute. He holds a first-class manager's certificate issued at Manchester, England, in 1903. He is also the holder of Colorado mine foreman and fireboss certificates, and has been captain of the Delagua first-aid team for the last three years.

Mr. Dean was recently elected to the "Daglish Traveling Fellowship" by the University of Durham, England, and in accordance with the stipulations of this fellowship, he is now concluding an extended trip of investigation through European mines. His observations throughout his European travels are now being published in Coal Age each week.

Mr. Dean writes from Montreal, Can., that he succeeded in leaving France after war broke out, reaching that city, Aug. 15, by the mail steamer "Tunisian." Fortunately he explored the German mines first and was visiting France when hostilities commenced.

Device for Detecting Firedamp

By Leonard Keene Hirshberg*

The difficulty of utilizing the well known property of platinum black for the detection of the presence of firedamp in coal mines, would appear to have been satisfactorily overcome in a recent invention of Alfred Williams. The rapid absorption of gas by platinum black causes a rise in temperature in the presence of even a small percentage of methane or firedamp. The circumstances, however, which have thus far prevented its useful application to the detection of gas in mines are: First, the difficulty of devising a reliable and easily understood means of indicating the percentage of firedamp present from the rise in temperature caused by the absorption of the gas; and, second, the fact that small percentages of firedamp do not sufficiently affect the platinum black when the initial temperature is low. The first difficulty has been overcome by a thermo-electrical method, and the second by a preliminary heating of the platinum black.

The instrument is so arranged that the air of the mine passes through a tube containing a pair of differential thermo-electric junctions, in series with each other and with a galvanometer, which may be fixed remotely from the thermo-couples. As long as the junctions remain at the same temperature, whatever that may be, their actions balance one another and the galvanometer indicates zero. Surrounding each junction, however, is a small head or capsule of a porous material. One of these heads is impregnated with platinum black, which raises the temperature of that junction when firedamp is present and causes a corresponding deflection of the needle of the galvanometer. Around or through each head is a minute loop of platinum wire carrying sufficient current from a small battery (the circuit being independent of the thermopile circuit), to raise the temperature to that at which platinum black is most sensitive. The galvanometer scale may be graduated in milli-volts; but preferably it should be graduated so as to read directly the percentage of firedamp present.

Tests of this instrument, made by Prof. Silvanus Thompson, have given satisfactory results, but indicate the necessity of keeping the auxiliary heating current at a constant value. One of the greatest benefits of a reliable method of testing for firedamp, independently of the miner's lamp, is that it permits of the exclusive use of electric lamps and thus displaces the ordinary Davy lamp, for the purpose of testing for gas.

Coke breeze which often lies in piles near beehive coking plants can be profitably utilized. The larger sizes can be prepared for foundry purposes, while the next larger size makes the best kind of fuel for hot-air furnaces in residences. The very fine material can be sold to zinc-retort operators.

*Johns Hopkins University, Baltimore, Md.

Editorials

The officers of great corporations are coming to realize that big business cannot be private. The management of any great industrial or mining enterprise is a form of government. It governs the lines of all its employees and many of its patrons far more intimately than the Administration and Congress of these United States govern them. Such a system generally exists through force or inheritance, which is wholly undemocratic because its rulers are not chosen by the votes of the people governed. That is why the so called common people are opposed to the old method of conducting business on monarchial lines where the keynote of all activity is secrecy.

The distinctive aim of the I. W. W. is to bring about the coöperative ownership of the tools of production. Just why it is necessary to use violence and break laws to realize this dream is more than we can understand. The employees of any great industrial corporation in America could obtain the complete ownership of the company they serve within four or five years' time if they so desired. There is no longer prejudice against ownership of stock by employees. The only difficulty in the way is the preference of the workers to get 3 or 4 per cent. without any risk of loss, than to assume the chances incident to industrial ownership. Workingmen in New York City alone have more than a billion dollars on deposit. If wage earners could be educated to know the powers and possibilities that are theirs, not only would the capitalist class disappear, but the general strike would be no more, for workingmen would then understand that wages are paid not out of capital, but out of production. It would be plain to all that the greatest crime that can be perpetrated against the wage earners is to stop production.

The War and the Coal Markets

Rumor-mongers are busy. Statements of all kinds are being circulated. Many bearing on the coal trade are without any foundation of truth. One report says a million tons of coal is to go to Russia. Other large tonnages are said to be on their way to Canada for the purpose of coaling British war vessels. Further dispatches would have us believe that the need for coal to supply Italy, Spain, Denmark, also Mediterranean countries and South American, is so urgent that the mines of the United States will have to work beyond capacity to fill the want.

The fact is, the coal business is unusually slow, and prices are unsatisfactory. The mines of this country in the present depressed state of business can supply with ease any quantity of coal the other nations may want. There is little likelihood the outside demand for American coal will equal or offset the decrease in domestic consumption, resulting from slack business this fall. It is, therefore, ridiculous to credit the current talk of fuel scarcity and price advances. Such statements do not emanate from the coal producer, but come from a few unscrupulous retailers who are endeavoring to profit by playing on the credulity of their uninformed customers.

That the conflict in Europe affords American coal-mine owners an opportunity to introduce their coals into foreign markets is true. If ships can be secured with freight charges reasonable, a few eastern fields (West Virginia and Pennsylvania especially) should secure a number of contracts for a considerable tonnage to South America and Europe. The Panama Canal is now open, and that is also a favorable condition.

As to the extent of our foreign possibilities, some idea may be gained from the following facts: Eight countries of South America purchase about $62,000,000 worth of coal annually. Of this amount the United States sold only $4,223,118 worth, while the British mine owners furnished $53,000,000 worth of coal to these eight countries. The greatest opportunities for American coal producers would seem to be in Argentine and Brazil, which countries annually import $25,000,000 and $24,000,000 worth of coal, respectively.

Our coal trade on the west coast of South America amounts to practically nothing. But now that the Panama Canal has been opened to shipping, we should secure some considerable part of the business of Chile, Peru, Ecuador and Bolivia. The first mentioned country imported $11,000,000 worth of coal last year, of which our share of business amounted to approximately $500,000.

There are also numerous opportunities at the present time for American coal on the other side of the Atlantic, and we should endeavor to avail ourselves of the present period to enter foreign markets; however, when the entire tonnage of possible exports is considered in the aggregate, the total is not a figure that holds hope of relieving to any great extent the unsatisfactory conditions in the whole fuel industry of America.

We produced last year about 575,000,000 tons of coal in this country; our mines could easily add another 100,000,000 to this output and not exert themselves very noticeably. Therefore, there is no occasion to get excited over an opportunity to send a possible 25,000,000 tons—but probably less—to foreign markets. As for any unusual increase in the price of coal to consumers, because of the European war, the idea is absurd, and it may be stated positively that mine owners have had no part in any such increase either actual or implied.

The Storage Problem

No problem is so important in mining as the discovery of a flywheel which will keep business moving steadily and normally year in and year out. Depression and excessive activity alternate, with the former occupying by far the longer periods.

However, the success of storage as a cure for this condition cannot be assured till the technique of that measure is better developed. C. A. Hall, the fuel agent of

the Chicago & Eastern Illinois R.R., at a meeting of the International Railway Fuel Association, of which he is secretary-treasurer, advocates storage of coal as a cure-all for excessive coal operation, low prices, unemployment, undue purchases of rolling stock, unequal seasonable traffic and other mining and railroad ills.

Now storage of coal would, if successful, perform all these services if coal could be stored as he suggests, but the limit of height in storage is 20 ft., and many coals under present conditions of storage will fire if the coal pile exceeds ten feet in height and may ignite spontaneously at even less depths in some cases. Mr. Hall himself sets the limit of height for coal piles of bituminous coals as normally 15 ft.

But it must be remembered that coal may heat if kept in far smaller piles and then it suffers much more deterioration than the United States Bureau of Mines and the University of Illinois have shown in their tables. Unfortunately despite the fact that the authorities mentioned have made abundantly plain that the storage must be practically without heating if the results tabulated are to be obtained, everyone who does not ignorantly question them, has taken them as being true so long as the mass does not actually fire.

It is important to remember that with one exception the results of Porter and Ovitz, of the Bureau of Mines, were obtained from small samples containing between 300 lb. and 6 tons and such small quantities could not suffer from heat storage. The one large mass of coal was stored under tropical conditions and may have wetted frequently.

In fact that oxidation is not the important cause of heating is evidenced by the fact that coal is slow to become heated, yet all the deterioration in the earlier stages is due to oxidation. Later the coal becomes dried out in the sun and when it is moistened the heat of hydration probably causes it to fire, though other causes are possible.

Perhaps by keeping coal continuously moist with a spray or by covering it with an envelope of some soapy substance like lysol, it might be prevented from complete dessication or if it should become dried it might more slowly became hydrated if it had a waterproof coat to protect it. These are possibilities well worthy of consideration, but until they have been tried or others of like character we cannot hope to keep stocks of highly inflammable coal in profitable bulk. It will be necessary to submerge it, or spread it in thin layers pneumatically over a large area and gather it in a similar manner.

The Bill against Strike Breaking

A bill has been introduced by John M. Evans, representative from Montana, making it unlawful to transport strike-breakers over state lines and to tranship arms from state to state for the defense of such men.

The only reason for forbidding the transportation of strike-breakers is to protect workingmen who are making just demands which should be granted. But this law equally protects also men who are striking for something which is not just. Thus the Industrial Workers of the World might strike to have the Western Federation of Labor men excluded from the Montana mines and if they did, the copper producers would have a restricted output and the railroads would be obliged to refuse transportation to the duly unionized Western Federation men if the company should "hire, employ or engage them." Moreover, the railroad would be forbidden to "transport, handle or carry any firearms or ammunition" for their defense.

In fact, the disorderly Industrial Workers of the World might drive out the Union and then prevent it from being recruited. All the violent actions in Butte, Mont., recently show how probable such a condition would be. The I. W. W.'s deliberately blew up the Federation safe and destroyed the building in which Federation men met. A few men were killed and a large number were victims of violence. A little more and the I. W. W.'s would have had unquestioned control, the Federation would have been driven out entirely and under this law, had it then existed, no new men could have been introduced and had they come in they could not have been defended.

We think the workingman really needs protection against the workers in some industries, who in knowing their strength raise wages abnormally, all of which other workers have to pay. Some of these trades limit those working in them to those having relations already in the Union and only a limited number of such relatives are counted as granting elegibility. One can become a glass blower if one's father or father-in-law has blown or is blowing glass, but not otherwise, though one may have worked at all the related labor in a glass factory.

The assumption in legislation such as we are discussing, is always that the workingman in a mass is right. What he wants he should have. But there is nothing to lead one to a judgment of this kind. He is, of course, certainly not always wrong and sometimes his cause is debatable, but prohibiting the importation of strike-breakers in every case is to assume that the employee who has struck is invariably right.

Let us suppose that one man, as often happens, incurs the dislike of the agitating force at a colliery. The mine becomes idle and the company can either discharge the man or seek men who are willing to work with the man in question. But now this last recourse is removed. The one man must be discharged and his rights are over-ridden by his fellows. We believe that the law Mr. Evans would enforce is a gross violation of individual rights. Labor which for centuries has struggled for freedom is now endeavoring to restrict its own rights by a series of arbitrary laws.

Eventually laboring men will learn that the larger trades employing the greater number of men will be able to tyrannize over all others and wages will be earned above the normal rate. The importance of these larger trades will be so great that the fear of their idleness will make the public take a favorable hand in the settlement of their strikes. Thus they will receive year by year an increased wage and the cost of their product will grind to the ground those workers whom chance will have kept out of such favored employment.

Legislation like that Mr. Evans advocates will prevent the man in one state who is getting $1.75 a day from going to another and making from $4 to $5. The United States will be a bitter jest to such a man who feels he is a citizen and yet receives the treatment of a man from Japan or China.

Legal Department

Diplomatic Controversies Concerning Coal as Contraband of War

By A. L. H. Street* .

Moore's Digest of International Law, which was published a few years ago by the United States as a public bulletin, quotes several interesting documents as showing the attitude of nations toward coal as a contraband of war.

One of the documents, a communication from Mr. Cass, Secretary of State, to our minister to France, sent in 1859, reads, in part:

"The discussion which at this time is going on respecting the military character of coal, and whether it is now excluded from general commerce as contraband of war, is a striking illustration of the tendency to enlarge this power of prohibition and seizure, and of the necessity of watching its exercise with unabated diligence. Here is an article, not exclusively, nor even principally used in war, but which enters into general consumption in the arts of peace, to which, indeed, it is now vitally necessary. It has become also important in commercial navigation. It is a product of nature with which some regions are bountifully supplied, while others are destitute of it, and its transportation, instead of meeting with impediments, should be aided and encouraged. The attempt to enable belligerent nations to prevent all trade in this most valuable accessory to mechanical power has no just claim for support in the law of nations; and the United States avows its determination to oppose it as far as its vessels are concerned."

Mr. Moore then quotes a declaration issued by a Spanish admiral in 1866, during a war between Spain and Chile and Peru, declaring coal to be contraband when coming from the Chilean mines. The declaration was partly based on this ground: "That a belligerant has a right to declare new articles to be contraband of war, when from the circumstances of the war they become, on the part of the enemy, elements for undertaking and carrying on hostilities." It is qualified, however, by the statement: "This declaration, confined as it is to a special case and peculiar to the present war, is not intended to establish any precedent with respect to the general principle, that coal should not be considered contraband of war." At the same time, the President of Peru issued a proclamation declaring coal to be contraband when destined for the use of Spanish ships of war.

This interesting statement, made by the United States Commissioner of Navigation in 1898, is, also, quoted: "Had coal been declared unconditionally contraband of war, the precedent would have been awkward in the event of war between foreign nations, where the United States as a neutral would desire the largest opportunities for the exportation of coal."

The Russian Government having declared coal to be unconditionally contraband in 1904, the British Government pointed to a declaration by the former government in 1884 that coal should not be deemed to be contraband. The officials of the Russian Government replied that they were justified in changing their views, "since 1884, during which time many developments and circumstances had occurred which had induced them to modify their opinion."

The opposition of the United States to the policy of declaring coal to be absolutely contraband is illustrated by the following extract from a message issued by Mr. Hay in 1904 to ambassadors in Europe: "In the wars of 1859 and 1870, coal was declared by France not to be contraband. During the latter war, Great Britain held that the character of coal depended upon its destination and refused to permit vessels to sail with it to the French fleet in the North Sea. Where coal or other fuel is shipped to a port of a belligerent, with no presumption against its pacific use, to condemn it as absolutely contraband would seem to be an extreme measure. . . . Many nations are dependent on coal for the conduct of inoffensive industries, and no sufficient presumption of an intended warlike use seems to be afforded by the mere fact of its destination to a belligerent port."

*Attorney-at-law, St. Paul, Minn.

Recent Judicial Decisions

Acquisition of Title to Land by Adverse Possession—If owners of adjoining tracts of land in Pennsylvania treated a fence as being on the true boundary line between them for more than twenty-one years, each acquired good title to the land extending up to the fence on his side, regardless of whether that was the true line or not. (Pennsylvania Supreme Court, Miles vs. Pennsylvania Coal Co., 91 Atlantic Reporter 211.)

Right to Enjoin Mining Operations as Nuisance—In a suit to restrain mining operations near plaintiff's dwelling-house, on the ground that they constitute a nuisance, a temporary injunction will not be granted pending a final hearing of the case, where it appears that that would involve large loss to the mining company and throw its men out of work, and that the injury to plaintiff will be comparatively slight, especially if the conditions have existed for some time and have been endured by him. (Pennsylvania Supreme Court, Alexander vs. Wilkes-Barre Anthracite Coal Co., 91 Atlantic Reporter 213.)

Claim for Injury Barred by Contributory Negligence—The manager of a coal yard who was injured by collapse of a footwalk in the yard, which was rendered defective through negligence of employees of a railway company, whose track extended into the yard, cannot recover against the railway company, if he knew of the defective condition, or by exercising reasonable care for his own safety could have known thereof. (Pennsylvania Supreme Court, King vs. Lehigh Valley Railroad Co., 91 Atlantic Reporter 214.)

Duty to Keep Coal Dock in Safe Condition—A lessee of a dock used in handling coal is bound, as between himself and the public, to keep the premises in such condition that they will be reasonably safe for persons who go lawfully upon the premises by express or implied invitation; and is prima facie liable for damages caused by defects in or dangers on the premises that reasonably could have been avoided by appropriate care. This is the law even though, as between the lessor and lessee, the former has agreed to keep the dock in repair. (Florida Supreme Court,, King vs. Cooney-Eckstein Company, 63 Southern Reporter 659.)

Sociological Department

Washington Holds Its First State Rescue Meet

By J. Bagley*

SYNOPSIS—The operators, the Union, the American Mine Safety Association and the Red Cross hold a conjoint meet at Seattle, Wash., thus starting a movement to hold in the future a state-wide contest once every year.

The first state-wide mine-rescue and first-aid meet in the state of Washington was held in Denny Field, University Campus, Seattle, Washington, on July 22 and 23, by the miners and the operators of Washington under the auspices of the U. S. Bureau of Mines and the State Mine Inspection Department. This meet was the first of a series of annual events and was pronounced by all present to have been the most successful ever held in the state.

The contest was in charge of W. D. Ryan, U. S. Bureau of Mines, who also awarded the prizes; H. M. Wolflin, district mining engineer, U. S. Bureau of Mines, and a committee composed of J. J. Corey, U. S. Bureau of Mines; James Bagley, state mine inspector; D. C. Botting, commissioner, Washington Coal Operators' Association, and Martin J. Flyzik, president District No. 10, United Mine Workers of America. The judge in the mine-rescue contest was Thomas Graham, chief inspector of mines of British Columbia. The other judges were: Drs. Don H. Palmer, H. C. Ostrom, Frank Maxson, H. Housten, A. L. Loe, H. D. Dudley, J. Tate Mason, George N. McLoughlin, D. C. Hall and Major Edger, of Fort Lawton.

A miniature mine was constructed on the field and consisted of a drift 150 ft. long, on one side of which two rooms were shown connected at the first crosscut to represent work carried on in a flat seam, and on the other side an 8-ft. chute was erected on a pitch of 45 deg. and carried up 30 ft. to show how men were rescued in the pitching seams of the state. A smoke house was constructed in front of the mine and each helmet team underwent the test of remaining 5 min. in the smoke before entering the mine. An examination was made by a fireboss to show the method of procedure in mine inspection and reporting as carried on in practice. All men before entering the mine obtained their checks at a checking house near the mine mouth and checked in on their return from the mine.

Mines in the state of Washington are operated by 28 different companies in districts within a radius of 100 miles from Seattle and are scattered throughout the state. The U. S. Bureau of Mines maintains a mine-rescue station on the university campus in charge of J. J. Corey, foreman, for the purpose of giving assistance in times of distress and teaching men relief work throughout the state.

Eight teams participated in the contest representing the foremost companies in Washington. These were: No. 1, CleElum; No. 2, Franklin; No. 3, Roslyn; No. 4, Issaquah; No. 5, Roslyn; No. 6, Black Diamond; No. 7, Roslyn Fuel Co.; and No. 8, Ravensdale. It must be explained that some of the members of the corps that took part in the first-aid contest did not participate in the mine-rescue contest.

CONTEST OF FIRST DAY

The contest began at 1:30 p.m. of each day, and on the first day was as follows:

First-Aid Contest—No. 1. Team event—Time, 20 min. Simple fracture of right thigh; fifth and sixth ribs on left side broken; compound fracture of right wrist with bright red bleeding. Treat and carry 50 ft.



First-Aid Prize Winners, Cle-Elum Team No. 1

From left to right: E. E. Simpson, T. Barros, T. Summerill, captain, W. Ray, F. Ashurst, W. Saul



Mine-Rescue Prize Winners, Roslyn Fuel Co. No. 7

From left to right: T. Wallace, H. Taylor, W. Shaw, captain, E. Taylor, J. McGraw

No. 2. One-man event—Time, 7 min. Miner is overcome by gas. Remove 20 ft. to fresh air and perform artificial respiration for one minute.

No. 3. Two-man event—Time, 8 min. Simple fracture of right forearm; right lower jaw broken.

No. 4. Four-man event—Time, 15 min. Patient overcome by powder smoke; right forearm broken. Improvise stretcher and carry 100 ft.

No. 5. Three-man event—Time, 8 min. Head, face, neck, arms and hands burned by gas ignition.

No. 6. Team event—Time, 15 min. Miner caught between loaded car and rib; right shoulder blade broken; left arm broken 6 in. above elbow; left foot crushed; lacerated right cheek; improvise a stretcher and carry 100 ft.

No. 7. Two-man event—Time, 10 min. Flesh torn off back of left hand; compound fracture of right arm.

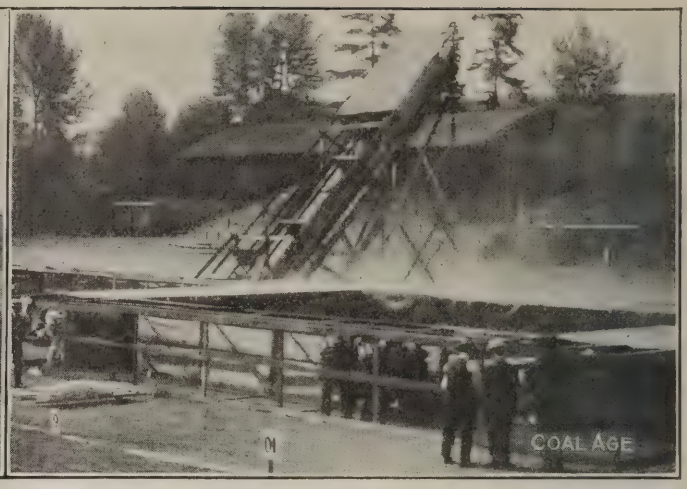
No. 8. Team event—Time, 20 min. Compound fracture of right thigh with severe arterial hemorrhage, and compound fracture of left forearm. Treat patient and carry 100 ft.

Mine-Rescue Contest—Team of five men, including captain, equipped with artificial breathing apparatus. Recovery work after mine explosion caused by blown-out shot. Carry miners rescued to air; perform artificial respiration for two minutes; treat for burns on face, hands and back.

*State mine inspector, 503-504 Alaska Building, Seattle, Wash.



TEAMS EXHIBITING MANNER OF BRINGING VICTIM DOWN A STEEP PITCH



MINE-RESCUE TEAMS REMOVING VICTIM AFTER A SIMULATED EXPLOSION

CONTEST OF SECOND DAY

The events on the second day were as follows:

First-Aid Contest—No. 1. Team event—Time, 20 min. Explosion of keg of powder, burning miner severely on face, neck, chest, back and both arms. Improvise stretcher and carry 100 ft. Treat patient.

No. 2. One-man event—Time, 8 min. Severe cut on forehead, right hand mashed.

No. 3. Two-man event—Time, 18 min. Man found lying with back across electric wire. Remove from contact and treat for electric shock.

No. 4. Three-man event—Time, 10 min. Right knee-cap fractured by fall of rock; left hand badly mashed. Improvise stretcher and carry 50 ft. Treat patient.

No. 5. Team event—Time, 20 min. Miner caught by flying coal from supposed missed shot. Right side of face badly cut; right eye blown out; simple fracture of right thigh; three lower ribs on left side broken. Treat and carry 100 ft.

No. 6. Team event—Time, 20 min. Miner with severely injured spine; fracture of right upper arm; treat and carry through tunnel and over obstruction.

Exhibition event not to be considered in contest.

Two-man event—Miner going back into chute too soon after firing a shot, overcome by powder smoke. Remove 20 ft. to gangway, perform artificial respiration for two minutes.

Note—A place to represent a chute will be built on the ground and all teams are expected to take part in this event if called on.

Mine-Rescue Contest—Team event—Mine fire. Seal off fire and remove one of helmet men in distress; carry to fresh air and revive.

Team will consist of five men, one of whom shall be captain.

The general rules governing the contest were the standard rules for governing first-aid and mine-rescue contests as used by the American Mine Safety Association.

AWARDS

In the mine-rescue contest Team No. 7 of the Roslyn Fuel Co. won the first prize consisting of a silver cup and American Mine Safety Association medals. The Issaquah Team No. 4 won the second prize consisting of two Koehler mine safety lamps and three subscriptions to "Coal Age." The Roslyn Team No. 5 won the third prize consisting of five yearly subscriptions to the "Colliery Engineer."

In the team events of the first-aid contest CleElum Team No. 1 won the first prize consisting of a silver cup and American Mine Safety Association silver medals and Red Cross medals. This cup must be won at two consecutive state-wide meets to be retained by the team. The Roslyn Fuel Co. Team No. 7 won the second prize consisting of American Mine Safety bronze medals, American Red Cross certificates and one Johnson & Johnson first-aid cabinet. The Issaquah Team No. 4 won the third prize consisting of one Bauer & Black first-aid cabinet.

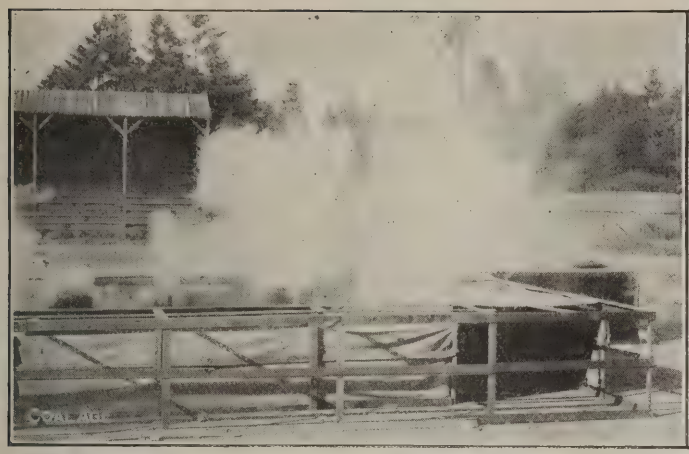
In the one-man events the first prize, $4 cash, went to Black Diamond Team No. 6, and the second prize, two "Justrite" acetylene lamps, to the Roslyn Team No. 5. The first prize, $5 cash, of the two-man events, was won by the Issaquah Team No. 4, and the second prize, three "Justrite" acetylene lamps, was won by Franklin Team No. 2. The first prize for the three-man events, three one-year subscriptions to "Coal Age," was won by Black Diamond Team No. 6, and the second prize, $6 cash, was won by Ravensdale Team No. 8. The first prize of the four-man event, which was a silver cup, to be retained by the winning team, went to Roslyn Team No. 5, and the second prize, $5 cash and Baldwin mine lamps, was won by the Roslyn Fuel Co. Team No. 7.

Two silver cups were contributed by the E. I. DuPont de Nemours Powder Co., one silver cup and $15 cash by the United Mine Workers of America and $25 cash by the Denny-Renton Clay & Coal Co.

The competition was keen and the averages resulting showed that the improvement in first-aid and mine-rescue



PARTICIPANTS IN THE FIRST STATE-WIDE FIRST-AID AND MINE-RESCUE



The Brattice-Cloth Heading and a Representation of a Mine Explosion



First-Aid Teams in Competition on the Denny Field, University Campus

work in the state is bringing its devotees closer to perfection.

Among those taking part in the meet either as directors or as members of the corps, were the seven men who in 1911 attracted attention at the contest in Pittsburgh in competition with teams from all over the United States. The team was captained by J. Hutchinson, of the Northwestern Improvement Co.'s mine, and was made up of S. McCulloch, a member of the Roslyn Fuel Co. team; James Bagley, now state mine inspector; A. G. Lindsay, a member of Roslyn Team No. 3; D. C. Botting, former state mine inspector and now commissioner for the Washington coal operators, and J. Parker, a member of Issaquah Team No. 4.

Among the other prominent mining men present were: C. C. Andersen, general manager of the Northwestern Improvement Co.; J. Ash, superintendent of Roslyn Cascade Coal Co.; E. N. Brooks, general superintendent of the Washington Union Coal Co.; C. H. Burnett, retired coal operator; R. Christensen, superintendent of the Pacific Coast Coal Co., Black Diamond; Wm. Graham, chief inspector of mines, British Columbia; S. H. Ash, deputy state inspector of coal mines; Wm. Hann, general superintendent of the Pacific Coast Coal Co.; E. Jacobs, secretary, Western Branch Canadian Mining Institute; J. F. Menzies, manager Carbon Hill Coal Co.; A. Patrick, vice-president, Roslyn Cascade Coal Co.; C. E. Jones, general superintendent of Roslyn Fuel Co.; G. Rockefeller, superintendent Fairfax Mine, Inc.; W. Warnock, superintendent Franklin District Pacific Coast Coal Co., and D. R. Swen.

Much credit for the success of the meet is due to the committee in charge for its earnest work in arranging and conducting the contest, to H. M. Wolflin and W. D. Ryan, of the Federal Bureau of Mines, who gave much time and attention to the promotion of the meet; to Henry Landes, president of the State University, for his assistance in obtaining the labor and field equipment, and to the Coal Mine Operators' Association and miners for their hearty coöperation.

J. D. Ryan, of the Federal Bureau of Mines, concluded the program by awarding the prizes and giving a speech in the course of which he congratulated all the teams and expressed much gratification with the excellent work of the contestants.

Welfare Work at Weyanoke W. Va.

Special Correspondence

R. D. Patterson, vice-president and general manager of the Weyanoke Coal & Coke Co., ever seeking to provide a means for increasing the returns to his stockholders, while raising the income of his workmen, has adopted the sound principle of providing playgrounds for the children, tennis courts and baseball diamonds for the young. At the same time he has stimulated an interest in vegetable gardening, flower gardening and sanitation among the miners and their families. Not only is this done by kindly words of advice, but by thoroughly competent lectures and personal instruction in gardening, and by furnishing, gratis, all seeds, lime and fertilizer desired. In order to stimulate a wholesome rivalry, substantial prizes, varying from $20 in gold down to $2, were awarded to the successful contestants.

Saturday, July 24, 1914, was a day of pleasant anticipation in the town of Lowe, the unpretentious, though prettily nestling village which has grown up about the plant of the Weyanoke Coal & Coke Co.; for the judges



Meet in the State of Washington, Held at Seattle, July 22 and 23

of awards in the several contests, E. A. Schubert, industrial agent of the Norfolk & Western Ry., an expert in agriculture and horticulture, C. A. Honaker, of the Bluefield *Daily Telegraph,* a local expert on sanitation, and Shutt Grady, of the Pocahontas Coal & Coke Co., were there inspecting and noting and finally deciding to whom the prizes should be awarded.

Gardens Have Made Lowe a Healthy Town

The excellent work accomplished by these men, women and children, which may be accepted as an outward expression of the contentment and happiness within, caused the judges frequently to stop and wonder why it was that the management of all industrial plants, even small municipalities, did not adopt this means of increasing the contentment, health, happiness and efficiency of the citizens of the community.

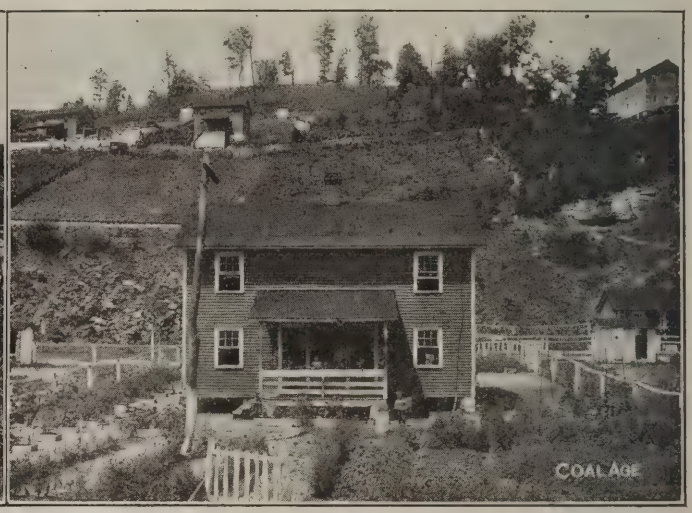
Much to the credit of the Weyanoke Coal & Coke Co., it may be said that not one case of serious illness has occurred at Lowe in over six years and typhoid fever is a name only. Finally, after much hesitation, for out of the hundreds of gardens viewed, it was difficult to chose winners, the judges made the awards.

The first prize for gardening, $20 in gold, was awarded to Frank Barton; the second prize in gardening, $18, was awarded to J. L. Burnett; the first prize for flowers, $5 in gold, was also awarded to Mrs. J. L. Burnett; and the first prize in sanitation, a luxurious lawn swing, was awarded to James Gordon, colored.

This company is ably demonstrating the fact that giving its miners all the comforts of life possible pays good returns and increases their physical vigor, making it possible for them to give more in return in a day's work. That the miners and their families receive a larger return is admitted at once, and it is only necessary to say that the vegetables in some gardens were valued at over $150, and few gardens there were that did not appraise at $50. The produce obtainable will total upward of $4000.



Garden Which Received First Prize



One of the Flower Gardens



The Most Sanitary Premises



A Prize-Winning Garden

Every square foot of bare pipe carrying saturated steam at a temperature of 330 deg. F. (100 lb. gage pressure) will represent a loss of 625 B.t.u. with a surrounding atmospheric temperature of 62 deg. F. There are various insulating materials in general use and tests show that the percentage of saving over bare pipe are as follows: Hair felt, 87 per cent.; magnesia, 87 per cent.; asbestos, 89 per cent.; silicated cotton, 90 per cent.; magnesia sectional covering makes a neat and firmly effective lagging, but has the objection that it will not stand much handling. It is, however, for its cost perhaps as effective a covering as can be obtained. Hair felt is now never used with the highest temperatures owing to the danger of combustion.

American Mine Safety Association

The following is the program of the Association for its meeting in New York City at the Waldorf Astoria, Sept. 7-10.

Sept. 7—Morning, sight-seeing and getting settled. 2 p.m., address of welcome. Reading of minutes. Report of executive committee. Meetings of subcommittees. Evening, entertainment.

Sept. 8—Morning, business session. Committee reports. Afternoon and evening, excursion to Coney Island by boat. Shore dinner.

Sept. 9—Morning, business session. Committee reports. Afternoon, closing business session and adjournment. Visit to Museum of Safety in Engineering Societies' Building.

Sept. 10—All-day excursion around Manhattan Island, with visit to New York Edison Co. at 38th St. station, and to the work of the Public Commission in tunneling the Harlem River.

The Edison companies have developed several exceptionally valuable methods of guarding against shocks from currents of high voltage and a visit to their works will well repay those who are interested in electrical work. Ladies will be welcome and a special program is being prepared though in all cases the trips to points of interest will be open to both ladies and gentlemen. The trip around Manhattan has been substituted for the advertised visit to the yacht race because that race is deferred for a year.

The field meet will be held at Terre Haute, Ind., on Sept. 12, at Central League Baseball Park. In the evening, there will be a smoker and social session. Dr. J. A. Holmes, director of the Bureau of Mines, J. P. Reese, president of the American Mine Safety Association, Governor Ralston, Mayor Roberts and others are on the program as speakers.

Everyone who is interested in the mining industry is invited to be present at the meet. No admission will be charged. All squads desiring to enter should notify either H. M. Wilson, secretary American Mine Safety Association, or the Bureau of Mines, both at Pittsburgh, Penn., or Dr. August F. Knoefel, Terre Haute Trust Building, Terre Haute, Ind. This notification should come through the superintendent of the company by whom the contestants are employed.

Mine-Rescue Work in Canada



Rescuemen No. 6 mine



Transporting patient on stretcher



Pulmotor work



Lifting the patient onto stretcher

MINE-RESCUE TEAMS AT STATION NO. 1, HARDIEVILLE, LETHBRIDGE, ALBERTA

Discussion By Readers

Problems in Rescue Apparatus

Letter No. 2—Referring to the recent discussion in reference to the reactions that take place in the human body and, particularly, to the relative volumes of oxygen consumed and carbon dioxide exhaled, COAL AGE, June 27, p. 1062, the following information will be of interest, coming as it does in response to my request, from an eminent physiologist in England, who writes:

"In the description of breathing apparatus used in mine-rescue work it is commonly stated that 2 liters of oxygen per minute or 120 liters per hour is supplied to the wearer. That is the amount of oxygen required by a man when doing moderately hard work. His output of carbonic acid or carbon dioxide will be approximately the same, namely, 120 liters per hour; and the absorbent provided must be capable of taking up that amount of carbonic acid per hour. The amount of carbonic acid breathed out is the same as the amount of oxygen taken in when a man is oxidizing carbohydrate food, and getting the energy of the work he is doing entirely out of that carbohydrate.

"By carbohydrate food I mean such food as starch, which is one of the chief constituents of bread, potatoes, sugar, etc. If a man is oxidizing fat or protein, which is the chief constituent of meat, he will not expire quite as much carbonic acid as he inspires oxygen. This is because part of the oxygen is utilized in oxidizing the hydrogen in the fat or in the protein, and leaves the body in the form of water. This water is not excreted necessarily in the expired air; it may be passed out from the kidneys in the urine, or from the skin, in the form of sweat. At the most, less than one-third of the oxygen would be turned into water, supposing the man were doing his work on a diet of fat and meat.

"The more carbohydrate food a man eats (and that is the food that a workman takes most of), the more nearly will the amount of carbonic acid expired correspond to the amount of oxygen inspired. The relationship of carbonic acid expired to the oxygen inspired is given by physiologists as the quotient, expressed by the symbols CO_2/O_2, called the "respiratory quotient." On a carbohydrate diet this respiratory quotient equals 1, while on a diet of protein and fat it will more likely equal 0.75."

H. N. ELMER, Gen'l. Agent,
Siebe Gorman & Co., Ltd.

Chicago, Ill.

The "Mine-Ruin" Law

The writer of the article in COAL AGE, Aug. 8, p. 239, entitled "Magnifying Supposed Evils," is evidently much in the dark in regard to the far-reaching results of the mine-run law as affecting the Ohio coal trade. This fact, no doubt, enables him to look on what he terms "the bright side of the proposition." It is truly a commendable way to regard the difficulties that, from time to time, obstruct our path. It is always easier, however, to look on the bright side of a proposition in regard to which we are but slightly informed.

The coal operators of Ohio have looked in vain for any bright side in the practical operation of the mine-run law, with which they have been confronted. I am pleased to say, from my own knowledge, the editorial that appeared in COAL AGE, June 13, p. 974, and other similar ones, have stated the condition, in respect to this law in Ohio, correctly. While our Kansas friend, writing in COAL AGE, July 25, p. 155, makes it a trifle strong from the standpoint in Ohio, there is not a shadow of doubt but that he is right when he sums up briefly the legitimate results of the mine-run law as "decreasing the revenue from the sale of coal by producing large quantities of a lower-priced quality; causing the loss and abandonment of much coal that could be otherwise profitably worked; increasing mine accidents; . . . overcrowding the mines with unskilled and ignorant workmen, and finally destroying large areas of surface lands."

When we consider that a large majority of the coal companies in Ohio, today, are not making a dividend of 1 per cent. on their investment when running normal, it is not difficult to understand that if this slight margin is to be still further reduced by the inferior quality of the coal produced, together with an excessive amount of fine coal that must be paid for by the operator, it is only a question of time when the coal operators of Ohio will be driven to the wall.

When Mr. Hogarth attempts to reassure the Kansas correspondent with the statement that in the district where he is located (Pittsburgh district) "all the coal is mined on a mine-run basis," he is evidently of the opinion that Kansas is situated similarly in respect to both mining and market conditions. While I am not familiar with the conditions existing in Kansas and must accept as correct the correspondent's description of the working of the mine-run law in that state as being disastrous, I do know conditions in the Ohio market and in the Ohio mines; and I can state positively that the operators of Ohio regard this act not as a mine-run law, but as a "mine-ruin" law. Such are the mining and market conditions in this state, that this law and the regulations governing its operation, can only bring disaster to the industry.

Referring again to Mr. Hogarth's letter, the mines in Heilwood are or were for years run nonunion, which rendered the matter of maintaining discipline in them much more simple than where the U. M. W. of A. has swing. While I am aware that 90 per cent. of the miners employed in those mines are foreign-born, they are not the I. W. W. element with which we have to deal in Ohio.

Without criticizing either union or nonunion mines or miners, the fact should be patent to everyone that the question of maintaining discipline in a nonunion mine is a much simpler problem than is presented in a mine where a union asserts its control. In the nonunion mine

a violation of state law or mine regulations can be punished as it deserves; but the discharge of a man for a similar violation of law or regulations, in a union mine, is a serious matter, however flagrant may be the violation.

In the latter case the mine committee at once gets busy and, in many cases, the company must submit to their dictation in the matter or run the risk of a shutdown as a result, the men going out on strike until such time as the matter can be put up to the district officials for adjustment. Moreover, the decision is not apt to prove favorable to the company, who may win out eventually in the case of a violation of state law, but the process is slow and tedious. Many operators will put up with a rank violation of discipline rather than entail the expense and inconvenience of a shutdown.

In order to show the attitude of one of the highest officials of the U. M. W. of A. in respect to the policy he desired the miners to adopt in reference to laws they felt were injurious to them, permit me to quote from his recent speech advising the acceptance of the mine-run law, with its provisions for docking the miners for a certain amount of impurities found in their cars. He spoke in effect as follows:

> By the provisions of this law, you must be fined by a Justice of the Peace for such violations of mine regulations. Now, men, we elect the Justices of Peace in all the mining districts; so let them provide for these fines in the law, and we, by our votes, will see to it that the fines are not enforced.

When a man who is a leader of an organization advocates the evasion of law through political power, it can readily be seen that it is a simple matter for the rank and file of the organization to follow his bidding.

If coal mining were as profitable as many think it is, it would be of great advantage for operators in different states to come together and discuss problems of general interest, and thereby learn of each other's difficulties, and how they may be best overcome. Under existing conditions, however, we must forego this pleasure and content ourselves with discussing such problems in a common forum. My conclusion is that the *mine-run law*, as far as Ohio is concerned, is bound to prove the MINE-RUIN LAW.

O. P. RATER.

———, Ohio.

Needed Education

It is with a feeling of regret and some anxiety that one observes the growing activities of the I. W. W. and kindred organizations. The drama recently enacted in the industrial affairs of Colorado and Ohio would seem to suggest, at least, the possibility that in some future day should these tendencies of man's primitive nature be allowed to gain a permanent ascendency, brute force might replace vested authority, and unreasoning demand take the place of calm judgment and justice. One might even imagine that the standing of the individual in a community, as in the days of barbarism, must soon depend on the strength of his right arm.

As was suggested in an editorial, COAL AGE, Vol. 5, p. 1058, the question may well be asked whether America is capable of assimilating the great tide of immigration now coming to her shores, and maintain the integrity of her standard. In the recent events to which reference has been made, one beholds a mad stampede of unreasoning destruction and barbarous cruelty. The actors in the drama were largely recruited from the foreign element.

The essential difference between the primitive and the civilized man is that the one is ruled by impulse, the other by reason. To avoid the admittedly rather vague possibility of this too impulsive foreign element eventually gaining control of our country, two solutions present themselves. They are as follows:

First, the exclusion of the morally uneducated and mentally undeveloped immigrant. It may be argued that, at the present stage of development, this would work a serious hardship on American industries, which, in a measure, is true.

Second, the need of what I would call the "moral education" of this primitive type, both native and foreign born. Certainly, this sounds like a difficult proposition; but when we remember that man is endowed by nature with reason, which enables him to anticipate his needs and makes him a law unto himself, it is clear that he has risen above the primitive level; and the morally educated man has overcome the blind instincts of the primitive man.

The education needed most, today, is the kind that will teach men how to live in peace and contentment. It should be recognized that the demand for an increased wage is inspired not so much by an existing necessity as by the desire for greater possessions. This desire, which is often an evidence of thrift and is commendable, if carried to excess may become a potent factor to crush out the refining influences of civilization, accelerating a reversion to the type. In avoidance of this, the needed education must show a man how to spend his money in a prudent manner; how to buy and prepare nourishing and wholesome food; how to furnish and decorate his home; how to make his surroundings sanitary and attractive; and last, but by no means least, it must teach foreigners how to speak and read the English language.

Until recent years, the assimilation of the foreign element has been left to take its own course, by gradual familiarity with American customs. At the present time, because of the increasing number, and the more closely drawn social lines, this method is no longer adequate; but moral education should be placed more and more in the hands of trained and competent teachers.

ERNEST L. BAILEY,
Mining Engineer.

Crumpler, W. Va.

Safety in Relation to Cost of Production

In the many articles and papers that have been written and read in support of the safety-first idea, in respect to coal mining, it is remarkable that the economic side of the question has been wholly disregarded. In my opinion, this is a subject that should receive the most careful consideration.

To avoid being misunderstood, let me say that safety has been my watchword as long as I can remember, indeed from the time I first came to understand the meaning of the word. While I know and appreciate the importance of making conditions safe in all mining work, I regard it as equally essential to study the economic aspects of the production of coal. There is as great ne-

cessity for producing coal at a profit as there is to produce it under safe conditions. As an industry, a mining proposition is without value unless the dividends are assured. Few, if any, men engage in the coal-mining industry for love of the work or for amusement; the acquisition of wealth is the motive. An old saying is to the effect that "the desire to acquire wealth is the greatest incentive to progress."

These reflections make it clear that the profits in coal mining are an essential part of the proposition. The safety-first idea must not be regarded too strongly from the side of sentiment. Sentiment is a poor diet for a hungry man. The young man who hopes to acquire a fair knowledge of mining without close application and hard work will never make a practical success, until he is able to grasp the situation as a whole, and apply his knowledge so that it will prove to be more than a sentiment.

The safety-first movement must not be allowed to degenerate into a sentiment; it has a practical side, which must be regarded. We live in an age of competition. Coal operators in different mining districts compete for trade in the same market. They mine their coal under conditions that vary widely. These conditions, and the varying charges for transportation, greatly modify the profits for the same quality or grade of coal.

The situation is further embarrased by the fact that a low-grade coal costs practically as much to mine and transport to market as a high grade coal, while the wide difference in the selling prices of these two grades makes the mining of the one a lucrative proposition, while the other must often be sold on the market at a loss. I recall now two instances of this kind where one coal mined at 95c. per ton sold at $3.50 per ton, f.o.b. mines, while another coal in the same market, mined at 88c. per ton, only brought $1.07, f.o.b. mines.

These few thoughts are expressed in the earnest hope that some of the readers of COAL AGE may give their opinions, and that the discussion may prove helpful, by drawing attention to the economic consideration in relation to the safety-first movement. What are the essential requirements to secure reasonable safety in the mining of coal, and to what extent must small operations be burdened with their obligation?

In my opinion, the most earnest efforts should be made to bring the coal trade to a basis of greater uniformity, and thereby avoid as far as possible the present state of affairs in this regard. I believe that economy of production and safety of operation are closely allied factors of the coal industry.

W. CROOKS.

Wylam, Ala.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

RELATIVE MEASUREMENTS

A common method of making physical measurements for the estimation of weight, volume, heat, etc., is by reference to some adopted standard. All such measurements are relative and are frequently termed "specific." Such, for example, are **specific gravity, specific volume, specific heat,** etc. The atomic weight of elements is often called **specific weight.**

The Elements—An element is a substance that has not, as yet, been resolved into parts of a different nature and is, therefore, regarded as being composed wholly of one kind of matter or **simple,** in contrast with a **compound,** which is composed of two or more elements or kinds of matter.

The following table gives the more important elements, together with their chemical symbols and specific or atomic weights:

TABLE OF THE MORE IMPORTANT ELEMENTS

International Committee (1910)

Elements	Symbols	Atomic weights H = 1	O = 16	Elements	Symbols	Atomic weights H = 1	O = 16
Aluminum	Al	26.9	27.1	Manganese	Mn	54.49	54.93
Antimony	Sb	119.3	120.2	Mercury	Hg	198.4	200.
Argon	A	39.6	39.9	Molybdenum	Mo	95.23	96.
Arsenic	As	74.36	74.96	Nickle	Ni	58.21	58.68
Barium	Ba	136.27	137.37	**Nitrogen**	**N**	13.9	**14.**01
Bismuth	Bi	206.34	208.	Osmium	Os	189.37	190.9
Boron	B	10.91	11.	**Oxygen**	**O**	15.88	**16.**
Bromine	Br	79.28	79.92	Palladium	Pd	105.9	106.7
Cadmium	Cd	111.5	112.4	Phosphorus	P	30.77	31.
Caesium	Cs	131.75	132.81	Platinum	Pt	193.44	195.
Calcium	Ca	39.77	40.09	Potassium	K	38.78	39.1
Carbon	C	11.9	**12.**	Radium	Ra	224.6	226.4
Cerium	Ce	139.13	140.25	Rhodium	Rh	102.08	102.9
Chlorine	Cl	35.18	35.46	Selenium	Se	78.6	79.2
Chromium	Cr	51.58	52.	Silicon	Si	28.1	28.3
Cobalt	Co	58.5	58.97	Silver	Ag	107.02	107.88
Columbium	Cb	92.75	93.5	Sodium	Na	22.82	23.
Copper	Cu	63.06	63.57	Strontium	Sr	86.92	87.62
Fluorine	F	18.85	19.	**Sulphur**	**S**	31.81	**32.**07
Gold	Au	195.62	197.2	Tellurium	Te	126.48	127.5
Helium	He	3.97	4.0	Thallium	Tl	202.37	204.
Hydrogen	**H**	**1**	1.008	Tin	Sn	118.05	119.
Iodine	I	125.9	126.92	**Titanium**	Ti	47.72	**48.1**
Iridium	Ir	191.56	193.1	**Tungsten**	W	182.53	184.
Iron	Fe	55.4	55.85	Uranium	U	236.59	238.5
Lead	Pb	205.44	207.1	Vanadium	V	50.79	51.2
Lithium	Li	6.94	7.	Zinc	Zn	64.85	65.37
Magnesium	Mg	24.13	24.32	Zirconium	Zr	89.88	90.6

The **above** table contains only 56 out of the 80 or more elements that have been discovered, many of which are so rare as to be of little practical importance. The values of the atomic weights are given referred both to hydrogen as unity and oxygen as 16. The heavy type indicates the values commonly used in the study of mine gases.

The Coal Age Pocket Book

The elements form the basis of all relative measurements with respect to weight, density, volume; and it has been discovered that there is an intimate and close relation between the atomic weight and the specific heats of substances.

Illustration—The density of air, referred to hydrogen as unity (H = 1), can be calculated from the relative weights and volumes of oxygen and nitrogen, which are the chief constituents of air. The composition of pure air, by volume, is practically, ogygen (O) 20.9 per cent., nitrogen (N), 79.1 per cent. Then, since the atomic weight of oxygen is 16 and that of nitrogen 14, the relative weight of 100 volumes of air, referred to hydrogen as unity is found as follows:

Oxygen,	20.9	× 16 =	334.4
Nitrogen,	79.1	× 14 =	1107.4
Air,	100	*vol's* =	1441.8

Therefore, one volume of air is 1441.8 ÷ 100 = 14.418 times as heavy as the same volume of hydrogen; or, the density of air referred to hydrogen is 14.418.

The percentage composition of pure air, by weight, is readily calculated from the above figures: thus:

Oxygen, $\frac{334.4 \times 100}{1441.8}$ = *say* 23.2 *per cent.*

Nitrogen, $\frac{1107.4 \times 100}{1441.8}$ = *say* 76.8 *per cent.*

Molecular Volume—Chemical hypothesis assumes that the molecules of simple substances each contain two atoms only, while the molecules of a compound substance may contain any number of atoms, but never less than two. Notwithstanding this multiplicity of atoms, **Avogadro's law** makes all gases, with a few unimportant exceptions, to contain the same number of molecules, per unit volume, when measured at the same temperature and pressure.

In other words, **all gaseous molecules, with few exceptions, are of the same size, at the same temperature and pressure.** This law holds true for all mine gases, and is important in the calculation of the relative volumes of gases concerned in chemical reactions.

Atomic Heat—An important relation has been found to exist between the atomic weights of the elements and their specific heats. Dulong and Petit (1819) found that the specific heat (relative heat capacity) of most of the solid elements vary inversely as their atomic weights, so that the product of these two factors is a constant quantity (6.4), which has been properly called the **"atomic heat";** and represents the common heat capacity of the solid elements, taken by weight in proportion to their atomic weights. The following are a few examples:

	At.wt.		*Sp.ht.*		*At.ht.*
Iron,	55.85	×	0.1190	=	6.6
Lead,	207.10	×	0.0305	=	6.3
Mercury,	200.00	×	0.0333	=	6.6

Inquiries of General Interest

Keeping Rooms on Sight

Having had some difficulty in keeping the rooms in our mine on the proper sight lines, I would like to ask for any suggestion as to the best method to employ that will enable the miners to drive their rooms in a straight line and parallel to each other. The usual method and the one that we have employed is to drive two plugs into holes drilled in the roof slate, on line or in the direction the room is to be driven. These plugs are about 3 ft. apart or less, and strings called by the miner "sights" are hung from tacks or nails in these plugs.

These sights are often lost; at other times they are wholly disregarded, with the result that the rooms frequently "hole" into each other. In a few cases, this has caused heavy roof falls and a serious loss of coal in the pillars, which had to be abandoned. A good, practical method of keeping rooms on line will be much appreciated by readers who have experienced the same difficulty.

MINE FOREMAN.

Middlesboro, Ky.

The difficulty to which correspondent refers is a common one. In most cases, the "sight lines" used by miners are not over 2 ft. apart. As a result, any slight variation in the position of these lines greatly magnifies the error at the face of the room. It is customary for a miner, from his position close behind the sights which he illumines with the light of his lamp, to line in the lamp of another miner held at the face of the coal, 30 or 40 yd. away. It is evident that the error of the line at the face may reach 3 or 4 ft.

A greater error, however, is liable to occur when these sights are extended and new sights put up in the room, unless the original sights have been carefully protected and the work of placing the new sights is done by an experienced person. To reduce the liability to error to a minimum, all sights should be extended and new sights put up opposite a breakthrough where it is possible to measure the distance between the sight lines of adjoining rooms.

A good suggestion has been made to the effect that sight lines are best extended by means of a chalk line on the roof. It is possible under a fairly smooth or uniform slate roof to establish a point in the roof some distance ahead, say opposite a breakthrough. If there are no timbers in the rooms, a chalk line can then be stretched between the entry sights and the point thus established. The cord is held taut and snapped against the roof, leaving a well defined line, which should then be marked by plugs at intervals.

All extensions should be made in the same manner, by stretching a chalk line between these plugs, and extending the same to the point where a new plug is to be placed. The usual sights 2 ft. apart can then be put up on this line as often as desired. In some cases, it may be considered better to go over the chalk line with a paint brush, making a permanent line, say 2 in. wide, and extending this as the room is driven forward.

Correction

Referring to the question of the transmission of electrical power as explained, COAL AGE, Aug. 1, p. 201, permit me to draw attention to a seeming oversight in the formula for finding the area of the wire required to transmit a current of 150 amp., a distance of one-half mile (2640 ft.), with a line drop of 19 volts. The constant 10.8 should be used instead of 21.6. This would reduce the size of wire required one-half.

In the same connection I would suggest, would it not, in this case, be better to assume a wire return, instead of a rail return?

E. B. WAGNER,
Kingston, Penn. Electrical Engineer.

We are glad to have correspondent draw attention to the oversight in the use of the double constant (21.6 mil-ft.) instead of the value 10.8, which should have been employed here, since the answer given assumes a rail return for which the pressure drop has already been deducted, leaving 19 volts as the permissible drop in the wire.

This answer was first prepared for a wire return, in which case the length of wire required is double the distance the power is to be transmitted, and the double constant (21.6) was used (Kent, 7th ed., p. 1033). But in order to show the more general case, in the transmission of power in coal mining, a rail return was afterward adopted without making the necessary change in constant.

The answer for a rail return should therefore read as follows:

$$Circ.\ mils = \frac{10.8 \times 2640 \times 150}{19} = say\ 225{,}100$$

The weight of a triple-braid, insulated copper wire of, say 250,000 circ.mils, as taken from manufacturers' tables, is 985 lb. per 1000 ft., or 0.985 lb. per ft. At 20c. per lb., one-half mile of this wire will cost $2640 \times 0.985 \times 0.20 =$ say $520.

On the other hand, however, assuming, as correspondent very properly suggests for the installation of a fan at some distant point on the surface, one-half mile from the power plant, a wire return, the required size of wire to transmit a current of 150 amp. a distance of one-half mile (2640 ft.), with a line drop of 275 — 250 = 25 volts is

$$Circ.\ mils = \frac{21.6 \times 2640 \times 150}{25} = 342{,}144$$

The weight of a triple-braid, insulated copper wire of say 350,000 circ.mils, as taken from wire tables, is 1345 lb. per 1000 ft., or 1.345 lb. per ft. At 20c. per lb. one mile of this wire would cost $5280 \times 1.345 \times 0.20 =$ say $1420.

Examination Questions

Questions for Examination of Mine Electricians

(Continued from last issue)

Ques. 30—Is a compound-wound motor, a constant-speed motor?

Ans.—No. A compound motor runs slower under load than with no load.

Ques. 31—On what does the speed of a motor depend?

Ans.—The counter current generated by the armature is a large factor in determining the speed of a series-wound motor when carrying a load.

Ques. 32—Why is the spider of a ring-wound armature made of brass?

Ans.—Brass is nonmagnetic. If iron or steel were used for this purpose these metals, being magnetic, would interfere with the magnetic field of the armature core.

Ques. 33—Does the voltage have any effect to decrease or increase the speed of a series-wound motor?

Ans.—The voltage of the electric current has little effect to change the speed of the motor.

Ques. 34—What is the average speed of the cutter-chain on a mining machine?

Ans.—The average speed of a cutter-chain is between 400 and 600 ft. per minute.

Ques. 36—If there is a break or an "open" in the resistance of a starting box of the common type, how would you locate the trouble and make quick repairs?

Ans.—Place the starting lever on the first button; then, with a screw driver or other piece of metal make connection between consecutive buttons, in order, till the break is found, as will be evidenced by the motor starting up. To repair the defect, place a "jumper" between those buttons where the break exists.

Ques. 37—Can an open circuit in an armature be detected by observation simply?

Ans.—An open circuit in an armature is frequently recognized by the greenish rings that appear to encircle the commutator, caused by the heating and oxidation of the copper, at that point.

Ques. 38—What is a compression cup?

Ans.—A compression cup is a grease cup having a spring-feed. A small spring forces a piston downward in the cup, by which means the grease is slowly driven out and lubricates the bearings.

Ques. 39—What is the wheelbase of a motor?

Ans.—The wheelbase is the distance between the centers of the extreme axles of the motor, and measures the base of support on the rail.

Ques. 40—Are chilled cast-iron or steel-tired wheels best for use on a locomotive?

Ans.—Steel-tired wheels give a greater tractive effort than cast iron, but cost more.

Ques. 41—How is the pitch of a gear ascertained?

Ans.—To find the pitch of a gearwheel, add 2 to the number of teeth and divide the sum by the diameter of the wheel in inches.

Ques. 42—What is the least number of teeth used in a pinion?

Ans.—In common practice, pinions are seldom designed with less than 12 teeth; but, in special cases, pinions of 5 teeth have been used, and 9 teeth are not uncommon.

Ques. 43—What is a castle-nut?

Ans.—A castle-nut is a nut having slots cut across the top, for the purpose of inserting a cotter-pin through a hole in the bolt, to keep the nut from unturning.

Ques. 44—What are the dimensions of a standard half-inch nut?

Ans.—A cold-pressed half-inch nut is ½ in. in thickness and ⅞ in. measured between the flat faces of the nut. The dimensions of a finished nut are slightly less than these, owing to the grinding down of the metal surface.

Ques. 45—What is the difference between a capscrew and a bolt?

Ans.—A capscrew is a bolt withiut a nut, the nut being the only difference between them.

Ques. 46—Is oil used when drilling cast iron?

Ans.—Oil is not commonly used, in drilling cast iron or brass, for the reason that, owing to the brittle nature of cast iron, the drill does not tend to heat as quickly as when drilling wrought iron or steel.

(Answered by Request)

Ques.—A mine sump is 60 ft. long, 10 ft. wide and 8 ft. deep. If this sump is full of water, how long will it take a pump to empty it, if the water end of the pump is 6 in. in diameter and operated at a piston speed of 100 ft. per min., assuming the efficiency of the water end to be 80 per cent.

Ans.—The sectional area of the water end is $0.7854 \times 6^2 = 28.274$ sq.in. At a speed of 100 ft. per min., the piston displacement of this pump is $(28.274 \times 100) \div 144 = 19.63$ cu.ft. Allowing for an efficiency of 80 per cent. at the water end, the quantity of water handled by the pump is $0.80 \times 19.63 = 15.7$ cu.ft. per min. The cubic contents of the sump is $60 \times 10 \times 8 = 4800$ cu.ft. The time required for this pump to empty the sump is then $4800 \div 15.7 = 305.7$ min., or 5 hr. 5.7 min.

Ques.—A current of 3000 cu.ft. per min. of air and gas is at its maximum explosive point; how much air must be added in order that the mixture will show a faint cap on a safety lamp?

Ans.—A firedamp mixture, at its most explosive point, contains 9.46 per cent. of gas. The volume of gas present, therefore, in this case, is $3000 \times 0.0946 = 283.8$ cu.ft. per min. Now, assuming that the first indication of a flame cap is seen, in the common unbonneted Davy lamp, when 2 per cent. of gas is present, the entire volume of gas and air required to produce this result would be $283.8 \div 0.02 = 14{,}190$ cu.ft. per min. The quantity of air to be added to the current, to produce this result, is then $14{,}190 - 3000 = 11{,}190$ cu.ft. per min.

Coal and Coke News

Washington, D. C.

Advices received from many sources continue to indicate that coal mining will probably be less disturbed as a result of the European war than almost any other industry in the United States, and that in some respects it will probably be stimulated by the war, as already indicated. Government officials have been reassured on this point by the data with respect to the shipment of coal from the mines which are now regularly supplied to them.

With respect to anthracite, the latest available figures received during the past week and made public indicate that last month's shipments were 5,391,897 tons, as compared with 5,487,852 tons in July, 1913, a decrease of 95,995 tons. Total shipments for the first seven months are about 2,000,000 tons behind those of last year, but this is apparently in no respect due to war conditions. On the contrary, the war situation is believed likely to aid in making up the shortage.

The amount of coal on hand at tidewater shipping ports decreased 39,630 tons from 554,120 tons on June 30 to 514,490 tons on July 31. The Lehigh Valley is reported to have led in tonnage last month with 1,026,225 tons, the Philadelphia & Reading second with 831,965 tons, and the Lackawanna third with 826,771 tons, the Erie fourth with 717,201 tons, the Central of New Jersey fifth with 708,891 tons, the Delaware and Hudson sixth with 671,682 tons, the Pennsylvania seventh with 406,760 tons, and the New York, Ontario & Western eighth with 302,362 tons.

The opening of the Panama Canal, which is now ready for business, an official trip having been made in the S. S. "Ancon" on the 16th of August, while various merchant vessels have been successfully put through, is expected to cause an immediate demand for fuel supplies in the Zone. South American countries are already manifesting a sharp demand for coal of various grades, due to the cutting off of other supplies.

Secretary Lane's View of the Situation

Secretary Franklin K. Lane, of the Department of the Interior, in an interview regarding the effect of the war on the United States, makes the following statement:

A direct benefit to the United States from the European war will be its effect in making the people of this country realize to a greater extent the value of its mineral resources. It is entirely possible to so utilize these resources and expand our industries that the label "Made in America" will become familiar in our own and foreign markets.

Of an importance second only to that of the food supply is the supply of mineral products necessary to meet the requirements of twentieth century civilization. One of the first effects of the war has been to make us realize the interdependence of nations in the matter of food supply. Most of the countries now at war are dependent upon importation of foodstuffs, and we have cause for self-congratulation in the United States that we are able to feed ourselves. What we possibly have not so fully realized is that we are nearly as independent in the possession of essential mineral resources, and that the interference with manufacturing caused by interruption of the flow of importations of many necessary raw materials may be overcome almost wholly by development of neglected resources in our own country.

"Do you mean," Mr. Lane was asked, "that the United States can make itself independent of the rest of the world in its manufactures?"

"Very largely," asserted the secretary. "The main difficulties to be overcome are in the rearrangement of the distribution system necessary to establishing this independence. Business is established along certain well-marked channels, and usually follows the line of least resistance. It has been easier, and perhaps cheaper, to import mineral products and materials from other countries than to go to the trouble and expense of developing our own resources of the same nature. Forced to the latter course by suspension of commerce with other countries, I believe that American enterprise and energy will almost at once turn to the development of the native resources, rather than permit production to lag and supply to be diminished in any industry.

"The Southern States have for years largely supplied the world with phosphates, but because of the distribution system, a large part of this supply has gone to Europe, and much of the phosphates used in the Western States have been imported across the Pacific. We have some 3,000,000 acres of phosphate lands in the West lying near the smelters, from which is produced the sulphuric acid necessary to convert these phosphates into a form available for plant food, and still there is no law by which these deposits can be made commercially available, although a bill which would allow of their immediate development has been favorably reported by the Public Lands Committee of the House of Representatives, and is awaiting the aproval of the House and Senate.

"While the United States leads in coal mines, the six European nations now at war happen to be the six next largest coal-mining countries, producing together over half the world's coal. Interference with both the mining and the commerce of these nations must necessarily increase the demand for our coal, at least in the neutral countries of the world. And coal is our one resource about which there need be no present anxiety. The United States is now producing 40 per cent. of the world's supply, and the reserves yet to be drawn upon exceed, so far as known, those of all the rest of the world combined."

An Additional Feature of the Rate Decision

A feature of the recent opinion of the Interstate Commerce Commission in the advanced freight rate case, to which considerably more attention is being given (because of its bearing on future coal rates) than was accorded to it by traffic men at the time it was first made known, is the question of relative railway earnings with respect to the movement of various classes of products over the lines concerned. The comparison shows that under existing rate conditions, the average net revenue of the railroads from the hauling of bituminous coal is 3.24 mills per ton mile, while the average net revenue per loaded car mile is 16c. These figures compare with 5.60 mills per ton mile on coke and 21c. per loaded car mile.

On other commodities, the statistics show that in certain cases the average net revenue per ton mile ran as high as 12c. and over, while the average net revenue per loaded car mile ran as high as 28c. The lowest figure for average net revenue per net ton mile was 2.77 mills, while the lowest average net revenue per loaded car mile was 6c. Average net revenue per ton mile on most commodities ran from 4 to 7c.

It is thus seen that the net revenue obtained on bituminous coal was distinctly below the average when measured per ton mile. On the other hand, the total number of carloads for which statistics were obtained was much greater in the case of bituminous coal than in that of any other commodity, amounting to 64,430 carloads.

In summing up the situation, the Commission says:

Instances will be found of ton-mile earnings as low as 0.58 of a mill and car-mile earnings as low as 1.69c. Other rates, while yielding higher car-mile earnings, appear very low when the value of the commodity is considered. For instance, there will be found through or proportional domestic rates on copper bullion below 2 mills per ton mile; the average yield on 676 cars of this commodity, as disclosed by the exhibits mentioned, was only 2.73 mills per ton mile and 11c. per car mile, whereas the average yield on 2486 cars of pig iron was 4.31 mills per ton mile and 17c. per car mile. A compilation prepared by the Commission showing the market prices for a series of years of the commodities covered by the traffic exhibits, together with representative rates thereon prevailing from time to time, will later be made available.

PENNSYLVANIA

Anthracite

Shamokin—Far up in a breast in the Cameron colliery of the Mineral R.R. & Mining Co., that had caved in early on Aug. 12, Leo Bulcosky was rescued late in the afternoon of Aug. 14 by a large force of men, headed by Superintendent William Reinhardt and State Mine Inspector P. F. Fra[illegible]. When found, he was in fairly good condition, notwithstanding he had been without light or food ever since being made a prisoner. As he crawled through a small hole into the arms of his rescuers, he asked for water, and after a small quantity was furnished him he wanted bread. Liquid refreshments were furnished him, after which he was wrapped in blankets and removed to the surface. A big crowd of spectators cheered him as well as his rescuers, and he was placed in an ambulance and taken to the state hospital for treatment against physical collapse.

The threatened general strike of Philadelphia & Reading Coal & Iron Co. employees in the Shamokin, Treverton, Mt. Carmel and Locust Gap districts, 5000 employees being involved, was averted on Aug. 16. The members of the United Mine Workers met at Shamokin and voted to report for duty on Monday, Aug. 17, as they had reason to believe matters would be adjusted satisfactorily with the company.

The big Alaska colliery workings of the Reading has been idle since Aug. 10, when the employees quit work because the company insisted on their obeying the order to produce checks issued by the company and to report at a central headquarters every morning and evening.

Scranton—The annual contests between the first-aid teams of the Delaware, Lackawanna & Western R.R. Co. will be held this year at Sans Souci Park (Wilkes-Barre), on Saturday, Aug. 22, when all teams from Scranton, Kingston and Nanticoke districts will particupate. Dr. Lake and District Supt. H. G. Davis are making the arrangements. The contests should prove of more than usual interest, for the winning team is to represent the company at the contests in New York City, to be conducted under the auspices of the Federal Bureau of Mines.

Pine Grove—The Public Service Commission, on Aug. 13, gave permission to the Philadelphia & Reading Ry. Co. to discontinue the evening passenger service between Pine Grove and Outwood on days when the collieries are closed, there being no demand for accommodation.

Bituminous

Colver—The coal town of Colver is one of the few towns in this section of the state which has not felt the effects of the war in Europe. The officers of the Ebensburg Coal Co. state that they expect to be able to sell all the coal they can mine for a year, and are laying plans for a decided expansion in business. One of the improvement plans is a large repair shop where the company will be able to make all its own repairs on mine cars.

Meyersdale—Judge Ruppel, on Aug. 12, ordered C. J. Rowe and C. F. Rowe, owners of the C. F. Rowe & Bros. Co., to pay a fine of $25 and costs, following a hearing of charges filed against the company by State Mine Inspector F. W. Cunningham. It is alleged that C. J. Rowe, who is superintendent of the Hamilton mines, failed to countersign the weekly mine record books, and that C. F. Rowe failed to keep a fan going at all times, and that he failed to measure the air current and record it, as is required by the state bituminous mine law.

Pittsburgh—The Export Coal Co., on Aug. 10, filed suit against the Fidelity & Deposit Co. of Maryland to recover $11,984.99, said to be owing by the Frank Williams Co., of Buffalo, N. Y., for which the defendant became surety. The plaintiff alleges that in March, 1913, an agreement was made whereby the entire output of the Export Coal Co. was to be delivered to the Frank Williams Co. from Apr. 1, 1913, to Apr. 1, 1914. The Williams company paid for a short time for coal, then became in arrears, and the mine was idle. Small sums were paid now and then, and the mine would work a few days. Finally, on Mar. 4, 1914, the Williams company went into the hands of a receiver.

Charleroi—According to the monthly report of officials at Lock No. 4, more than 13,282,000 bu. of coal passed through the locks during July, a decrease of 3,000,000. In June, more than 17,000,000 bu. were towed through.

WEST VIRGINIA

Glenalum—On Aug. 14 a band of Italian bandits murdered three officials of the Glen Alum Coal Co. who were proceeding from the railway station to the mines, with between $10,000 and $15,000 in the payroll. The Italians escaped to the mountains with this money, but were located by a posse on Aug. 15 and the following day every member of the band was killed. These five men, however, for almost 24 hours, held a posse estimated at 200 men at bay, and were finally dislodged only by the use of high explosives.

Bluefield—Indications are for a general revival of activities in the Virginia and West Virginia coalfield. The mines which have been working half time throughout the summer are daily increasing their working forces, and it is considered but a matter of a few days before practically every operation will be working a full force. The mines affected lie in Russell, Tazewell, Motgomery and Wise countines in Virginia, and Mercer, McDowell, Mingo and Fayette counties in West Virginia.

Charleston—Reports from the Cabin Creek coalfield indicate that the mining and shipping of coal has taken a considerable boom during the past few weeks. It is said that more coal is now reaching the Chesapeake & Ohio main line over the Cabin Creek branch than ever before in the history of this field. The settlement of labor troubles in the Cabin Creek section, and the present European war, are expected to exert a powerful influence toward increasing the output.

Piedmont—Various improvements are being made at the mine of the Davis Coal & Coke Co., of Beryl, which has been idle since June 1. The Masteller Coal Co., with mines located at Hampshire, has completed another opening, which will give employment to about 45 or 50 men and further increase the present output.

KENTUCKY

Earlington—It is announced that the Victoria Coal Co. will develop an additional coal mine near here and will sink a 300-ft. shaft.

Louisville—The sale of the assets of the Central Coal & Iron Co., held a few days ago, was a part of the re-organization plans of that company, according to J. H. Small, secretary. Mr. Small is quoted as saying that the plan has nothing to do with the projected large merger of coal concerns in the western part of the state. Detailed information as to the re-organization plans is not yet available.

OHIO

Athens—One of the few suits filed as the result of personal injuries since the workmen's compensation law went into effect in Ohio was brought at Athens, recently, by the administrator of the estate of Fred Kaplar, the Manhattan Coal Co., of Nelsonville, being the defendant. Damages of $10,000 are asked. It is alleged that Kaplar was employed as a motorman in Mine 36 of the company, and that he was killed by a fall of slate on Oct. 29, 1913.

Congo—State Mine Inspector J. M. Roan and a number of deputies have arranged to open the Congo mine of the Sunday Creek Co., which has been sealed up for nine months because of fire. It is believed the fire is extinguished.

Wellston—The tipple and power house of mine No. 9 of the Superior Colliery Co., located near Wellston, were totally destroyed by fire recently. Burning embers dropped in the shaft and for a time threatened the mine but prompt work on the part of employees and mine inspectors saved it from burning. It will be two months before the mine can again be operated.

Massillon—After an idleness of four months and a half work has again started at the mines of the Peacock Coal Co. in the Massillon field. It is expected that practically all of the mines in that field will be in operation soon.

INDIANA

Terre Haute—A conference was recently held here to discuss the advisability of uniting the bituminous and block miners into one organization. Strong opposition developed There are about 21,000 bituminous and 1500 block miners and the latter are decreasing rapidly, with the exhaustion of the supply of block coal.

ILLINOIS

Zeigler—In removing the debris from the air shaft after a fire at the mine here, the body of one of the employees was found at the foot of the air shaft, in three sections. It is supposed that the man was trying to escape up the shaft and was overcome by the smoke and fell to the bottom, where the refuse cut and burned through his body. The local mine seems to be unfortunate, for only a week or so before the air shaft fire a fly wheel burst, not doing any damage to the property, however, with the exception of the engine house roof. Work has now been resumed.

Marion—Reports from all points in the southern Illinois mining field and as far north and west as Sparta and throughout Herrin, Jackson, Williamson and portions of Saline counties, are to the effect that several of the mines have had to rely upon the railroads to haul them a sufficient supply of water to operate the property. In some sections of the southern Illinois mining field there has been no rain for over three months, and all the ponds, lakes, streams and wells have dried up. Water, in some cases, is hauled many miles

Millstadt—Failure to successfully drill wells deep enough to secure an adequate supply of water has kept the large strip mine here, known as High Prairie, idle since last spring.

Johnston City—The First National Bank of this city has been ordered closed by the bank examiner. This condition of affairs is due largely to bad loans previously made, and the recent heavy demands for cash made by the foreign miners, who are getting ready to return to Europe in answer to the call for reserves from the different countries now at war.

WYOMING

Cheyenne—Wyoming mine operators recently met with representatives of the United Mine Workers in an attempt to adjust difficulties which were submitted a short time prior to the meeting. Chief among the demands made by the miners is the adoption of an eight-hour day from bank to bank, or from the outside to the outside of the mine. They do not ask for an increase of wages, with the exception of the shortening of the actual working time within the mine itself. Furthermore, a few additional safety rules are requested.

FOREIGN NEWS

Halifax, Nova Scotia—As a result of the unprecedented financial situation growing out of the European hostilities, it was recently decided to close a portion of the iron mines in Newfoundland, and the blast and openhearth furnaces at Sydney mines, on Cape Breton Island.

Nanaimo, British Columbia—South Wellington, the site of the Pacific Coast Coal Co.'s mines, six miles from Nanaimo, was recently destroyed by fire. Sixty houses were burned, also three stores, a poolroom, post office, and the Wellesley Lumber Co.'s saw mill. The loss is estimated at over $50,000 with little insurance. The upper works of the mine were not, however, damaged, and work here will be continued.

OBITUARY

Charles L. Hall, of the coal shipping firm of Hall Bros. & Co., and who was especially well known to the anthracite trade, died Aug. 15, at Ocean City, N. J., from injuries received by diving into a tank. He struck his head and died as a result of a fractured spinal column. Mr. Hall was 46 years of age.

Geo. L. Miller, of the Kettle Creek Coal Mining Co., died Aug. 12, at his home in Westport, Penn., of meningitis, superinduced by an affection of the heart. Mr. Miller was prominent in business and political circles. He was the Republican candidate for Assembly in 1912, and was elected State Committeeman from his county at the primary election in May last.

William Forrester, superintendent of the Cameron Coal Co., and one of the most prominent mine operators in Utan, recently died as the result of being struck by a cable while at the Cameron mine. Mr Forrester was born in Scotland in 1868, coming to this country when he was about 20 years of age. His family moved to Utah in 1890 and settled in Salt Lake, where Mr. Forrester has resided ever since. He is survived by his wife, six children, two brothers and one sister.

George Thomas, assistant mine foreman of the Babylon mine of the William A. Colliery, Lehigh Valley Coal Co., and George Cray, of the Lehigh Valley engineering corps were killed on Aug. 12, by a fall of rock. The engineering corps were making a survey of the mine and in their travels were obliged to go into the old workings Mr. Thomas and Mr. Cray preceded the other men in the corp when the fall came. Both men were killed instantly. Their bodies were crushed and mutilated, and it took considerable time to remove the rock. Mr. Thomas was nearly 70 years of age, while Mr. Cray was about 20 years old.

PUBLICATIONS RECEIVED

Department of the Interior, Bureau of Mines, Technical Paper 75. "Permissible Electric Lamps for Miners," by H. H. Clark. Twenty-one pages, 6x9 in.; illustrated.

Department of the Interior, Bureau of Mines. Bulletin No. 73. "Brass Furnace Practice in the United States," by H. W. Gillett. Two hundred and ninety pages, 6x9 in.; illustrated.

Department of the Interior, Bureau of Mines Technical Paper 70, "Methods of Oil Recovery in California," by Ralph Arnold and V. R. Garfias. Fifty-seven pages, 6x9 in.; illus trated.

Illinois Coal Mining Investigations, Bulletin 5. "Coal Mining Practice in District 1 (Longwall), by S. O. Andros. Forty-two pages, 6x9 in., with many drawings and illustrations.

University of Illinois, Engineering Experiment Station, Bulletin No. 74. "The Tractive Resistance of a 28-Ton Electric Car," by Harold H. Dunn. Fifty-three pages, 6x9 in., with many tables and curves.

Department of the Interior, Bureau of Mines, Technical Paper 78. "Specific Gravity Separation Applied to the Analysis of Mining Explosives," by C. G. Storm and A. L. Hyde. Fourteen pages, 6x9 in.; illustrated.

University of Illinois, Engineering Experiment Station, Bulletin No. 72. "Magnetic and Other Properties of Electrolytic Iron Melted in Vacuo," by Trygve D. Yensen. Seventy-one pages, 6x9 in., with many illustrations, diagrams and curves.

RECENT COAL AND COKE PATENTS

Furnace. F. Siemens, Berlin, Germany, 1,098,985, June 2, 1914. Filed June 13, 1912. Serial No. 703,554.

Coke Oven. S. A. Hoge, Rices Landing, Penn., 1,099,703. June 9, 1914. Filed Oct. 23, 1913. Serial No. 796,766.

Miner's Lamp. W. H. Logan, Carnegie, Penn., 1,099,753. June 9, 1914. Filed Nov. 22, 1912. Serial No. 732,812.

Gas Producer. J. A. Herrick, New York, N. Y., 1,100,074. June 16, 1914. Filed Feb. 27, 1911. Serial No. 611,032.

Dumping Grate. E. A. Wildt, Scranton, Penn., 1,100,412. June 16, 1914. Filed Jan. 25, 1913. Serial No. 744,226.

Mining Shaft. C. B. Rowley, Brainerd, Minn., 1,100,622. June 16, 1914. Filed May 13, 1913. Serial No. 767,330.

Miner's Safety Lamp. P. Wolf, Zwickau, Germany, 1,100,336, June 16, 1914. Filed Jan. 30, 1913. Serial No. 745,206.

Mechanical Stoker. Gustav de Grahl, Zehlendorf, Germany. 1,098,566, June 2, 1914. Filed June 3, 1913. Serial No. 771,450.

Coke Oven or Gas Furnace. W. Fricks, Bloomfield, N. J., 1,098,374, June 2, 1914. Filed Jan. 3, 1912. Serial No. 699,188.

Mining Machine Grizzly. O. H. Briggs, Providence, R. I., 1,098,934, June 2, 1914. Filed Mar. 24, 1911. Serial No. 616,636.

Forced Draft Hollow Grate Bar. J. H. Dietz, Kansas City, Mo., 1,100,125,June 16, 1914. Filed May 3, 1913. Serial No. 765,251.

Apparatus for Manufacture of Coal Gas. R. C. Congdon, Atlanta, Ga., 1,099,639, June 9, 1914. Filed Mar. 14, 1914. Serial No. 824,640.

Mining Machine. S. M. Mavor and H. A. Mavor, Glasgow, Scotland, 1,100,597, June 16, 1914. Filed Mar. 8, 1910. Serial No. 548,009.

Safety Appliance for Mine Hoists. W. E. Housman, Scottdale, Penn., 1,100,304, June 16, 1914. Filed Jan. 30, 1912. Serial No. 674,253.

Automatic Damper for Chimney Flues. J. Goerrien, Minneapolis, Minn., 1,100,296, June 16, 1914. Filed Apr. 21, 1913. Serial No. 762,605.

Method for Controlling Combustion. F. H. Brown, Ridley Park, Penn., 1,098,935, June 2, 1914. Filed Nov. 28, 1911. Serial No. 662,814.

Closure for Retort Coke Ovens. H. Koppers, assignor to H. Koppers Co., Chicago, Ill., 1,099,256, June 9, 1914. Filed July 8, 1913. Serial No. 777,831.

Safety Appliance for Mine Shafts. W. E. Housman and G. E. Huttelmaier, Scottdale, Penn., 1,100,184. June 16, 1914. Filed Sept. 10, 1912. Serial No. 719,686.

Blower for Boilers. T. S. Waller, assignor to Diamond Power Specialty Co., Detroit, Mich., 1,100,165. June 16, 1914. Filed Mar. 14, 1912. Serial No. 683,893.

Fastener for Sectional Coal Auger Nuts. J. H. Wenslick, assignor to Fulton Tool Works, Fulton, Ohio, 1,099,224, June 9, 1914. Filed Apr. 7, 1913. Serial No. 759,287.

CONSTRUCTION NEWS

Windber, Penn.—The Lochrie Coal Co. has a force of men working on its new mine opening at the Manges farm near here.

Hazleton, Penn.—G. B. Merkle & Co. have given the contract for the erection of a new breaker, to cost $60,000, to Wheeler & Reilley, of Wilkes-Barre.

Indiana, Penn.—A contract has been let for the construction of 5 miles of railroad along Yellow Creek from Homer City. This spur will connect a new opening with the Pennsylvania R.R.

Mt. Carmel, Penn.—Ground has been broken for the concrete foundations of the new breaker of the East Bear Ridge Coal Co., which is controlled by James Bros., of Mahanoy Plane

Shawnee, Ohio—The Hanna-Essex Coal Co., of New Straitsville, Ohio, has started to rebuild the tipple at the Shawnee mine. When completed the capacity of the operation will be increased to 600 tons daily.

Pekin, Ill.—The work of rebuilding the Wolschlag mine across the river from this point has been started. This structure burned two months ago. The new buildings will be of concrete and steel, and fireproof. The work will be pushed as rapidly as possible, and an effort made to get the mine completed for the winter season.

Chattanooga, Tenn.—A 20-acre tract in Alton Park has been accepted by representatives of the Durham Coal & Iron Co. as the site for the projected million dollar byproduct coke plant to be constructed here. Control of the property will be vested in the Chattanooga Gas & Coal Products Co. Lewis T. Wolle has been representing the interests of the promotors of the proposition

Lackawanna, N. Y.—Construction work on the new coking plant of the Buffalo Coking Co. at this place has been stopped, on account of conditions in Europe. Several hundred men have been laid off, and operations suspended indefinitely. This plant, which was being built by the Otto Coke Oven Co., was to be employed for supplying gas for the operation of the steel company's furnaces. It was to have been completed within the year, and would have employed three or four thousand men.

NEW INCORPORATIONS

Ft. Wayne, Ind.—The Evans Coal Co. has increased its capital stock $5000.

Seattle, Wash.—The Table Mountain Coal Co. has been organized with a capital of $200,000. The incorporators are Gustov A. German, E. A. Grunden, and Clara Cornell. Leon W. Bernard is the attorney for the firm.

Nashville, Tenn.—The Galloway-Eberhardt Coal Co. has been organized in Shelby County, with a capital stock of $30,000. The incorporators are Chas. S. Eberhart, June H. Rudisill, Carl S. Page, Charles S Eberhardt, Sr., and Samuel Schloss.

Fairmont, W. Va.—The Fairmont Rail & River Coal Co. has been incorporated with a capital stock of $300,000. The chief works will be in Marion County. The incorporators are Thomas S. Neptune, Ernest R. Bell, R. O. Nuzum, H. W. Alford, and Frank J. Wilfang, all of Fairmont.

St. Clairsville, Ohio—A number of Bellaire people recently received permission to incorporate as a company to be known as the Elkins Coal Co. The capital stock will be $10,000, divided into 100 shares. D. A. Elkins, L. E. Long, Alexander Gibson, Charles and Guy Dankorth, are the incorporators. All are from Bellaire.

INDUSTRIAL NEWS

Stewartsville, Ohio.—Several representatives of the Pursglove Maner Coal Co. have made a thorough inspection of the company's mines located at Stewartsville and Glencoe.

Columbus, Ohio—The Little Miami R.R. Co. has applied to the Ohio Utilities Commission for permission to issue $306,500 in guaranteed stock for the purpose of making needed improvements on its line.

Anderson, Ind.—A contract to supply the municipal light and water plants with coal for one year has been awarded to the Globe Coal Co., Indianapolis, at $1.10 mine-run and 75c. slack, f.o.b. The contract amounts to about $25,000.

Washington, D. C.—Proposed increased rates on bituminous coal from points on the Pittsburgh & Lake Erie R.R. to Wilmington, Philadelphia, and Baltimore, on traffic destined to points beyond these cities, were suspended Aug. 12 by the Interstate Commerce Commission.

Fayetteville, W. Va.—Shipments of coal over the Virginia Ry. during the past fiscal year broke all previous records, being an increase of 13.6 per cent. over the previous year. Compared with the fiscal year ending June 30, 1912, the 1914 tonnage shows an increase of 1,328,711 tons, or 39.6 per cent.

Washington, D. C.—Surface rights to a large part of the 450,000 acres of the segregated coal and asphalt lands of the Choctaw and Chickasaw nations in Oklahoma will be sold in November. Announcement of the proposed sale was recently made by the Commissioner of Indian Affairs.

Charleston, W. Va.—Sixty of the stockholders of the Lackawanna Coal & Lumber Co. have just completed a tour of the property on a special train. Seth, Olcott and Griffith were the principal points visited and at these points thorough inspections were made of the developments under way or begun.

Cincinnati, Ohio—The Chesapeake & Ohio Ry. Co. has filed in the Federal District Court here its petition for an appeal from the judgment of that tribunal awarding to the McKell heirs damages of $125,000, assigning 58 errors as ground for the appeal and reversal. The petition was allowed, and the appeal bond fixed at $175,000.

Columbus, Ohio—The residents of Jackson, Hamden and Wellston, Ohio, have lodged a complaint with the Ohio Utilities Commission against the Hocking Valley Ry. Co., abandoning its interurban service on the 17-mile line, leased by that company. The utilities commission has taken evidence and will announce its decision in the near future.

Washington, D. C.—That a shortage of coal exists on the west coast of Mexico was recently reported by Admiral Howard to the State Department. "Under existing conditions," he states, "with the scarcity of foreign vessels, the supply of coal appears a difficult problem. Even before the European war, no coal could be bought by a foreign battleship.

Philadelphia, Penn.—Two American steamships, the "Berwind" and the "Lorenzo," have been chartered to carry coal from Atlantic coast ports to Buenos Ayres. The vessels have been taken on time charters, and are the first American steamships to carry coal direct to the Rio de la Plata, this condition being made possible by hostilities in Europe.

Portland, Ore.—The Interstate Commerce Commission will be appealed to, it is understood, to adjust the freight rate on coal from the Centralia, Wash. district, to Portland. At present the rate is $1.40 per gross ton, while to Seattle, a similar distance, the rate is but $1. This is considered an unjust discrimination that the railroads should be compelled to remove.

Charleston, W. Va.—Notice was recently received by the state Public Service Commission from the Interstate Commerce Commission, that beginning Oct. 1 next the freight rate per ton on coal from the mines along the Kanawha & Michigan R.R. to Richmond would be $1.65 instead of $1.90. The present rate from the same territory over the Chesapeake & Ohio R.R. is $1.60 per ton.

Toronto, Canada—Sir William Mackenzie, Sir Donald Mann, and other Canadian capitalists, have acquired important coal deposits in Venezuela, and have had them investigated by Canadian government geologists, who report that they are of great extent and high quality. This means the establishment of a coal supply near the Panama Canal and a supply for Brazilian gas plants which are now dependent upon imports from England and Wales.

Philadelphia, Penn.—An interesting feature in the charter market on Aug. 13, was the closing of 10 steamships to load full cargoes of coal at Philadelphia, Baltimore or a Virginia coal port for Las Palmas, Canary Islands, at 20s. This is the first time since the trouble in Europe that steamship chartering became active. In addition to the closing of 10 steamships, two vessels were chartered to load coal at the same port, one for Rio Janeiro at $5.75 per ton and the other for the River Plate at 23s. 6d The shipments to Las Palmas is entirely new business and due to the difficulty in securing English coal.

Pittsburgh, Penn.—The Pittsburgh Industrial Development Commission was recently in receipt of a communication from the American consul at Montevideo, Uruguay, announcing that that government requires about 20,000 tons of coal in two months. Large quantities of fuel are also required for the retail trade, the selling price in Uruguay at the present time being equivalent to $21.70 per ton. The Commission is in frequent receipt of cables from various South American points where American consuls are located, and may become a substantial factor in extending American trade throughout South America.

Springfield, Ill.—The Mine Rescue Station Commission anticipates having an interesting exhibit at the State Fair this year. This will be located in a tent near the main entrance to the grounds, and will include the principal apparatus kept at the stations, such as oxygen breathing apparatus, pulmotors, safety and electric lamps, first-aid materials, etc. A trained team of first-aid miners will give daily exhibitions in the practical application of first aid, and on Friday, Sept. 25, in the Coliseum, will be held the Second Annual First Aid Contest, open to all miners in the state Substantial prizes will be given to the winning teams and the winners in the one-man events.

Coal Trade Reviews

General Review

Business uncertainties have created a sharp buying movement in anthracite. Derangement in coastwise and foreign shipping has seriously disturbed the Eastern bituminous situation. Producers aggresively investigating the possibilities in the foreign markets. Sentiment generally better.

A general uneasiness has developed among anthracite consumers which has created an unexpected and broad buying movement in all directions. Prices are notably firmer, with concessions on the regular circulars confined more particularly to the poorer grades, and the market appears to be easily absorbing the relatively large production now in effect. A feature of the hard coal situation is the persistent demand for the steam sizes, practically all of the current production going into immediate consumption; as a consequence, the fear is expressed in some quarters that the companies will not succeed in accumulating the customary surplus stocks of these grades before the winter trade opens up.

The Atlantic Seaboard bituminous market is much disturbed by the unprecedented conditions prevailing in shipping circles. This has resulted in occasional accumulations of demurrage coal, but the trade has not at any time been actually choked up. In fact, there are complications arising such as car shortages and a slow movement which seem to indicate an impending shortage. Consumers at down east New England ports are already becoming urgent about orders. Water freights will also be an important factor in the situation, and with the government considering taking over a number of steam colliers, there will be considerable tonnage to replace.

Developments in the export business have been of a contradictory nature so far, the Berwind-White Co. supplying the large liners, having been compelled to reduce operations to less than half capacity, whereas other concerns bunkering irregular tramp steamers report such vessels taking coal up to their full capacity in order to have sufficient to last for the round trip.

Interior points are also showing great interest in the possible results of the European war on their markets, but it is difficult to see how they can expect to benefit until districts shipping the Seaboard trade are completely swamped with orders. The results so far in the Pittsburgh district have been of an adverse nature, breaking up a gradual improvement that had been evident for some time; prices are irregular with contracts negotiable on a rather low basis. Production in Ohio is increasing rapidly, and the domestic grades are in good demand with prices well maintained. The Lake trade continues light.

There is a notably improven sentiment in the Southern market, due to the possibility of a heavy export business developing So far the increases and decreases in business have approximately balanced each other, so that conditions remain rather quiet, though the indications of an improvement ultimately are generally accepted. The Middle Western trade also expects to participate in any benefits derived from an increase in the export business, as this will restrict the Western shipments of the Eastern coals. The results so far have been of a depressing nature. The grain movement has been interrupted, with the result that considerable railroad buying anticipated for this time has not materialized.

ATLANTIC SEABORD

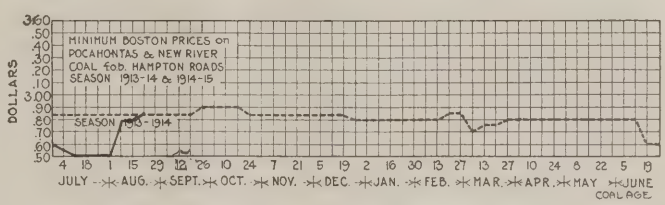
BOSTON

Good inquiry for Pocahontas and New River, both off-shore and coastwise; prices firm. Better demand expected for Pennsylvania grades. The only apprehension now is over a possible car shortage. Water freights advance. Anthracite demand picks up and active fall market is in prospect.

Bituminous—Shippers of Pocahontas and New River are beginning to get their bearings with regard to fall business. The volume of coal on cars at Hampton Roads is still very large but there is a lot of inquiry for off-share loading 30 and 60 days hence. There are few now who do not look for a strong active market before we are far into October. The announcement last week that the West Atlantic is safely open to English, French, and neutral shipping has given a better complexion to the export trade and heavy requisitions are expected soon from points that ordinarily are supplied by foreign shippers.

Coastwise, the $2.85 basis is being very firmly maintained, much to the surprise of tardy buyers who failed to be impressed by the low prices that prevailed in June and July There is a strength to the market that has not been in evidence for nearly a year. The on car prices, $3.69 at Providence and $3.78 at Boston ,are also being held reasonably well, although sales have been light thus far.

All this makes the soft coal interests in Pennsylvania similarly hopeful. If anything like the demand comes that the Southern shippers look for it will mean the bulk of Hampton Roads and Baltimore coals will go for export. In disturbed times, coal always goes to the market that pays and in the event of stiffening prices off-shore New England will almost surely have to look to Philadelphia and New York for supplies. The bunker trade in New York certainly is not slack, as was feared. Quite an amount of business has been closed the last ten days and some buyers are quite urgent about getting coal forward. Several mines that were under curtailment in July are reported now to be on full time.



The Georges Creek grades are sharing the benefits of improved conditions. The shippers are conservative about fall orders and are doubtless well pleased that they did not meet the competition from Hampton Roads that looked so ominous earlier in the season.

Water Freights are notably stronger. Spot rates, 2500 tons or so, Hampton Roads to Boston, have advanced 10c. within a week and some of the transportation people are declining to make rates more than a month ahead. The feeling prevails that coastwise freights will continue to advance with the season. The Government is expected to take over several steam colliers now operating to the coal ports and if negotiations are successful there will be quite an amount of tonnage to replace Schooners, 4000 tons upwards, are now quoted at 70c., Norfolk to Boston ,as against 55c.@60c. Aug. 1.

Anthracite—There are many signs that the fall demand is beginning to set in. The dealers in the cities have their hands full already putting out coal to consumers and the week has developed rather unexpectedly the first run of orders in several weeks. Dealers find their storage needs replenishing and the trade is counted upon now to settle into a satisfactory fall market. Some of the far-sighted buyers are trying to figure out how the anthracite railroads will meet the extra Western traffic that is likely to be thrown at them. This may become a serious problem.

Prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.45	$1.25@1.65	$1.67@1.77	
Philadelphia*	2.15@2.70	2.10@2.90	2.92@3.02	
New York*	2.45@3.00	2.80@3.20	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.85@2.95
Boston†	.....	.....	.....	3.58@3.78
Providence†	.....	.....	.....	3.58@3.68

* F.o.b. †On cars.

NEW YORK

Complications developing in bituminous that indicate an impending shortage. Interest centering on export business, though developments so far are of a conflicting nature. Sub-

stantial improvement in the anthracite situation. General buying movement has been started in the line trade.

Bituminous—The soft coal trade is still characterized by many uncertainties. Never before has there been such active investigation or so much inquiry for export tonnages, but business actually closed is seldom heard of as yet. Developments of a constructive nature so far have about been offset by other factors equally adverse. However, it is generally agreed in all quarters that complications are developing, such as the slow movement on the Pennsylvania and car shortages on both the Baltimore & Ohio and the Norfolk & Western, which are usually the forerunners of a general shortage.

Interest is centering around the export and bunkering business, and sales agents are devoting much of their time to a diligent study of the conditions and possibilities offered in the foreign markets. Results developed to date are generally conflicting. The Berwind-White Co., by far the largest exporters at New York harbor, have been exceedingly hard hit by the interruption in Trans-Atlantic travel, and have again been forced to restrict operations down to less than half capacity The Berwind company's business, however, is confined principally to the large ocean liners, which business has been the principal sufferer because of the war. On the other hand, the irregular tramp business is even more active than usual, as vessels of this character are coaling up to the maximum capacity in anticipation of difficulty in obtaining supplies at foreign ports.

Internal conditions are also showing definite indications of improvement. Even though the railroads feel that they did not benefit greatly by the decision of the Interstate Commerce Commission on the 5% rate increase, they have the compensating advantage of knowing exactly where they stand and are able to adopt more definite policies. As a result of this condition, and also no doubt in anticipation of handling large amounts of freight for export, there is a notably stronger buying movement on the part of the carriers.

Certain restricted grades have experienced slight advances recently, carrying them back to normal figures, but the nominal market continues unchanged on the following basis: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—As a sequence of the general unsettlement in all lines, particularly as regards financing business, an unexpected and gratifying buying movement has sprung up in the line trade that has given a welcome momentum to the hard-coal business. Interior dealers are taking the position that high prices are going to prevail at Tidewater this fall, while at the same time the rural banking interests, being more conservative than the New York institutions, will draw in on credits. As a result of this condition, they are being forced now to buy in self protection.

The Reading Co., which has been working under a heavily curtailed schedule, are reported short of broken coal, though the other large producers, which are in most instances now operating up to nearly full capacity, are able to take care of all surplus orders of this description. Egg coal is notably stronger, selling at concessions of only about 10c., with a few odd lots offered at less. Stove coal continues the leader, and is only sold with certain proportions of egg and nut which has aided materially in maintaining the market on these slower grades.

There is a stronger demand in the line trade for pea coal which is absorbing the total production, and there will scarcely be any surplus of this grade accumulated for the winter trade. Notably better prices are prevailing on the other grades of steam coal, although the off qualities are still offered at low figures. There has been considerably less than the normal stocking of the steam grades.

The strong steady demand in the all rail trade, together with the possibilities of developing some export business for anthracite, has created in an excellent situation at Tidewater. It is believed that a large export business might be worked up for egg and broken coal.

The market is higher, quotations being now as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	$4.60@5.00	$4.95	$4.55@4.95
Egg	5.25	5.15@5.25	5.20	5.00@5.20
Stove	5.25	5.25	5.20	5.20
Chestnut	5.50	5.30@5.50	5.45	5.25@5.45
Pea	3.55	3.45@3.55	3.50	3.25@3.50
Buckwheat	2.80	2.75@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.25@2.30	2.00@2.25	1.70@2.25
Barley	1.80	1.75@1.80	1.75	1.30@1.75

PHILADELPHIA

Anthracite trade showing some improvement. Tidewater business more brisk, and better inquiry locally. Bituminous quiet, with no increased demand, and prices unchanged.

Anthracite—The market is not showing any marked activity, but indications point to an early opening of the fall demand. Sales agents report quite a number of inquiries, and it is understood that business is coming in quite freely for Tidewater shipment. Mining still continues on the short time basis, the market absorbing practically all sizes with the possible exception of chestnut, which continues to pile up in storage. Broken, egg and stove seem to be moving off particularly well, and it is confidently expected that the early part of September will see the dealers in the market to replenish supplies, depleted by the house holders returning from their vacations, and desirous of filling up their bins.

Individual operators still continue to flood the market with offers at reduced prices This refers to certain sizes which are in excess supply, notably chestnut and pea. The prices on other sizes seem to be well maintained, although a substantial order for chestnut would doubtless bring a concession from the circular on the other grades.

Prices at Tidewater are as follows:

	Circular	Individual
Broken	$4.65	$4.65
Egg	4.90	4.80 @ 4.90
Stove	4.90	4.90
Chestnut	5.15	4.65 @ 4.75
Pea	3.25	

Bituminous—The market has been somewhat disturbed on account of the accumulation of coal at Tidewater points, consigned there for bunkering foreign steamers, requiring that this coal be sold to points on the Atlantic seaboard. Some of this coal, being on demurrage has been sold at a sacrifice, but as a rule, the market has been well maintained and it is understood that the situation has now been adjusted. Inquiries are being received here for shipments of gas and steam coals for South American ports, notably the Argentine, where it is reported there is but a three months' supply on hand. Freight rates on vessels have stiffened, on anthracite as well as bituminous. It is almost impossible to charter a vessel for the Southern ports at any rate.

COAL CHARTERS

The "Journal of Commerce" reports the vessel situation as follows:

Steamer chartering was light in all trades and there was no material change in the general conditions of the market. A few boats are wanted for South American and West Indian business, and it is understood that there has been some fixtures of the kind completed, the details of which are being withheld, but they are undoubtedly for coal to South America and for Cuba sugar to New York or Philadelphia. For boats to European ports there are a few scattering inquiries, but nothing of consequence has yet been done. In the sailing vessel market very little was done in chartering, and the only fixture of interest reported was that of a large schooner for a cargo of coal from Norfolk to Seattle, via the Panama Canal. Ample tonnage is available, although it is sparingly offered for charter.

Coal charters have been reported as follows:

Vessel	Nationality	From	To	Tonnage	Rate
Hermiston[2]	British	Virginia	Las Palmas	2927	$4.80
(Neutral)[2]		Virginia	Rio Janeiro		5.75
(Neutral)[2]		Baltimore	River Plate		5.64
(Neutral)[2]		Atlantic Range	Christiania		4.80
Ada F. Brown[1]		Newport News	Boston	1294	0.65
Polyktor[2]	Greek	Baltimore	River Plate	2484	6.00
Laertis[2]	Greek	Baltimore	River Plate	2380	5.64
Nygaard[2]	Norwegian	Philadelphia	Rio Janeiro	2742	
Henry F. Kreger[1]		Philadelphia	Porto Rico	991	
T. W. Dunn[1]		Philadelphia	Port Royal	·635	
Ella M. Storer[1]			St. John, N.B.	426	1.50
O. H. Brown[1]		Philadelphia	Boston	929	0.60
Otto Sverdrup[2]	Norwegian	Baltimore	Buenos Ayres	2291	6.30
(Neutral)[2]	Foreign	Baltimore	Buenos Ayres	9000	
Galveston[2]	Norwegian	Baltimore	Sagua	795	
Ben Nevis[2]	British	Philadelphia	Havana	2525	
Castle Bruce[2]	British	Norfolk	Curacao	2095	
R. W. Hopkins[1]		Philadelphia	Porto Rico	829	2.50
Perry Setzer[1]		Philadelphia	Boston	1268	
Daisy Farlin[1]		Philadelphia	Liverpool N.S.	385	1.50
Sutley[2]	British	Virginia	Metiterranean	2170	
D. B. Barrett[1]		Norfolk	Seattle	1799	

[1]Schooner [2]Steamer.

BALTIMORE

War results and possibilities continue the main topic of the trade. Much coal tied up at the piers here. Foreign inquiry heavy, but available bottoms for European shipment short.

The coal trade is still deep in the discussion of the effects of the great European war on the fuel business here. One of the immediate effects is seen in the manner in which coal is piling up at tidewater. At the Curtis Bay piers of the B. & O. and at the Port Covington pier of the Western Maryland Ry., there is much coal a-wheel and on demurrage. As far as possible, shippers caught with this coal, which was

sent to tide for export business and for foreign bunker trade connections. The result has been some sacrificing at tide, and a price list here is largely regulated by the necessity of the individual case.

While the call for fuel Eastward is still poor and prices the same, there is a little better demand reported to the Westward. Three-quarter West Virginia gas was possibly a little stronger, holding well to the dollar mark. Pennsylvania fuels also were selling at a dollar or better for the most part. There is a distinct feeling at the mines that better times are ahead, and there is very little disposition to sacrifice at production points, even though demand is poor. Everybody feels that a vast business is due for American coals to make up for the displaced Welsh product.

Anthracite coals are taking the ordinary late summer course in regard to household. Industrial call is very poor.

HAMPTON ROADS

Coastwise shipments showing some increase. Prices at Hampton Roads remain stationary. Inquiries being received from markets which have heretofore used Welsh coal almost exclusively.

Although there has been no extra heavy movement over the piers at Hampton Roads, dumpings for the week should show up good, as there has been some increase in the demand from New England and a fair amount has been shipped to South America and ports in the West Indies. Perhaps the most significant shipment of the week has been to Las Palmas, as this port receives practically all of its coal from Wales. This shipment will no doubt be followed by others, and it is understood that there are a number of inquiries in the market from other ports which have heretofore been supplied almost exclusively with Welsh coal.

The steamers "Benpark" and "Strathroy" are reported to have loaded for account of the Brazilian Government. Little information, however, is obtainable in regard to this.

So far as can be learned, there has been no advance in prices. The accumulation of coal in the railraod yards is perhaps a little above normal, with a fair amount of vessel tonnage in port and about due. Shippers are in most cases well prepared to take care of any orders which might call for prompt shipment. It is hoped that they will take advantage of any inquiries from markets using Welsh coal exclusively and endeavor to make prices that will hold this trade in the future.

The U. S. collier "Vulcan" loaded about 7000 tons of coal which she will take to Europe for the use of the battleships "Tennessee" and "North Carolina."

Export shipments were loaded for Gibraltar, Canal Zone, St. Thomas, Santiago, Las Palmas, Georgetown, Rio de Janeiro, Manaos and Para. The cargo for Gibraltar was loaded into the S. S. "Kirkoswald" and was originally intended to move to an Italian port, but after the vessel was loaded and held in port for several days, her destination was changed and she cleared for Gibraltar.

LAKE MARKETS

PITTSBURGH

Operations unchanged. War has checked what would otherwise have been a definite improvement. Prices still deeply cut. Prompt mine-run at close to a dollar a ton.

Eventually, the Pittsburgh coal district may experience some increase in demand on account of the war, but not without the districts which normally ship to Seaboard being first actually filled with business. Thus far the effect of the war has been to cause somewhat of a halt in business, forestalling what would otherwise have probably been quite an improvement in the coal trade at this time, as stocks are now about exhausted and manufacturing operations have been increasing. Production in the Pittsburgh district is fully as large as ten days ago, at close to 70% of nominal capacity.

Prices are very irregular, as regards both prompt and contract, and there is little hope that they will firm up until the mines are practically filled with business. Steam coal slack is going in prompt lots at 55@60c. and gas coal slack at 65@70c., though even these prices might possibly be cut sometimes. Desirable contracts for mine-run could probably be placed with some sellers on the basis of $1.15, while prompt lots have gone at less, and down close to a dollar a ton. Even ¾-in. has sometimes sold below $1.15 for prompt lots. Regular circular prices, which are purely nominal remain: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50 per ton at mine, Pittsburgh district.

BUFFALO

Some large orders for foreign shipment have been received. Business improving slowly though rather heavy. Anthracite more active than usual.

Bituminous—Trade has not improved to any extent since the breaking out of the European war, but the expectation is that it will begin to pick up before long. With any starting up of export orders the situation ought to be much brighter. One or two large companies with offices here have already received foreign orders which will divert unusually large blocks of coal from this market. On the other hand there are many concerns engaged in foreign trade, or dependent upon it in some way, that are doing little and hence are not disposed to add to their fuel supplies Nobody calls business at all active for this season.

No great amount of coal has been consigned to this market lately and this has helped the price situation. Much of the coal that is offered speculatively is of poor grade and comes from small operations, which have no good outlet. Quotations remain on a basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny sizes about 25c. less.

Anthracite—The activity continues greater than ordinarily prevails in August, much of the business coming from Canada. Retailers have begun to feel some alarm over the war situation and its possible effects upon the coal trade; this is also felt to some extent by consumers and a heavy stock of coal is being carried all around. As a rule orders are filled promptly. Lake shipments of anthracite are in steady volume and show no tendency to increase, as there is a good deal of coal on docks up the Lakes. For the past week the shipments were 151,000 tons.

TORONTO

Consumers stocking up to full maximum capacity and business very active.

Since the outbreak of the European war, business has been very active, consumers being anxious to secure supplies before an advance in prices, which is expected at any time. There are ample supplies on hand and consignments are coming forward freely. Quotations are as follows, prices being firmly maintained. Retail—Anthracite egg, stove and nut, $7.50; grate, $7.25; pea, $6.25; bituminous steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale, f.o.b. cars, three-quarter lump, $3.68; screenings, $2.64

TOLEDO

Better tone to the market and Lake shipping is increasing. Foreign war will ultimately improve the coal business. Expectations of a car shortage.

There is a better tone to the market since the settlement of the wage scales at most of the Ohio mines. With the resumption of work in the Hocking district, there have been many more boats shipping in the Lake trade and conditions are much better than they were, though not up to normal.

Local coal men are taking an optimistic view of future conditions. They predict an increase in prices on account of the European war, although business may be held down some at the outset. It is also pointed out that European economic exhaustion is bound to follow the strains of the wasting conflict and that American products will be called upon. The decision of the government that the Great Lakes are not subject to the neutrality laws has made the coal trade with Canada legitimate. Local dealers are reticent about Canadian shipments, but there are rumors of German questioning of the destination of certain coal now going up the Lakes.

Whatever else may be the result, dealers here are confident about the general betterment of the coal situation. Buying is heavier now than it has been for months past, and prices are holding steady. Pocahontas is still scarce and quotations are very firm. A car shortage is predicted by practically all the local trade. The public utilities commission is already sending railroad traffic men and large shippers a circular advising close coöperation between the roads and shippers to prevent the congestion of traffic.

COLUMBUS

Mining is being generally resumed. The only district now idle is eastern Ohio. Increasing demand for domestic sizes is reported. Fine coal is weak.

Mining is being generally resumed with the exception of eastern Ohio, where the scale has not yet been adjusted. In practically all other districts scales have been fixed up and the output is gradually increasing.

Reports show that there is a good demand for domestic grades. Dealers are buying both for immediate delivery and also for shipment towards the latter part of the month. The price list is generally well maintained and cutting is

becoming less frequent. The stocking season is now at hand and consequently dealers are busy looking after orders. They report a marked preference for the fancy grades such as Pocahontas and West Virginia splints, but on the other hand there is also a good demand for Hocking and Pomeroy coal.

The Steam Trade is rather slow but this can be expected when the business conditions are taken into consideration. Manufacturing is at a rather low ebb and buyers are not inclined to close steam contracts. Some such contracts have been closed recently and sales managers are working on others. The prices are usually the same as last year. There is some stir in railroad fuel contracts but practically none have been closed recently.

The Lake trade is becoming more active as the production increases; some of the larger operators are devoting considerable attention to that department. The Sunday Creek Co. will try to ship 600,000 tons to the head of the Lakes which will be much less than last season. Bottoms appear to be more plentiful now and the docks of the upper Lake ports are free from congestion.

The market for small sizes is very weak, due to the large production of Lake coal and heavy shipments from West Virginia. As a result prices are lower than have prevailed for some time.

Quotations are now on the following basis:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Rescreened lump	$1.60		$1.75	$1.50
1¼ inch	1.50		1.60	1.50
¾-inch	1.20	$1.20	1.40	1.30
Nut	1.15		1.50	1.15
Mine-run	1.10	1.05	1.15	1.10
Nut, pea and slack	0.55		0.55	0.50
Coarse slack	0.45	0.40	0.45	0.40

CLEVELAND

For all the increased inquiry the orders do not actually grow larger. More varieties are being quoted. Only the restricted arrivals are holding the market to its present level.

Railroads brought only about half as much coal into this market over Sunday as they did two weeks ago. The market is able to absorb just about all the coal now on track, but if shipments are increased there will be a drop in prices as there was two weeks ago. All of the coal held over is now out of the way and current receipts are being delivered.

Goshem operators have signed up with the miners on the basis of 50.5c. a ton for machine-mined run-of-mine coal. Mines have not resumed operation to any extent, but clean up work is progressing and operators are quoting 1¼-in. at $1.45; three-quarter, $1.30, and mine-run at $1.20. Slack is quoted at $1.60 to 1.65, delivered. The freight rate to Cleveland is 70 cents.

Hocking producers are holding to $1.60 at the mines for rescreened three-inch lump, $1.50 for 1¼-in.; and $1.30 for three-quarter. The contract business is taking the bulk of the coal being produced and only one company will be out strong for business when shipping is resumed at full capacity.

No. 8 operators are not conducting any further negotiations but the miners are reported to be making arrangements to open the way for further parleying, though nothing has been done as yet.

The Lake trade is all that could be expected with upper Lake docks as heavily loaded as they can be. At Duluth-Superior it is estimated there are 8,000,000 tons of coal. The docks are rated at over 9,000,000 tons capacity but damage by wind last spring has done much toward reducing the storage space.

Quotations are as follows:

	Pocahontas	Youghiogheny	Fairmount	No. 8 W.Va.	Masillon
Lump	$3.60				$3.20
Lump, 1¼ in.		$2.25	$2.05	$2.10	
Lump, ¾ in.		2.25	2.05	2.10	
Egg	3.60				
Mine-run	2.60	2.10@2.15	2.00	2.00	
Nut		2.20			3.20
Slack	2.35	1.60@1.65	1.70	1.60@1.65	

CINCINNATI

The local market has been strengthened by the stiffening effects of the war. Lake movement continues in fair volume, and domestic deliveries are improving. The steam trade is slow.

With actual deliveries of West Virginia coal reported to be increasing in volume at Atlantic Coast points for purposes connected with the European war, the trade locally has a distinctly optimistic tone. The general opinion seems to be that any change must be for the better. The Lake movement continues free, but small in volume as compared with an average year, due apparently to the large amount of fuel carried over from last season.

In Cincinnati the situation remains practically unchanged, the demand from dealers not having yet developed to any considerable extent, and the normally heavy consumption by industrial concerns being still lacking The retail trade has held off buying later than ever before, moved by the numerous unusual conditions which have affected the market during the entire season. The steam market is awaiting more active business, as it has been for some months. If the expectations of stimulated demand in all lines of business, as a result from the war, are realized, there should be an active demand for fuel soon.

DETROIT

More buying and prices tending towards higher levels. Production restricted down to absolute requirements.

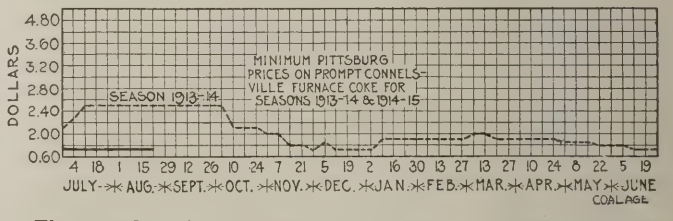
There has been an improvement in domestic trade and the operators are quite optomistic as to the future. Buying has continued at the advance price, effective Aug. 15, and business is about normal for this season of the year. Production is bringing it within the limits of the demand so that the market will not be overcrowded. Much interest is also being shown in the car situation.

The West Virginia districts are getting their share of the increasing business and their circular has advanced to $1.50 on lump and egg and $1.65 on washed nut. Kentucky coals are also higher, $1.75 being quoted on domestic lump, although this is not general, $1.60 being about the average. Some of the smaller producers will also advance their circular about September. There is a steady increase in the demand for coal from the Cambridge and Hocking districts with prices at about the same level as a year ago.

COKE

CONNELLSVILLE

The coke market continues stagnant, the operating furnaces being well covered and the idle furnaces showing no disposition to blow in. Foundry coke is quiet as to prompt lots, practically all the contracting having been done, and shipments are only fair against contracts. Prompt furnace coke is easily obtainable at $1.75, and this figure could doubtless be shaded occasionally. Practically all the operators who were asking $2 on contract for furnace coke have receded from this position and would accept $1.90, if not less, on contracts running through December, but some sellers who never attempted to obtain $2 are now willing to sell at $1.75.



The market is quotable as follows: Prompt furnace, $1.75; contract furnace, $1.75@1.90; prompt foundry, $2.25@2.35; contract foundry, $2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ending Aug. 8 at 264,070 tons, a decrease of 5505 tons, and shipments at 269,968 tons, an increase of 393 tons.

BUFFALO

The outlook has not improved during the past few weeks and few sales are being made. The inquiry is light for this season and the prospects are not regarded as bright for a resumption of activity in the near future. The market has been weak for some time, although there is practically no change in quotations, which are on a basis of $4.25 for best 72-hr. Connellsville foundry and $3.25 for stock coke.

BIRMINGHAM

There is little to say in regard to the coke situation, other than it seems to be in a stagnant condition, with prospects for improvement at an early date. Very little tonnage is being moved.

CHICAGO

The market is steady and quotable as follows: Connellsville, $4.90; Wise County, $4.75; byproduct egg, stove and nut, $4.85; gas house, $4.25.

SOUTHERN

BIRMINGHAM

Possibility of heavy foreign orders is stimulating local buyers. Improved sentiment in the trade generally.

The market on lump coal seems to be slightly better than last week; many of the retail yards have not yet bought their fall and winter supply, but realizing that should any foreign business develop as a result of the European war, operators will be even more independent and prices are liable to advance; they are, therefore, beginning to feel around, and many of them are placing their orders.

Business on steam coal is just about the same, although the operators are inclined to believe that the next two weeks will see a decided improvement, both in tonnage and prices. While the present business is rather quiet, the general outlook for the fall is good. Many small sales of pig iron are being made, and it is the general opinion that prices have reached the bottom, and will begin to advance. Some little trouble is being experienced, due to car shortage on several of the lines, but not sufficient to materially handicap the operators.

The Tennessee Coal, Iron & R.R. Co. reports the sale of 100,000 tons of lump and steam coal to the Morrison Coal Co., Jackson, Miss., for shipment during the next six months. This is one of the largest individual orders in the South.

LOUISVILLE

Foreign war creating uncertainties in the local market, though the general tone is better. A long war will help the Kentucky trade.

Though the market is showing increased strength, conditions are uncertain, due to the war in Europe. This influence is working both ways, promising an increased demand for Kentucky coals on the one hand and a decerased local consumption on the other. The closing down of the coastwise traffic will divert a great deal of Virginia and East Tennessee coal to the manufacturing establishments which have been deprived of their usual supply, but at the same time the suspension of certain of the tobacco factories and cotton mills will offset this in a measure.

If the war in Europe is prolonged, the Kentucky operators expect to profit largely in the way of increased demand if not through higher prices. Though here and there an operator has withdrawn quotations, prices are substantially unchanged as yet. Demand has been helped by the domestic requirements and the usual late summer stocking movement is under way. In some cases, the demand is reported to be larger than usual. In some markets there is coal on demurrage, while in others there is almost an actual shortage.

MIDDLE WESTERN

INDIANAPOLIS

A slight improvement in demand for domestic grades and more inquiries from factories. No change in prices or running schedule. War developments creating some interest but it is doubtful if Indiana mines will benefit much. Contract season ended.

The only improvement in this section is a better movement of domestic grades, though even this is not up to the expectations. The movement of grain has been checked by the war and an expected larger demand from the railroads has not materialized. There is better inquiry from factories but not much increase in orders. The contract season for the year (or two years in some cases) is practically over. Indianapolis retailers report a good movement from the yards to domestic consumers.

About the only members of the trade that show much interest in the war are the operators and selling agencies of the Eastern mines. These are advised that there is certain to be an export demand for coal that will take prices up, but Indiana operators are not yet sanguine. They believe that little of the coal required for export will come from mines that ship West. Some of the West Virginia coal might be delivered to supplement that from tidewater mines, but it will scarcely decrease the amount going West. For the time being the war seems a depressing factor; exports are cut off and industries affected by this are closing down or running on short schedule.

CHICAGO

General expansion of the Western coal market expected as a result of exportation caused by the European war. Heavy production of Hocking coal and an advance in price is expected.

A better demand is expected in the Western market as a result of the European war. This forecast is based on the conclusion that central Pennsylvania, West Virginia and Alabama will send a great deal of coal into the export trade at least enough to absorb the surplus production in those fields. This will mean the withdrawal from Western trade of a great deal of coal normally marketed here.

Hocking coal is now being produced in large volume and the opening price of $1.50 is regarded as low; an advance of 25c. a ton is expected. Market observers point out that Hocking producers can step into the market heretofore supplied by smokeless coal. The splint coal situation has been rather easy in the West, but there are indications that it will be tight as soon as a free movement into export takes place.

Carterville operators report that the market is firm at the circular of $1.50. Leading Franklin County companies have enough sales at the circular to confirm the advance recently announced. The central Illinois field is centering its attention on the steam trade. An embarassing factor in the situation is the fact that screening prices are going down steadily. An increase in domestic orders has been noted in the Indiana field, due to the harvest demands.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07	$2.45@2.65	$2.1@2.27	
Steam lump	1.87@1.92		1.97	
Egg		2.45@2.65		$4.05
Mine run	1.87	2.15@2.25	1.87	3.30
Screenings	1.52@1.57	1.75@1.80	1.52@1.57	

Harrisburg quotations are: Domestic lump and egg, $2.40@2.55; steam lump, $2.25; mine-run, $2.15@2.25; screenings, $1.75@1.80; No. 1 nut, $2.55; No. 2 nut, $2.40.

Carterville prices are: Lump and egg, $2.40@2.55; No. 1 washed, $2.55@2.70; No. 2 washed, $2.35@2.40.

KANSAS CITY

Trade is brisk. Situation relieved by the resumption of mining. Dealers are uncertain as to the immediate future.

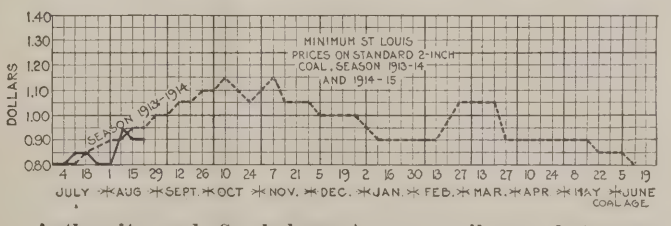
The return of the Kansas miners to work Aug. 19 and the consequent resumption of shipments of the Cherokee product to Kansas City, eased the local situation. Trade generally is reported fair, and even brisk by most dealers

The temporary Western slump in production gave opportunity for Illinois shipments here, several carloads having already arrived and others coming. Local retail business is slow, people generally being inclined to hold onto their money as long as possible, and the usual summer business being decidedly less than at this time last year.

ST. LOUIS

The market continues to improve on high grade coals, with the exception of the steam sizes. Demand from the country for lump exceeds the supply. The washed market is picking up on Nos. 1 and 2, but still continues weak on the smaller sizes. Prices on the steam sizes holding better than anticipated.

Everything indicates a sharp advance in the price of lump and egg from the high grade fields. A plentiful supply of cars is now being furnished, but this is only temporary, as most of the shipments are for distant points, and it may be weeks before these cars return for another load. In the Standard district quotations continue at from 85 to 95c. for 2-in. lump and screenings at about 60c. Standard lump in the 6-in. size seems to be the only coal that is going ahead in price, and this is now being quoted at from $1 to 1.10.



Anthracite and Smokeless—An unusually good tonnage of anthracite is coming forward at the circular price, but a large lot is also selling at concessions of from 25 to 40c. There is very little demand for smokeless.

The market is now quotable as follows:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	.....	$0.85@1.00	$1.10
3-in. lump	.....	....	$1.30	....	.....
6-in. lump	$1.35@ 1.60	....	1.40	1.00@1.10	1.20
Lump and egg	1.85@ 2.15	$2.25	.....	....	1.15
No. 1 nut	1.20@ 1.35	....	.....	....	.....
Screenings	0.70@ 0.75	....	0.80@0.85	0.55@0.60	0.60
Mine-run	1.00@ 1.15	....	.....	0.75@0.80	.....
No. 1 washed nut	1.40@ 1.50	2.25	1.50	....	.....
No. 2 washed nut	1.25@ 1.35	....	1.35	....	.....
No. 3 washed nut	1.15@ 1.20	....	.....	....	.....
No. 4 washed nut	1.10@ 1.15	....	.....	....	.....
No. 5 washed nut	0.70@ 0.75	....	.....	....	.....

PORTLAND

War in Europe will not materially affect prices in the Pacific Northwest. An increased demand expected, however, because of shortage in slabwood, due to short time operations at the sawmills. No car shortage feared for the present.

While Utah coal advanced 50c. at the mines on Aug. 1 some of the dealers here are still selling at $9 a ton and $9.50 for large lump coal, with the same price being quoted on Wyoming They were able to do this because they placed large orders early in the season.

A small quantity of Japanese coal was imported here this week when the British steamer Fernley delivered a few hundred tons. Some figuring has been done here lately with a view to bringing Japanese coal into the market but the freight rates were regarded as prohibitive. Future business along this line will depend entirely on the freights. Under existing conditions, with vessels tied up by the war nearly everywhere it is felt that bottoms will not be a drug on the market.

PRODUCTION AND TRANSPORTATION STATISTICS

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during May and the first five months of the last two years, in short tons:

	May		5 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	107,494	97,003	665,488	633,765
Chesapeake & Ohio[1]	2,638	1,270	6,981	6,224
Erie[3]	752,609	787,238	3,463,729	3,642,083
Pennsylvania[2 3]	967,898	1,022,077	4,641,994	4,799,030
Virginia[2 1]	130	.....	486	52
Total 5 roads	1,830,769	1,907,588	8,778,678	9,081,154
Bituminous				
Baltimore & Ohio[1]	3,151,296	2,488,515	14,343,182	13,716,729
Buffalo, Roch. & P.[1 2]	811,280	466,455	3,766,426	3,309,135
Buffalo & Susq.[1 2]	151,795	43,125	754,296	490,772
Chesapeake & Ohio[1]	1,450,371	1,821,011	6,375,705	7,849,046
Erie[3]	7,396	4,262	263,218	32,683
Hunt. & Br'd T. Mt.[1 2]	99,691	59,043	574,667	466,219
New York Central[3]	672,425	492,619	3,791,585	3,318,606
Norfolk & Western[1 2]	2,131,745	2,338,672	9,369,541	10,200,365
Pennsylvania[1 3]	4,178,271	3,543,218	20,092,450	19,657,638
Pitts. & Lake Erie[1 2]	1,180,197	957,528	5,223,592	4,482,749
Pitts. Shaw. & North[1 2]	214,065	152,807	1,123,050	1,016,809
Virginia[1 2]	318,720	359,879	1,897,003	1,706,539
Western Maryland	248,063	159,483	1,254,612	1,147,559
Total 13 roads	14,615,315	12,886,617	68,829,427	67,394,848
Coke				
Baltimore & Ohio[1]	434,898	301,163	2,050,966	1,541,624
Buffalo, Roch. & P[1 2]	45,711	21,175	255,154	118,397
Buffalo & Susq.[1 2]	26,060	8,643	130,271	129,509
Chesapeake & Ohio[1]	29,433	31,040	150,523	178,363
New York Central[3]	4,233	.....	29,385	.....
Norfolk & Western[1 2]	138,249	88,145	716,701	492,747
Pennsylvania[1 3]	1,238,083	817,816	6,225,387	4,434,422
Pitts. & Lake Erie[1 2]	615,433	428,395	3,070,143	2,299,069
Pitts. Shaw. & North[1 2]	.....	.....	9,383	.....
Western Maryland	8,068	5,058	35,511	34,504
Total 10 roads	2,540,712	1,701,435	12,673,424	9,228,635

Total Coal and Coke 13 Roads	1913	1914
January	19,266,202	18,124,936
February	17,546,496	15,419,439
March	17,631,345	20,201,479
April	16,850,690	15,463,143
May	18,986,796	16,495,640
Total, 5 months	90,281,529	85,704,637

[1] Includes coal from connecting lines.
[2] Includes company's coal.
[3] Does not include company's coal hauled free.
Note:—The Southern Railway hauled 314,203 short tons of bituminous coal during April, and 1,302,171 short tons during the four months.

SAULT STE. MARIE CANALS

Coal shipments through the Sault Ste. Marie Canals for July of the current year were as follows in short tons:

	U. S. Canal	Cana. Canal	Total
Anthracite	375,127	56,066	431,193
Bituminous	1,580,950	287,200	1,868,150

FOREIGN MARKETS

GREAT BRITAIN

The "war spirit" is largely in evidence, and considerable excitement is everywhere noticeable, and more particularly as to its influence upon the coal market. News of the stoppage of the export trade at many ports, and the holding up of steamships, has led to a conviction that in the next few weeks an overwhelming quantity of all kinds of coal will find its way to all the home markets; but, on the other hand, all the merchants are inundated with orders from the general public, and are absolutely unable to deal with the plethora of orders sent in.

The bulk of the merchants report a fair stock of coal in hand, and the delivery trade is now at its height. The War Office, however, have laid hands on a large number of the horses and vans and the motor lories, and this, coupled with the enormous withdrawal of the "Reserve" and "Territorial" men, has had a telling effect upon the depôt work. Colliery prices are all withdrawn, and for the time being only hand-to-mouth prices are available; in every case, however, the prices are higher. From the colliery point of view there seems to be another serious problem to face in the near future; not only the shortage of men, but the shortage of timber for pit props, etc.

On Wednesday's market, when the buying and selling was at its height, the bell rang, and everyone uncovered to hear a short speech from G. C Locket, J.P., the chairman of the Coal Merchants' Society. He stated that the society had had a meeting, and decided under the present circumstances it would be unpatriotic to think of advancing public prices. He admitted that all the merchants had been bombarded with an unprecedented number of orders, and some from householders who never consume more than eight or 10 tons in the whole year, who had rushed in and ordered the whole eight or 10 tons at once. The announcement as to continuing "lowest summer prices" during this remarkable pressure was received with an ominous stillness, but the allusion to the patriotic sentiment, and to the folly of bolstering up the attempt to obtain higher prices, was received with immense enthusiasm.

The railroad companies have given notice that they can no longer take any further consignments to the usual relabelling stations, but that all coal so labelled will be kept at the colliery sidings until final destinations are forthcoming. The ordinary marshalling, or wait-order, stations are already terribly congested, and it is understood that the Admiralty transport department will require all the available area and facilities for the rapid movement of troops, etc. The control of the railways by the government has not been a surprise to anyone. Collieries relying upon the export trade, especially from the Humber ports, will undoubtedly soon have to reduce their output, or close down.—"Colliery Guardian."

FRANCE

In this moment of upheaval, it is naturally impossible to speak of commercial markets at all, since they do not exist for general purposes. It appears quite certain that the French Government has been quietly building up stocks to meet any eventuality, so that the feverish energy required from the armament suppliers will not be checked for lack of combustible. There are, however, very little stocks at the pits, and naturally the production, already vastly reduced, is liable to be stopped altogether in the North of France, although it is less likely to be interferred with in the Center and South, where coal is especially wanted.

As regards Paris, there is no immediate danger of a shortage of coal. The gas and electric lighting companies announce that they have sufficient stock to maintain their normal service for a considerable time—they do not specify just how long—while the retail dealers have sufficient to supply the domestic demand until the end of September.

The production of Béthune during the first six months has decreased from 1,222,510 tons to 987,704 tons, Courrières from 1,560,580 tons to 1,553,656 tons, Dourges from 731,910 tons to 713,960 tons. Drocourt is one of the few with an increased output, improving 9050 tons over last year to 337,430 tons.

There is, of course, no coal market in Paris and no change so far in prices even for retail, only deliveries are very hard to obtain, especially for the "one sack" householder, since most of the carters have gone to the front, and the wagons and horses commandeered for army transport. There is a long train of them passing my office as I write, laden with forage and baggage."—"Colliery Guardian."

COAL AGE

Vol. 6 NEW YORK, AUGUST 29, 1914 No. 9

There is a man at each works of every coal-mining concern who at one time or another sees every one and is personally acquainted with more of the men than the foreman or superintendent. He is the timekeeper.

A man like this, who keeps time, issues store checks, pays off, etc., is the point of contact between the company and the men. In a large sense, he is the personal representative of the company. He transmits the current of ill or good will that permeates the entire organization, and this depends simply on whether he treats the men curtly or courteously. It is through him that rightly, or not, the men acquire their ideas of the company's feelings towards them.

Let us draw a few comparisons from experience and see what part a timekeeper plays in the affairs of a large coal corporation.

A miner goes to the office where a curt timekeeper is in charge. The detail of his yardage earnings is not shown on his pay statement. The amount does not tally with his figures. The timekeeper pays no attention to the presence of the man whom he must know wants information of some kind or he would not be there. The miner waits patiently for a while and finally asks his question.

"All I know about it is what the engineers turned in," says the timekeeper.

"Don't worry me with *your* troubles."

The man goes away with a grouch and it takes him two or three days to see the engineer and get the detail of his yardage—the very data the timekeeper had on his file.

Did the company want that miner treated this way? Did they gain a friend?

At another operation where a courteous timekeeper is employed, one of the men comes to the office. The timekeeper is busy, but not too busy to smile and say "Hello, Jack, what's worryin' you?" The way is paved for the question.

"Sure I can tell you all about it," says the timekeeper and he does it to the entire satisfaction of the man. Did that miner feel friendly or unfriendly toward the concern? We'll leave it to you to say.

This time it happens at a Southern coal mine. Most of the labor is colored and the timekeeper, unfortunately for his company, thinks every negro is a "Nigger." One appears at the window.

"What's your trouble, Nigger?"

"No trouble, Cap'en, only I'se cut fo' de' sto' and yo' know I doan' do no tradin' dere."

"Ain't your name Henry Jones?"

"Yes, suh, but dere's anudder———"

"Well you're cut for the store all right."

"But, Cap'en, I ain't de right man, dere's anudder—"

"Oh, go on and talk to the storekeeper about it."

It took the negro just long enough to do that to keep him out of the mines that day and it was finally found that the stop list showed the charge against Henry Jones, rock-helper, instead of Henry Jones, miner; where the timekeeper entered it.

At another Southern mine where the right sort of timekeeper was in charge the negro was treated differently—like this:

"Hello, Henry, how's your watermelons this year?"

"Dey's sho' good, Cap'en, I'se gwine bring you—"

"What do you want, Henry?"

Henry tells him and in a moment the timekeeper looks over his list.

"You're a rock-helper, ain't you, Henry?"

"No, suh, I'se diggin' in the 14th West."

"Well it's on me, Henry, I cut you wrong this time. Hurry up and catch the man trip and come by tonight. I'll have it all fixed for you."

"Yas, suh! Thank you, suh!"

Henry cut more coal than usual that day simply because he was accorded the kind of treatment the Southern negro likes to have at the hands of his white friends.

Cases like this might be multiplied, but why do it? You have seen and heard everywhere just lots of such dialogues in your own experience. It will be enough to remember that just as sure as the payroll records the earnings of your men, just so sure do the character, temper and attitude of your timekeeper reflect—so far as the men can see—the attitude and spirit of the company. If the curt timekeeper is allowed to remain in charge, can you blame the men for feeling that the company likes his ways and wants him there?

Mine managers and superintendents should not consider that all their time and energy must be devoted to getting out coal, or to welfare work, which latter consists alone in building fences, schools, churches and playgrounds, and then saying, look what we've done for our people! Welfare work without a real moving human spirit is wasted energy.

You can have either a curt or a courteous timekeeper. It's up to you.

Ideas and Suggestions

[*Everyone who has followed the work of* COAL AGE *must be familiar with the paper's policy. We are primarily an engineering weekly. The bulk of matter published is technical in nature. However, there is no doubt in our mind that we are living in an age when present action must no longer be governed by past traditions. We feel deep reverence for all the great men and noble deeds that have set the industries of America on such a firm foundation, but ideas and beliefs must fit the times.*

We are coming to a democracy in commerce and industry just as we have in civil government. As a consequence, the mine engineer, superintendent and manager today have problems to solve, other than those mathematical in nature. No employer can be successful who does not feel a common sympathy for the men he directs. That is why COAL AGE *devotes so much attention to questions of an ethical and sociological nature. We would be doing only half our duty and fulfilling a small purpose if we were to deal with ventilation, pumping and the engineering principles of mining, to the exclusion of all our vital labor questions.*

It is for this reason we urge our readers to contribute articles along the lines of those published here and on the foreword page preceding. Do you know that we will pay as high as $20 for a suitable foreword? Do you know that some of our contributors net more than $500 a year for the writing they do in spare minutes. Perhaps you are fitted for such work. It isn't always the artistic penman or the fellow with a wonderful vocabulary who has a real knowledge of mining.

What we want are worth-while facts, not elegance of expression. We publish COAL AGE *for plain people who are best pleased with plain talk. We invite you to write for us, and we assure you of careful and considerate attention.*—EDITOR.]

The Value of Co-operation and Encouragement on the Part of a Man's Wife or Family

BY PENNSYLVANIA SUPERINTENDENT

Not long ago, a first-grade mine foreman in the bituminous region of Pennsylvania remarked, "I am free to confess that I owe a good deal of my advancement to my wife. If it had not been for her, I probably never would have studied and passed the examination for fireboss, nor would I have had the ambition to go on studying and trying to improve myself so that I could pass the examination for mine foreman.

"Now, mind you, my wife never had much of an education herself. She had to leave school while quite young and go to work. However, she seemed to have the ability to learn, and so when I began to study, she studied with me and often by her encouragement, kept me from giving up and resting content to drive a motor."

Near the same town in which this mine foreman lives, there is a young technical graduate, recently married, who is starting in at the bottom to work his way up in coal mining. His wife, also a college graduate, takes the keenest interest in the mining journal he receives, and usually she reads it each week. Her questions and requests for explanations of some of the articles she does not understand, often cause her husband to investigate something helpful and interesting that he has overlooked in reading the paper, and frequently to brush up on some technical matter that he finds he does not know quite as much about as he thought he did.

Considering the wide difference in educational opportunities of the persons concerned, these two instances taken together, show the advantages of a man's making the work by which he earns his daily bread of some interest in his home. Even in those cases where a man must study alone at home, a sympathetic understanding by the members of his family of the value of study is of great assistance. Moreover, if a person has the slightest desire to advance himself, a little encouragement will go a long way to fix his determination.

The value of study of any character is entirely dependent upon its being earnest, kept up at regular intervals and for definite periods of time. This is much more easily accomplished when a man has the coöperation, or at least the interest of his wife. The value of this coöperation has been demonstrated in many cases. Isn't it worth trying in a great many more?

Co-operation of Mining Factors

BY I. C. PARFITT*

The success of the coöperation of mine officials and employees in the solution of industrial problems by the submission and discussion of theories, facts and practical suggestions, will depend upon the amicable relations of the different elements and the degree of personal interest with which each is actuated.

I have always maintained and advocated that the more friendly the personal relations between the workmen and the officials, the greater will be the efficiency of the productive organization, but to establish such relations there must be mutual concessions.

THE COAL MINER HAS BEEN REGARDED AS AN INFERIOR BEING

The coal miner, from the establishment of the industry until the present time, has been regarded by his contemporaries as a being, mentally and morally, of an inferior species of humanity. That such a conception is erroneous, the true standard of humanity will verify, and its authenticity cannot be strengthened by any appeal to the fallacious theory of caste.

The prevalence of such an opinion arose from the social isolation necessitated by the nature of his labor and

*Jerome, Penn.

the retrogressive results of compulsory associations of a class whose standard of superiority was the measure of brawn and not brain.

Intellectual growth, except within very prescribed limits, was impossible to a class of people so situated as to be excluded from contact with culture and refinement, except what was intuitive, and who had the fact impressed upon them, in no equivocal terms, that the attainment of such was impossible because nature had not endowed them with the faculties required for such acquisition, but had designed them to be the vassals of a superior caste. It was urged upon them that to aspire after a higher mental and moral life, would be a violation of the dispensations of an all-wise providence.

While such conditions never existed in the United States in the same degree as they did in the countries of the old world, because the practical democratic principles of theoretic equality will not recognize the existence of any such distinction, yet they practically exist in such a degree as to form the chief barrier to the coöperation of employer and employee on the basis of an equality of rights and a mutuality of interests.

That this statement is not based upon any hypothetical or theoretical assumption, may be readily verified by any one who will take the trouble to investigate the ulterior motives that have actuated the opposing forces in our great industrial conflicts; the one has been dominated by the nonrecognition of rights; the other by the nonrecognition of superiority.

These motives can be made nonantagonistic only by a demonstration of the fact that the actual and vital interests of the two elements are mutual. The suggestion under consideration is a step in the right direction for the ultimate establishment of such a desirable sentiment.

The Motive of the Average Employee and Average Employer Is Purely Selfish

The ordinary worker does not recognize the pursuit of his occupation as a means to a universal end, but as a task that it is incumbent upon him to perform in order to maintain his physical well-being. His interest, so far as he has any, is limited to the compensation he receives for his services. He does not and cannot regard it as a means by which he may be enabled to cultivate his talents or display his genius, because he does not recognize the fact that his interests are the same as those of his employer. His motive is purely selfish. Labor performed under the incentive of such a motive, never has nor ever will, conduce to individual or collective happiness and industrial welfare.

To be a potent beneficial factor in coöperation, he must concede the same skill, perseverance, industry and honesty of purpose to his work as he would if it were his own individual undertaking.

The average employer, likewise, does not regard the business he has established as a means to an honorable and praiseworthy end, but simply as a medium through which he can utilize the labor (capital) of others for his personal aggrandizement. Primarily, he is actuated by the desire to accumulate wealth, and thereby come into the possession of power. His motive is also purely selfish.

He cannot be actuated by any other because he does not recognize the fact that his investment is only one-half, and the less substantial half of the combination. He fails to perceive that the interest of labor is equally as important to the existence and continuance of the industry as that of capital and that it should receive the same recognition. Such a business is a partnership of antagonistic interests, if I may be permitted the use of such an expression, and exists only by the operation of a mutually selfish principle.

The employer must acknowledge and concede the equality and rights of the means he employs.

Benefits of a Mutual Agreement

Leaving the ethical aspects of the subject and considering only the benefits that may accrue, from a strictly business standpoint, it is evident that the interests of both factors, though mutually selfish, may be materially benefited by a mutual discussion and agreement upon plans whose execution will result in increased stability of operation and financial returns. The employer will be benefited in an increased scope for the employment of his managerial and executive abilities by securing a more thorough knowledge of the technical and practical principles involved in the methods of operation.

He also obtains a more intimate knowledge of the general characteristics, mental caliber and executive abilities of his employees. That such knowledge is of inestimable value to an employer in supplying him with positive data as to the possession of the requisite abilities of those to whom the management of the operation must be entrusted, and in enabling him to select the most suitable, cannot, I think, be questioned.

The recognition and appreciation of the employee's abilities, even if it be only a verbal acknowledgement, tends to establish and nourish confidence and self-esteem and raises the recipient in his own estimation, making him a more valuable factor in the aggregation. Self-esteem or self-confidence is an absolutely essential element to success. To properly cultivate it is to confer a benefit; to disparage or ignore it is an offense.

In addition to this stimulus, the employee learns to respect his employer since he has condescended to meet him upon a basis of business equality, and there is no better way of breaking down the barriers of distinction and establishing a mutuality of interests than for man to meet man as a peer.

It is a natural law of our being to render more valuable service to one whom we respect than to one whom we fear.

Suggested Precautions

Don't allow men to ride electric locomotives.

Don't fail to protect the trolley wires at cross-overs and partings.

Don't fail to have wires promptly repaired after roof falls.

Don't work on live apparatus if it is possible to cut off the current.

Don't send an inexperienced man to work on or about live apparatus of any kind.

Don't rely upon gloves for protection, unless they are perfectly dry, free from holes, and without metal parts.

Don't handle wires carelessly, just because they are insulated.

Don't travel in the same entry with the trolley wire if you can avoid doing so.

Don't get your explosives near electric wires or in cars near the locomotive.

Don't allow packages of explosives to come in contact with the metal parts of cars.

Don't fail to report when you find that electric wires are down.

Don't install temporary lights; leave that work to the electrician.

A Visit to Altofts Colliery, England

By Samuel Dean*

SYNOPSIS—Altofts is the mine operated by W. E. Garforth. He has made several improvements, such as breaking away from the stepped longwall face, installing disk undercutters and conveyors 260 ft. long. His loaders average 9 tons per day. All the coal is cut in the shale; shale dust is sprinkled everywhere. Garforth believes that American room workings can be made almost explosion-proof.

It is worth while going a long way to visit Altofts colliery. It is here that W. E., now Sir William, Garforth, has blazed the trail that so many coal-mining men have followed. Many years ago the barriers of prejudice were broken down, longwall faces were crooked and worked by what is known as the step system, as shown below.

He made them straight and the coal was undercut with

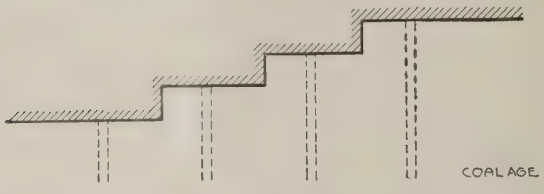


Fig. 1. This Method of Stepping Longwall Is Abandoned at Altofts

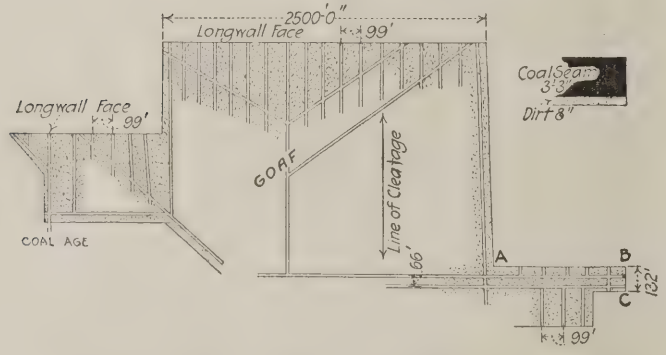


Fig. 2. Garforth's Method of Opening Up a Longwall Face

disk machines. Eminent mining engineers predicted failure, and said that the roof could not be held at the face, and now that success has been secured the roof is declared, in explanation, to be very favorable at Altofts.

Mr. Garforth had his own breathing apparatus (the WEG) patented and manufactured at a time when there were few such appliances in existence. He was one of the first to install a coal-washing plant. He designed and patented his own coal-cutting machines. Coal-face conveyors are used with great success in the thin seams he is working.

And what he has done in the way of preventing explosions and fires in mines is, of course, well known. He can look back upon a career of wonderful success, both scientific and commercial, and on account of his talents and modest disposition, and willingness to give others the benefit of his valuable experiences, he is held in high esteem by everyone who has met him.

*Delagua, Colo.

How Longwall Is Handled at Altofts

Fig. 2 shows the method of working a seam of coal 3 ft. 3 in. thick. The seam lies practically level, and wide bords or rooms, as on the right of the figure, 132 ft. wide, are driven out on the face of the coal with two gateways, set at 66-ft. centers. The space between ribs, excluding the gateways, is packed as tight as possible and there is never any trouble at the face. On the right and left of the bords longwall faces are started. From *A* to *B* shows one of these just opening. It is customary to pack tightly until the first weight has subsided, then spaces can be allowed between the goaf packs. The faces are worked on the butts because more lump coal is produced than when they are driven on the "faces" or parallel with the lines of cleavage. Compressed-air disk machines undercut to a depth of 5 ft. 6 in. in the

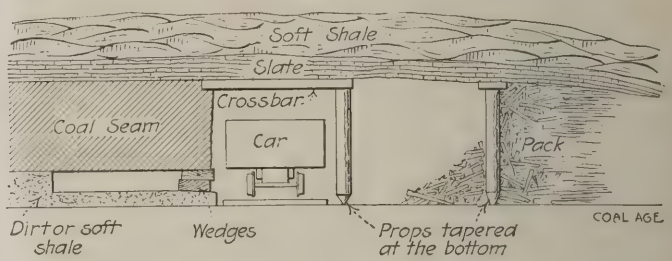


Fig. 3. Altofts Method of Protecting a Longwall Face

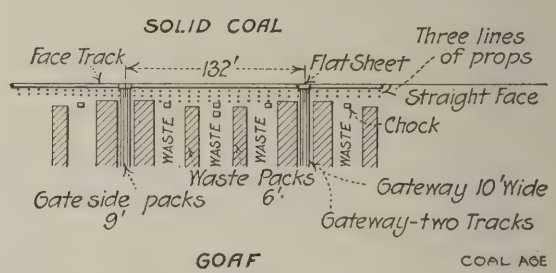


Fig. 4. Straight Longwall Faces at Altofts, Cut by Machinery

8 in. of dirt, and as a consequence there is no "bug dust" and the faces are automatically shale-dusted.

The Unstepped Longwall Face

Figs. 3 and 4 show the method of supporting a machine-cut face in a seam 4 ft. thick at a depth of 960 ft. As stated, the face is perfectly straight, and the timbering is maintained in straight lines. A few chocks of square timber are built, but these, with the props, are all withdrawn as the face advances. The packs are kept up as near the face as possible.

In 1882, Mr. Garforth made the following statement:

> The straight line of face affords the best line of fracture, and by allowing the subsidence of the superincumbent weight to be regular and to fall on the goaf thus taking the pressure from the coal face, working places are seldom stopped by weighting in, and there is less liability to sudden outbursts, as the pent-up gas may be liberated in small quantities and regularly dealt with. ("Trans.," Mid. Inst., 1882, Vol. VIII, page 36.)

And after 32 years his opinion is unchanged.



FIG. 5. INTERIOR OF EXPERIMENTAL TUBE AT ALTOFTS, SHOWING SHELVES



FIG. 6. DESTRUCTION OF ALTOFTS TUBE BY A COAL-DUST EXPLOSION

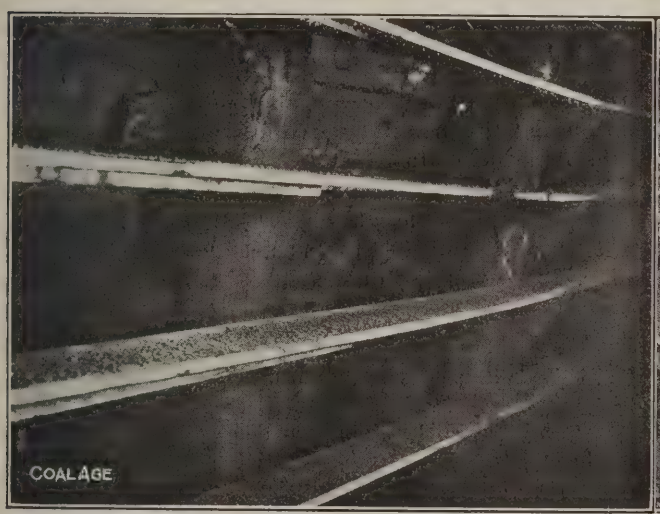


FIG. 7. SHALE-DUST SHELVING LINING THE SIDES OF A ROADWAY AT ALTOFTS COLLIERY



FIG. 8. SHOWS HOW SHALE DUST RESTS ON PROJECTIONS ON THE RIBS OF THE HEADINGS



FIG. 9. A COAL-DUST EXPLOSION AT THE MOUTH OF THE ALTOFTS TUBE

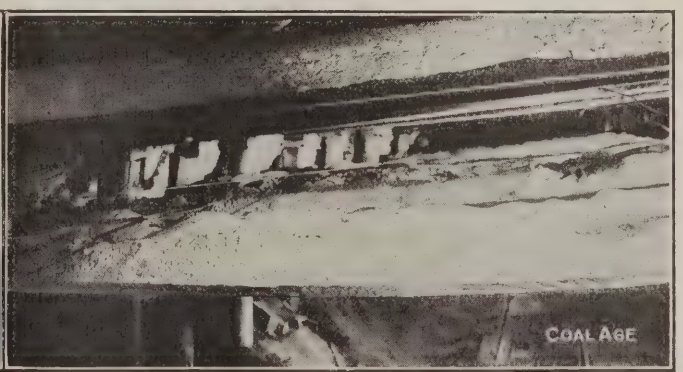


FIG. 10. SHALE-DUST SHELVES SPANNING THE TRACKS IN THE COLLIERY

WORKING ON THE BUTTS GIVES BETTER COAL AT ALTOFTS

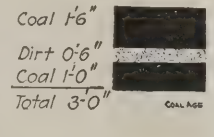
Further, by working his seams plumb on the end or "butts," or at right angles with the lines of cleatage, he secures the maximum amount of lump coal, so much so that there is a difference of 25c. a ton gained in the selling price over coal worked on the "face." He believes in an undercut running as deep as from 5 to 7 ft.

His miners have loaded machine-cut coal into mine cars, in these thin seams, for as low as 25c. a ton and have obtained higher wages than when working by hand at a much higher tonnage rate. The seams at Altofts vary from a little over 2 to 4 ft. in thickness. It is important in undercutting to remove the coal always to the same depth and not allow the machine to run in and out.

Instances could be quoted where a particular machine has given excellent results in one seam, while the same form of undercutter has caused inconvenience and loss in another mine, until a special machine has been adopted. The height of the undercutting, say in dirt, must be 5 in. or more, so that when the roof sinks the clearance is sufficient to prevent the coal from being wedged or crushed. Sir William favors the use of compressed air underground, but believes there are many mines which can be worked safely and with advantage by electricity. Since he introduced machines with a deep undercut, the use of explosives has been greatly reduced and in some cases abolished.

Why Longwall Is Advocated

He claims the following advantages for machine-cut straight-face longwall mining over the room-and-pillar methods: (1) Fewer men are required at the coal face, owing to the output per man being greater; (2) increased and more regular output per man; (3) less arduous labor by which the safety of the men is increased; (4) better quality of coal; (5) greater tonnage from a smaller area of coal field; (6) saving in timber; (7) reduced cost of production; (8) minimum danger to the overlying seams and surface property by a more regular settlement of the intervening strata, etc. A seam of the section adjacent is being worked with machines and face conveyors.



The machine cuts in the dirt, and the bottom foot of coal has to be shot up. Light charges are all that are necessary, only 2 oz. of permissible powder per 4-ft. hole. The gateways are at 270-ft. centers, the conveyors being about 260 ft. long. The miners or loaders break up the coal, load it on the conveyor, timber the face and remove any rock that may fall for 25c. per ton, and average 9 tons per man. The total output at Altofts is 3000 tons per day.

Coal-Dust Dangers

Sir William Garforth has taken great interest in the subject of the danger of coal dust for nearly 30 years. When giving evidence before the British Coal Dust Commission in 1891, he advised the use of shale dust for the prevention of coal-dust explosions.

Seventeen years later, in 1908, he was asked by the Coal Owners' Association to construct an experimental gallery, and the outcome was the famous Altofts tube, where so many tests were made proving the efficacy of incombustible dust. He based his original opinion on the teaching of nature. When leading the first exploring parties after the disaster in the Silkstone pit in 1886, he noticed great destruction in the haulage ways where there was coal dust, yet where the explosion had traveled roadways which contained quantities of shale dust formed by the feet of men and horses, there was no evidence of damage perceptible.

In some of the traveling ways at Altofts, the shale dust has been lying thickly on the floors for years, and has been raised in clouds daily by the men and horses going in and coming out, yet no complaints have been heard about lung troubles, and some of the old timers must have breathed a lot of this dust every day for many years.

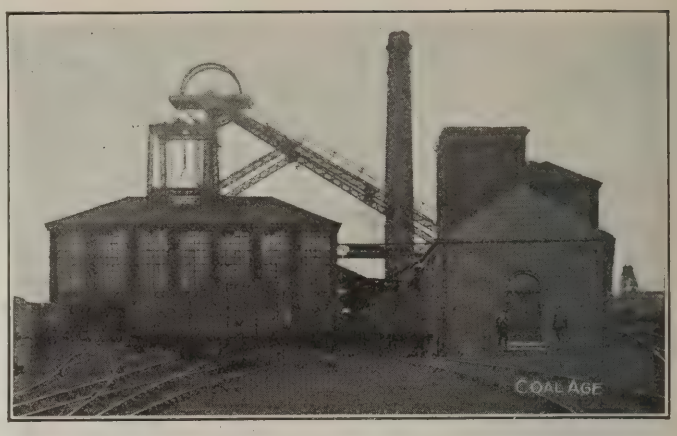


Fig. 11. One of the Shafts at Altofts Colliery

For over twenty years coal-cutting machines have been cutting in shale bands, and the exhaust from the engines and brisk air current has sent this dust along the faces, but it has never caused lung troubles and no complaints have been heard.

Tuberculosis Not Caused by Shale Dust

Occasionally scare heads appear in the mining journals pointing out the dreadful results of miner's consumption on the Rand in South Africa, caused by the inhalation of dust. It is the hard flinty material which causes the trouble, and this subject has been well studied and investigated by the eminent physiologist, J. S. Haldane, who said in 1910 that the dust used at Altofts for stopping coal-dust explosions is from soft shale and is certainly not of such a nature as to cause any anxiety as to the dangers of inhaling it, particularly as the amount inhaled must be small.

During the last six years, hundreds of tons of shale dust have been scattered along the haulage ways, traveling ways and returns at Altofts, but as yet it has not caused lung troubles. The only complaints heard have been from the boys who have done the shale dusting; after six months or a year they have asked for a change, and this could only be expected, as shale-dusting day by day may not be a delightful occupation, no more than is



Fig. 12. Large Quantities of Shale Are Placed on Shelves Hanging from the Roof of the Roadway

sprinkling with a hose in the main intake in the depth of winter.

Excess of Shale Dust

The rule at Altofts is to put shale dust wherever there is coal dust, and in all parts of the workings which I visited there was from two to ten times as much powdered shale as powdered coal. There are many dust-tight steel cars without end doors in use and the coal is not loaded above the top of the car. Before a roadway is treated with shale dust, it is thoroughly cleaned and as much as possible of the coal dust is removed.

I questioned Sir William Garforth as to the possibility of successful stone-dusting under unfavorable conditions. He made his reply and asked for the opinions of his general manager, Mr. Lloyd, and his manager, Mr. Harrison. I give the statement and query as I presented it and a summary of the solution as supplied.

Fig. 13 shows part of a typical room-and-pillar mine, and I made the difficulties as great as possible, stipulating that machines were employed at the face of each

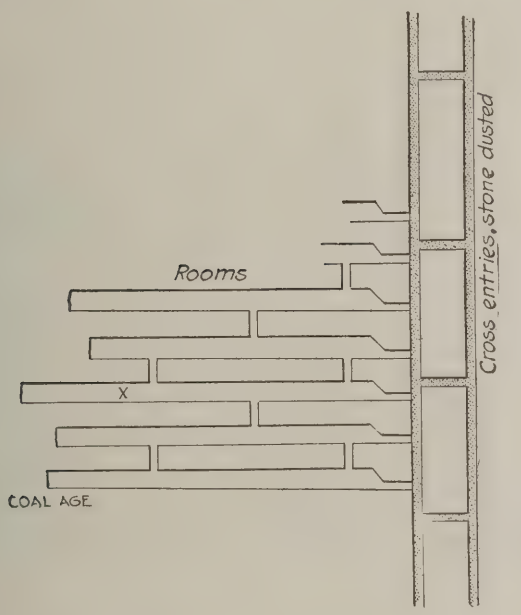


Fig. 13. Typical American Conditions in a Stone-Dusted Mine

room, that these cut in the coal, and that a large quantity of dust was raised which floated about and settled on the floor and projections. I assumed that the cross-entries were shale dusted, and said that there was little difficulty in keeping them in a safe condition, and I think even the opponents of the use of shale dust will agree with me here.

But I know that the opinion is that it cannot be applied at the face, and this factor was what I wanted to get cleared up. I assumed that an explosive mixture had been ignited by a defective safety lamp at the point *X* and asked what should have been done to prevent such an explosion from spreading and causing the deaths of several men?

Stone-Dusting in Room-and-Pillar Workings

Sir William replied that he would heavily shale-dust the crosscuts between the rooms to prevent the flame from spreading from room to room. Mr. Lloyd agreed but added that he would also shale-dust the room necks. Mr. Harrison went further and said that in addition to the crosscuts and room necks he would place as much shale dust as possible around the entrance to each cross-cut, so that a large amount of incombustible dust would be raised at the points so that the flame would, as it were, be nipped in the bud.

The man who ignites the gas, or the man who fires the shot will, in most cases, be killed, and also the men immediately about him. But those great disasters which cause the deaths of hundreds of men can be prevented, by the use of shale dust. By killing the flame we prevent the formation of those poisonous gases which are found in the afterdamp. And as a rule that explosion product is responsible for the majority of deaths in a mine explosion.

Experiments at Bruceton could prove whether the flame could be stopped by heavily shale-dusting the cross-cuts between rooms. I am of the opinion that the crosscuts should be wide enough and high enough to hold shelves.

Some statements having been made concerning the difficulty of shale-dusting large Pennsylvania mines like Marianna, Vesta, etc.; I wish to say that I have not visited any mine in the United States which is more suitable to the shale-dust treatment than Vesta No. 5, and this mine will in all probability be eventually the biggest producer in the country.

Heavy Coke Production in New Mexico

The quantity of coke made in New Mexico in 1913, according to figures compiled by E. W. Parker of the U. S. Geological Survey in coöperation with the Geological Survey of New Mexico, was 467,945 short tons, valued at $1,548,536. This was the maximum record both in quantity and value. Compared with the output of the previous year, it showed an increase of 54,039 tons, or 13 per cent. in quantity, and $191,570, or 14.4 per cent. in value.

All of the coke made in the state is from coal mined in the Raton field in Colfax County. This field is the southern part of the Raton Mountain coal region, which consists of the Raton field in New Mexico, and the Trinidad field in Colorado. The coal measures are continuous, but the producing areas are separated by a high divide near the Colorado-New Mexico line.

Slack coal is used in the manufacture of coke and as over 25 per cent. of total output of the mines yielding coking coal goes into slack, an ample supply for the coke ovens is available. All the ovens in the state are of the beehive type. At Dawson, however, 446 out of a total of 570 ovens, although of the beehive type in construction, are provided with under flues, through which the gases are conveyed to a large passage, back of the ovens, and thence to the power house. The heat obtained from the oven gases renders the use of other fuel in the power plant unnecessary.

This plant in addition to furnishing power for the operation of the mines for ventilation, electric haulage, the coal crusher, washery, etc., furnishes also steam heat to the offices, commissary, hotel, hospital and theater, and electric lights in the city of Dawson.

The Destruction of Forbes

By L. C. Paddock*

SYNOPSIS—Forbes was not protected by mine guards and did not belong to the Colorado Fuel & Iron Co. Yet it was destroyed by the "strikers" before the Ludlow battle. A short description of the incident, mostly in the words of R. Nickol, the superintendent of the mine.

On the 28th day of April about five o'clock in the afternoon an Italian called up his brother at the Forbes mine, which lies about 12 miles northwest of Trinidad, from the union headquarters at the latter place, telling his brother, who is a non-union man, that he had better leave the town because the strikers were going to come there that night and burn up the Forbes mine. Mr. Nickol, the superintendent, said:

"When I received this notice I sent three men to the lower end and three to the upper end of the town to guard the mine buildings, and I put the women into the mine tunnel and sent 12 miners there to protect them; we had no mine guards whatever and had to depend upon volunteers, and I and a few others went to the building where our telephone was stationed. We guarded all night and until about 5:30 in the morning.

"While standing in front of my house a large number of strikers who had taken their position on the hill tops above the mine building and dwelling houses began firing a fusillade of bullets at us and into the houses. These strikers had red bandana handkerchiefs tied about their heads.

A NEW USE FOR THE WHITE FLAG

"Among them was a tall man wearing an overcoat and bearing a white flag. This man seemed to be the leader and from time to time waved the white flag in the air, and as he did this the strikers on the hills fired their rifles; the air was full of bullets. One crashing through the sash went over my left arm; as I stepped into another room another came through the wall blinding me with the plaster dislodged.

"While standing near the door another bullet crashed through carrying splinters into my hands. Over 40 bullets passed through the house while I was there, and how I escaped being killed I do not know. The shooting continued from the miners on the hill tops; I could see the tall man still continuing to wave his flag and volley after volley of shots resounded almost constantly from this hill and from the other hills around the camp and this continued until about 6:45 a. m.; then they seemed to run out of ammunition.

"I then went to the mine tunnel where the women were; they were safe but crying and hysterical. From that point I saw great black clouds of smoke rising from the buildings in the vicinity of the upper portion of the camp. I and others went up there. As I approached it I saw three of the dwelling houses burning, saw the barn and other structures in the upper canon on fire; the air was thick with smoke and the heat was intense.

AS MUCH RUBBLE AS LUDLOW

"As I approached the three dwelling houses I noticed the body of a Japanese; he was lying on his back with his arm over his face. He was dressed in his underwear and had a bullet hole through his breast. This Jap and the others had worked in the mine for about five months.

"About 20 ft further on up the tram track I found the body of Edward Kestler lying near one of the burning buildings. Kestler was lying on his back and the flesh was burned off his legs, his head was burned and his face blackened, his clothes were burned off. Kestler was the mine engineer, about 45 years of age, married and had a wife and two children living in Denver. He had been working at the mine for about a year and a half.

"Next I found the body of Jack Smith, a coal miner. He had a wife and six children. He had been killed by a bullet, had been shot through the right leg just above the knee, his leg was broken and he was also shot through the head. The bones of a Japanese were found in a burning building. The flesh was burned off and the bones were so black and charred you would hardly recognize them as a human skeleton. Back of the rock supply house were the bodies of two other Japanese. Both were dressed in their underwear and each had been killed by a bullet. The substation was on fire.

EVEN THE MULES WERE BURNED

"Then I noticed at the barn there were the bodies of 24 mules and two horses in the places where they were tied, the bodies in every imaginable shape. Three mules and three horses out in an enclosure had been shot. We then went toward the 20-roomed rooming house which was in flames, and near the tipple at the lower end of the mine we found Newman, the blacksmith, lying on his back; all his head above his eyes and ears were shot away; he had been shot from behind by a soft-nosed bullet. His wife was with the other women in the mine.

"I found that all the buildings at the lower end of the town were burning and that the strikers had a fire-setting brigade, the members of which wore white strips of cloth over the shoulders down the front and back so that the strikers on the hills would recognize and not shoot them. After shooting awhile the firing brigade would be sent down by the invaders to set fire to the buildings. Some of the people, both of the men and women, were taken prisoners, and later escaped.

"I will not take time to tell you of the robberies and horrors they underwent. After killing nine people, burning



Body of the Blacksmith Newman after Forbes Attack



A Saloon for Avowed Anarchists at Aguilar, Colo.

*Editor, "Daily Camera," Boulder, Colo.

Note—This article appeared in the "Daily Camera," and we are indebted to that paper for the photographs which we here reproduce.

all the buildings, the 250 strikers marched back in broad daylight into the city of Trinidad."

The character of the people engaged in this ruthless war is well illustrated by the picture of the saloon accompanying this note. It shows a saloon in full blast near Aguilar which is in the same coal field as Forbes. It is known as "The 29th of July Saloon" which is significant as illustrating the temper of the foreign element. This drinking-place was so named because on July 29, King Humbert of Italy was assassinated by a fellow-citizen of the owner of the saloon. To kill those who are the heads of the state is the hope of anarchy. Men could sit in that saloon, drink beer and think of blood. Three times Lieutenant Ray Benedict with a detail of troops pulled down the red flags of anarchy on that drinking house.

The picture we present shows the flags in position prior to the last time they were pulled down. That saloon is now closed by federal orders. Is it too much to hope it will forever remain closed?

Extracts from a Superintendent's Diary

I have lately attempted to get a line on the papers that seem to be the most popular with our miners. Much to my surprise, I find that the honors are about evenly divided between two weeklies that I had not even heard of before. One is a rabid socialistic organ and the other is an anti-Catholic paper, also best described as rabid. A third paper which enjoys some popularity poses as a straight-out weekly newspaper, but its news is sensational in the extreme. Yellow journalism with a few streaks of red and scarlet.

Since discovering these weeklies, I have been reading them in good earnest, not only devouring the current issues, but getting all of the back numbers possible. And this is the opinion I have formed about them: They are simply great destroyers, they everlastingly hammer away at something, either a man's reputation or a company's shortcomings, or a church society's disgrace. They have no desire to build up, apparently it is so much easier to tear down. Furthermore, they attempt to make everyone dissatisfied with one's surroundings, but do not bother about suggesting means of bettering things. Any three current issues read in rapid succession would make the keenest thinker addle-brained. Compared to them, the Police Gazette and dime novels are soothing.

If the average miner has been looking to such papers for inspiration during many years, any overt act of theirs can be easily justified. The miracle is that not more of them are found in asylums.

If one can be convinced that the government is "agin" him; that his employers are "agin" him; that the daily papers are "agin" him; and even his God is "agin" him, what prospect has he of lying down at night to peaceful dreams. And what prospect has any of his neighbors of being able to live near him in peace and quiet.

I recall a statement made by one of our Bank Committee last week and I realize now where he received his prompting. He suggested that any person who was satisfied with his surroundings and refused to resent misfortunes, but considered them as acts of Providence, would soon die of dry rot.

Yet, these weeklies are very anxious that none of their readers should become victims of such a terrible state of mind, and the reason, therefor, is that they depend upon their subscribers' voluntary work for any increases in circulation. They want to excite them to a point where they can't sleep unless they have induced at least one of their fellows to also read the paper.

But the unfortunate part of the entire discovery is that I am powerless to change matters. If I should suggest to any of the men that such literature should be avoided, every man in the camp would hear of it and those who are not subscribers at present, would be annexed to the list immediately.

Possibly some day I'll undertake a small weekly of my own and circulate it in our camp strictly for the benefit of our miners. Perhaps some of our young men might take to my arguments and assist me to reach the old fellows who just now realize so vividly the danger of attempting to live in a peaceful and contented manner.

Recent Legal Decisions

Shipper's Liability for Freight Charges—The fact that the shipper of freight may not be the owner of it does not defeat his liability to the railway company for the amount of the freight charges, unless the company knows that he is acting merely as an agent in making the shipment. (Texas Court of Civil Appeals, Chicago, Rock Island & Gulf Ry. Co. vs. Floyd, 161 Southwestern Reporter 954.)

Construction of Docks in Streets—When a dock is constructed on a river bank at the end of a street without authority having been first obtained from the proper officers of the city, the public will be deemed to have a right of way over the dock to the water's edge. (New York Supreme Court, Westchester County Special Term; City of New Rochelle vs. New Rochelle Coal & Lumber Company; 144 New York Supplement 852.)

Shipper's Responsibility for Injury to Car—One railway company which delivers a car owned by another to a shipper to be loaded, under a joint traffic arrangement between the two companies, can recover against the shipper on account of any injury to the car, caused by negligence on his part or on the part of his employees. (North Carolina Supreme Court, Asheville & East Tennessee Railroad Company, 80 Southeastern Reporter 406.)

Responsibility for Safety of Derrick—Having furnished a derrick of standard make and in perfect condition, for use of employees in handling coal, an employer was not bound to keep it in proper adjustment, to avoid injury to the employees; that duty resting upon them, for whose use it was furnished. (New York Supreme Court, Appellate Division, Third Department; Pierce vs. Atlantic, Gulf & Pacific Company; 144 New York Supplement 330.)

Conjectural Causes of Injury—An employer cannot be held responsible for death of an employee, through coming in contact with a counterweight, used in hoisting a large coal bucket, if it is left wholly to conjecture how he came in contact with the weight. In the absence of proof as to the cause of the accident, the workman having been found dead in the shaft, the court refused to determine whether the counterweight was such "hoist" as is required by the laws of Wisconsin to be safeguarded. (Wisconsin Supreme Court, Hansen vs. Milwaukee Coke & Gas Company, 144 Northwestern Reporter 289.)

Taxation of Mineral Lands—Land granted by the United States to the Northern Pacific Railway Company was conveyed by the company, subject to a reservation in the company of all underlying coal, together with the right to use so much of the surface as might be necessary in exploring for the coal. Held, that the interest retained by the company, while the land remains unexplored, constitutes property taxable as an interest in land; the interest not falling within the provision of the Montana constitution to the effect that "mines," after purchase from the United States, shall be taxed only at the price paid the United States therefor, which in this case would amount to an exemption from taxation. "That several estates in the same land may be owned by different parties is recognized generally. One may own the surface, another the growing timber, and a third the minerals underground, and each estate be subject to taxation." (Montana Supreme Court, Northern Pacific Railway Company vs. Mjelde, 137 Pacific Reporter 386.)

The Purchase of Coal on Specifications--I

By F. R. Wadleigh*

SYNOPSIS—The first of a series of articles that will cover this subject in all its ramifications. This installment takes up the abuses and prejudices common to the B.t.u. system of coal buying. Well defined remedies for these are advanced; other preliminary phases of the question discussed.

Probably the first large contract made in this country for the purchase of coal on a specification basis was that of the Illinois Maintenance Co., who in 1902 bought 20,000 tons on a B.t.u.-ash-moisture basis for use in steam plants of various buildings. The Interborough Co. of New York was probably the first large consumer to buy coal on a strictly specification basis, with premiums and penalties, having put such a contract into effect previous to 1907. The United States Treasury Department adopted this plan in 1906, and its use has gradually spread to all government departments, with the exception of the Navy.

At this date, several million tons of coal are being bought on specifications, and the use of this method is increasing every year, although there is now a growing aversion to it on the part of coal operators and selling agencies. The *London Times'* engineering supplement of 1908 said of the B.t.u. system:

> There are few materials required in our manufacturing and carrying industries which are purchased on a large scale with such a neglect of common-sense rates and precaution, as fuels. The majority of our manufacturers still purchase fuel by this rule-of-thumb method which satisfied the last generation.
>
> A user is not purchasing so many tons of a solid of uniform composition, but should be purchasing so many units of heat in solid form, as a matter of convenience.

Kent, in his "Steam Boiler Economy" (1901), says:

> To buy coal on the reputation of the district in which it is mined is not as good a way as to buy it on a guarantee of quality as determined by an analysis for water, volatile matter, ash and sulphur, but it is the most common way.

Advantages of the B.t.u. Method

These quotations, from two well known authorities, sum up the question briefly and in a general way, but there are many difficult details to settle before we can arrive at a thoroughly satisfactory solution of the whole matter.

The principal arguments in favor of this system of coal purchasing are as follows:

1st—It places all sellers on a similar competitive basis as regards both quality and price.

2d—It enables more sellers to compete, by rejecting trade names and fields, thus broadening the competition.

3d—Systematic and constant analysis of the coal establishes a standard for plant operation and gives more uniform results, often effecting definite savings.

4th—Mine operators are compelled to prepare and mine their coal with greater care.

5th—Disputes as to the quality of coal may be easily adjusted or done away with.

6th—If inferior coal is shipped, the buyer pays only for such quality, while if a better grade than the standard is shipped, the seller gets a higher price.

7th—An exact and definite basis for cancellation of contract is provided for.

8th—By ensuring coal of a uniform quality, the work of the fireman is made easier and more skillful firing is possible.

9th—Valuable and useful information as to coals and their actual quality is acquired by both buyer and seller.

10th—It enables the seller of high-grade coal to get a price commensurate with the value of his product.

11th—It gives to the seller of low-grade coals a chance to compete with the better fuels.

12th—It often results in the adoption of better combustion methods, enabling the power plant owner to use, in many cases, lower grade fuels.

Disadvantages of the B.t.u. Method

1st—It will result finally in making the consumer pay more for his fuel by increasing mine costs and destroying the balance of price between poor and good coals.

2d—It will defeat the principle of conservation of fuel, by operating in favor of the high-grade coals.

3d—Natural variations in coal from the same seam or mines make it impossible for the mine operator to control or guarantee any fixed heating value.

4th—It is impossible for the sampling to be always accurate.

5th—Coal can be sold by the old method with less trouble and expense.

6th—Poorer fuels will not be so much in demand, consequently will remain unmined and often lost entirely.

7th—Greater saving to the consumer would ensue if he would abolish wasteful methods of using coal, instead of trying to save a first cost in buying.

8th—Any saving would be more than counter-balanced by the expense of having chemists for making analyses.

9th—Competitive bidding between coals of different heating values would be restricted.

10th—Sampling is generally done by the buyer; it is impossible for the seller to always have a representative present, and the latter is therefore entirely at the mercy of the purchaser as regards proper sampling.

Preliminary Consideration

The purchase of coal on specifications is a condition as well as a theory; a very practical condition, too, and one that demands careful consideration by both the buyer and seller. Efficiency, the slogan of the day, is required in purchase as well as in use; it should apply equally to both. A sane and impartial viewpoint is necessary in buying more than in anything else.

Too many buyers have looked upon the purchase of coal by specifications as a remedy for their own inefficient methods of use, to be glossed over by using only high-grade fuel, which will give good results, even with the most wasteful equipment and ignorant, cheap handlers. Many specifications are in use that were written from the point of view of the consumer only. They are

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often loosely drawn up, badly worded, unfair and apparently looking only to getting the best article at the lowest possible price. In addition to this, they frequently leave out entirely, or dismiss in a few words, the most important thing—the sampling of the coal.

To buy coal intelligently on any basis, the buyer must first determine the kind and size most suitable for his particular plant. This can only be accomplished by actual working tests, and should be done before any contract, whether on a specification basis or not, is made.

The most efficient plant operation, at the lowest possible cost, is the basic consideration to the plant owner. As coal is a most important item, its purchase should be given the greatest care both by the one doing the actual buying and by the one responsible for its economical use, whatever may be his position.

No buyer should decide on specifications for coal to be used at his plant until he has considered carefully the following items and determined upon the kind of coal that will best suit his plant and conditions:

Boilers

1—Kind, capacity and arrangement.

Furnaces

1—Grates, surface and setting.
2—How operated, stokers or hand-fired.
3—If stokers, kind of and coal they will handle best.
4—If hand-fired, kind of grates and kind of labor available.

Draft

1—Amount available and how controlled.
2—Kind: Natural, forced or induced.

Load

1—Character; maximum, minimum and time.

Coal

1—Delivery at plant, method of handling, method of storage, how much.
2—Price at mines and freight rates.
3—Capacity of mines.
4—Conditions of delivery and movement from mines to plant.
5—Kind of cars to be used.
6—Moisture and its possible effect.
7—Volatile matter; its relation to furnace condition and smoke laws.
8—Ash; its amount.
9—Fusing temperature of ash.
10—Coking qualities.
11—Skill of firing.
12—Size.
13—Heating value.

What Coal Specifications Should Cover

The true object of the purchase of coal by this method is to ensure the buyers getting, during the life of the contract, the quality and kind of coal needed and a sufficient and uniform supply of it, at a fair price. These should be the main objects of all coal specifications.

To insure this, it should be specified:

1. Period of time covered by contract.

2. Kind of coal, amount needed and method of delivery; a standard analysis, as a description only.

3. The minimum and maximum of each constituent that affects the cost and efficiency of operation of the steam plant.

4. The standard price.

5. The scale of penalties or premiums to be charged up to cost of coal, which should be based directly on the losses sustained in plant operation from an inferior coal or the greater efficiency obtained from a better fuel.

6. The method of sampling to be used at each plant, giving also the amount of coal which each sample is to represent and the name of the person responsible for the sampling, who should be, whenever possible, the chemist who makes the analyses.

7. The method of getting at the final price, which should specify the amount of coal that each analysis represents, as a basis for payment.

One of the most important points about sampling is the question as to who is to do it. It would seem obvious that, as the buyer and seller are both interested, the sampling should be done by an outside party. But, in the operation of most contracts calling for sampling, the work is done by a representative of the buyer, whose chemists also usually make the analyses. To overcome this, there is generally a clause in the contract giving the seller authority to have a representative present when the samples are taken and analyses made.

Unfair Requirements Have Created Prejudice Against the B.t.u. Method

It is manifestly impossible, however, for the seller to always have a man on hand, and the practical result is that, as a rule, both the sampling and analysis are in the hands of the buyer. This is one of the reasons why many sellers object to this kind of contract, and there is no doubt that improper sampling by the buyer, whether intentional or not, has been the source of much trouble and many disputes. Even in the U. S. Government contracts, there have been serious complaints of the sampling methods, notably in the case of the coal bought for the Panama Canal work.

The most flagrant offenders in putting out unfair specifications have been the city and state institutions. As a general rule, they will find that their fuel costs have been higher than they would have been under the old system, as the coal sellers generally anticipated possible losses in their bids. Simplicity in the terms of such a contract should be insisted upon as most important.

The main point to be gained for the specification contract is the general acceptance of the main principle and acknowledgment of its value and fairness. Specifications have been too elaborate and in many cases coal sellers have bid blindly because they wanted the business, merely adding a few cents per ton to cover any possible loss that might be incurred.

Under the old methods, when a fuel has been chosen by a consumer and a contract made for a supply, he has generally concluded that his interests are protected as to quality by a provision that it must come from a certain colliery or collieries and from the same seam. Were this same consumer buying copper ore, he certainly would not consider this as sufficient grounds to insure that the ore would always be of the same value. Nor should such proviso be sufficient for the purchase of coal. That coals from the same seam may vary in quality is fairly well known, but that fuels from the same mine may also vary considerably is not so generally recognized.

Reliable Methods Will Produce Advantageous Results for Buyers and Sellers

As to the attitude of mine operators and selling agencies, opinions today are somewhat divided. Many of the large producers are quite willing to sell on a specification basis, provided they may be assured of fair treatment. Others are against selling on any such contract, and only do so when they cannot get certain large contracts in any other way. On the whole, a decided reaction has set in among coal sellers against the specification basis, and the same may be said about the large users and buyers.

To overcome this tendency, specifications should be so rearranged that the seller will see that it is to his best interest to handle his coal on this basis, and be assured that he will receive what is justly due him for the amount and quality that he supplies.

There is no question that the selling of coal by analysis has tended to make the mine operators more careful in the matter of preparation. Some of the mine owners who are not in favor of this method have issued statements to the effect that they are doing all they can to properly mine and clean their coal, and that selling on an analysis basis would not improve the quality. In some cases at least this has not been true; as a rule, they have given particular attention to shipments sold on specifications, either by selection of mines or by better inspection of the coal.

There has also been a decided tendency to add to the price of coal when bidding on a specification contract, usually from two to five cents per ton; this increase is partly to overcome any additional cost of preparation and partly in anticipation of losses due to penalties for inferior coal.

The first requisite to any universal adoption of this system of coal purchase is the establishment of confidence in the sampling and analyses. At present this is lacking in many instances, and quite often rightly so. This is due to the taking of samples by interested and ignorant employees, and also because the making of calorimeter tests is left to persons not specially trained in its use, whose work could not possibly be accurate enough to use as a basis for payment of coal.

Specification System in Europe

The purchase of coal on a specification basis is much more used in this country than abroad, although applied for years to some extent, and along certain lines, in Germany. It is now in use by a number of companies in England, Sweden, France and Italy.

Recently, the Chemical Subcommittee of the South African Engineering Standards Committee has submitted two valuable reports covering coal sampling, standards for analysis and sizing of coals for commercial use. This report is a valuable and interesting one, going into every detail of sampling and analysis, as well as sizing. Its length precludes printing here in full, but the following items are treated fully:

Colliery Sampling.
Sampling Ships' Cargoes.
Bunker Sampling.
Car Sampling.
Laboratory Treatment.
Moisture, Ash, Volatile.
Sulphur Determinations.
Calorific Value Determination and Details.
Standard Sizing of Coal.

The present status of opinion on the subject in England is indicated by the following editorial from the *Iron and Coal Trade Review*, under date of Mar. 28, 1913:

In another column we publish particulars of the coal contract specification and conditions, which have been agreed upon between the Associated Municipal Electrical Engineers of Greater London and representative firms of contractors in the London coal trade and also approved by the Society of Coal Merchants. As pointed out in our issue of Mar. 7 its most important feature is the recognition of the principle of selling coal in terms of heat units and the adoption of a scale prepared after careful and expert analyses, forming a basis of calorific values upon which business may be done under the new conditions. The seller is to receive a bonus should the coal prove to be above the standard and to pay a penalty should it fall below, in accordance with what is now the common practice in the United States.

It will be noticed also that a standard is given for each class of coal in regard to the percentage of small and that the buyer has the right of rejection if that percentage be too large. Moisture is also included, but not ash, which has been eliminated as superfluous, because a high ash content means decreased calorific value. Sulphur must not exceed 2 per cent., and that, of course, is important, since a high percentage is destructive to fire bars and undesirable in other ways as well.

Under this form of contract no particular colliery need be named, the contractor reserving the right to supply sized coals from any collieries in the districts indicated. This, of course, is a matter of indifference to the consumer since he has his calorific guarantee. The grouping of the districts has been done simply as a matter of convenience and for the sake of brevity. As to the way of taking and testing samples, that is briefly outlined, but we are informed that the whole matter has been put before the Engineering Standards' Committee with a view to formulating a standard system.

Experience alone will show how the scheme will work out in operation, for laboratory analyses are not always a reliable guide to practical results in boiler furnaces. Coal which proves satisfactory at one plant is often the reverse at another, so much depending upon the condition under which it is burned. Sellers will learn in time what prices to charge for the coals they guarantee and competition may be relied upon to prevent the general level being too high. It may be also that the table of standard values will have to be modified in one way or another; but in any case the new specification represents an earnest attempt to provide a practical basis upon which coal can be sold under guarantee.

The Colorado Strike Affects the Coke Output

The output of coke in Colorado in 1913 was 879,461 tons, valued, according to E. W. Parker, of the U. S. Geological Survey, at $2,815,134. The decrease as compared with 1912 amounted to 93,480 tons in quantity and $228,860 in value and was due entirely to the labor trouble and not to adverse trade conditions.

The principal labor disturbances were in Las Animas County, the leading coal-producing and coke-making region; this was responsible for a falling off in coal production of nearly a million tons and the whole decrease in the output of coke.

There are 15 coke-making establishments in Colorado which operate 3588 ovens, all of the beehive type. Six of these firms operating 726 ovens were idle throughout the year. In addition, 980 ovens were idle at plants which made some coke during 1913 so that the total number of idle ovens was 1706 or nearly half the coke capacity of the state. No new ovens were under construction at the end of the year.

According to returns made to the Geological Survey, the average value of Colorado coke advanced from $3.13 per ton in 1912 to $3.20 in 1913. These fluctuations are, however, more apparent than real. A large proportion of the coke produced in the state is made in ovens which are parts of plants including in their operations coal mining, coke making and the manufacture of iron and steel or the smelting and refining of the precious and base metals. For such plants, the placing of a value on the coke produced is an arbitrary matter and does not represent market conditions. Only about 30 per cent. of the total output of Colorado in 1913 was commercial coke.

The complete inclosure of all live parts within substantial grounded metallic outer coverings is the best safeguard against every kind of electrical accident.

The Labor Situation

SYNOPSIS—The eastern Ohio miners are trying to get a sympathy strike in Pennsylvania, but if it occurs the action will probably only extend to concerns mining coal in both states. The Vancouver strike is declared off. The old scale for 35 independent operators and their men in Colorado has been renewed. General scales are now completed for Washington, Oklahoma and Arkansas.

Everywhere in Ohio except in the eastern district, the mines are beginning to produce their normal output. During the past week more mines were put in operation in the Hocking Valley, Pomeroy Bend, Jackson, Cambridge, Massillon and Crooksville districts. Working conditions have proved satisfactory and little friction is reported.

The Ohio Industrial Commission has not yet been asked to decide the question of the percentage of impurities or the proportion of slack allowable in the coal as loaded by the miners. Both problems have been settled by agreement between miners and operators, at least for the time being. A docking system for impurities has been provided and it is working satisfactorily.

Officials Are Opposed to Miners Assembling

The eastern Ohio miners are anxious to return to work. Operators who have mines in that district profess to believe that the rank and file of their employees would return to the mines at almost any scale, but are kept in check by the officials of the miners' organization. The officials are strong in the determination to adhere to the 47c. rate for machine-mined coal.

In fact they have circulated a letter to their following in subdistrict No. 5, informing the members that "certain people, bosses or superintendents" might advise them "to call special meetings and to adopt certain measures in order to end the strike, not for" their "benefit, but for the benefit of the bosses." They urge them not to call any meetings of the local for the purpose of arranging terms of settlement unless they are officially notified to do so by the subdistrict officials. That such a notice as this, which is dated Aug. 15, has been found necessary is a sign that a sentiment for concession is somewhat generally present.

What the Eastern Ohio Operators Declare

The position of the eastern Ohio operators is well defined by Thomas L. Lewis in his Coal Mining Review, and is about as follows:

The miners were to negotiate for a scale in which the price was to be the same as before or else the equivalent of the price heretofore paid. Now the miners have taken this as if meaning that the price paid in Ohio, as a whole, shall be equivalent to that paid, as a whole, in the previous scale, though in different districts the change may give a higher or lower equivalent.

Thus in the Hocking district 72 per cent. of the coal output was paid for. The other 28 per cent. was handed over to the operator without payment. He paid for that 72 per cent., 69½c. per ton, so that it was as if he had paid 50.04c. for the whole of the coal. Similarly the Guernsey district produced 32 per cent. of screenings and hence only 68 per cent. of the coal was paid for. The operator paid 69c. per ton for the sized coal and that was equivalent to a price of 46.92c. for all the miner produced. In the eastern Ohio district the rate was 69½, but the free screen coal rose to 36 per cent., so the miner was paid on only 64 per cent. and the equivalent would be 44.48c.

The Miner Seeking More Than an Equivalent

Clearly, then, the miner in the eastern Ohio district is trying to better his position in making his new contract. Of course, it might give him a higher rate, yet less steady work and consequently small pay,. He is trying, however, that is clear, to get more than the equivalent of the former wage despite the fact that there is now less incentive for him to prepare lumpy coal, and that the companies, even in case of a rigid mathematical equivalent, would be subjected to loss from the change. But it is true that as the joint-scale committee on Mar. 24, 1914, failed to arrive at an agreement, neither miner nor operator is bound to seek the exact equivalent of the former scale rate.

The Hocking Valley Operators Won an Important Concession

On the other hand, the miner in the Guernsey district has been satisfied to go back to work at the mathematical equivalent or its close approximation and the miner in the Hocking Valley district has consented to accept 47c. instead of the mathematical equivalent, which is 50.04c. That is he has agreed to go back for a decrease of 3c. and more per ton or over 6 per cent.

Thus there were parts of Ohio where the miners' demands were not unreasonable, and here an agreement was soon made. But in eastern Ohio an equivalent was not sought, but a better wage instead. We must not forget, however, that the miner has this justification. He has realized that an unequal wage was being paid in Ohio under the lump-coal scale and he has determined to wipe out this discrimination. The eastern Ohio operators have profited by the larger amount of slack which they got without payment.

On the strength of this discrimination, like West Virginia and Tennessee, they have extended their field of operation and now if this difference is removed and wages are equalized, they must be content to occupy a restricted field, and those who work for them will find an almost universal law facing them and that is this: That an increase in relative wage will be more than balanced by a decrease in regularity of employment. Both miners and operators are likely to be sufferers.

The trick worked by the miners has been clever. They used the lowered equivalent in some districts as a pry to help them in others and they promised to make the 47c. rate binding on all districts alike. It remains to be seen whether they will keep their promises to the other Ohio operators or will follow the instructions of the Union as interpreted by the eastern Ohio operators and renew the scale with what the latter deem an exact mathematical equivalent, namely, 44.48c.

Both Miners and Operators Show Little Respect for the Equivalent

It is clear that while the miners are trying to get a rate of 47c., which is 2½c. above the equivalent of the old rate, the individual operators who are seeking to operate without a district scale are trying to pay them only 42½c. and 43c., which is 1½ to 2c. lower than the exact equivalent. In fact, the operators as a body still seem to stand firm on 41.12c. as the price they are willing to pay for run-of-mine machine coal. This is done partly because of the advantage given the Hocking Valley operators by the change, partly to assure against loss from poorer coal, resulting from a run-of-mine scale, and partly so as to put Pittsburgh coal operators in Ohio on a footing more nearly equal with that of the operators mining that bed at Pittsburgh.

The Blockhouse mine of the Dexter Coal Co., at Brilliant, which was operating under the 47c. rate, has been closed down. The receiver says that it was impossible to mine coal at that figure, the coal was so dirty and the rate so high. Of course, there may be other causes, but eastern Ohio operators consider that the failure to operate the mine with success points their moral satisfactorily.

To Strike in Pennsylvania

The miners are anxious to bring pressure to bear on the M. A. Hanna Co., the Youghiogheny and Ohio Coal Co., the Ohio and Pennsylvania Co., and others by promoting strikes at their mines in other states, which are filling the orders which would otherwise be filled in Ohio. The executive board of the United Mine Workers is said to have ordered these strikes, which shows that the board believes a contract is not a contract under certain eventualities.

The operators are anxious to begin producing in eastern Ohio, as their markets are rapidly being invaded by other districts and they fear they may not be able to recover them.

Peaceful in West Virginia

In West Virginia, there has been little trouble. The Four States Coal Co. is expecting that a peaceful result will follow its conferences and has made a temporary agreement with its men. In Maryland, a state not much disturbed by strikes, a small corporation, the Maryland Coal Co., at Lonaconing, has a dispute with its miners. They want 25c. per yd. for removing rock and have gone on strike.

The contract for Oklahoma and Arkansas, in district 21, has been completed by the conference in session at Kansas City. As noted last week, the Kansas contract has also been completed, and the Missouri agreement is practically finished. Thirty-two mines became idle on Saturday, Aug. 22, the men refusing to work without a contract, or quitting because of disputes within the union. It is believed that when the contracts are finally approved by the conventions of the districts on Aug. 31, the men will return to work.

Scales in Washington and Colorado

An agreement has been made in District No. 10, the operators and miners convening in Seattle, Wash. The old scale will be renewed, but the wages of firemen will be increased and free tools will be supplied company miners. The miner's convention will reconvene on the 25th to ratify the agreement. The miners asked for an increase in the mining rate, which they knew they could not get. There is no sense in making demands for the purpose of having concessions to offer. Neither operators nor miners should spar for points. It weakens everybody's faith in the justice of a cause if the parties presenting it habitually ask for more than they can expect.

Another agreement was one in Colorado made between the United Mine Workers of America and 37 independent coal operators. The wage scale was renewed, which had been in effect since Sept. 1, 1913. The operators came from all parts of Colorado, eleven being from the northern field and nine from the Walsenburg district, Huerfano County. Several were from Crested Butte, in Gunnison, and from Palisade in Mesa County. Some came from El Paso County and a few from Routt and Fremont Counties. So the settlement, if not important from a tonnage point of view, covered almost every section of the state.

Federal Troops Likely to Remain in Colorado

Federal troops are apparently destined to long service in the Colorado coal fields. The attempt being made by the administration to accelerate settlement will be found described in the editorial department. Nothing is being done toward reorganizing the state militia, the present numerical strength of which is below minimum emergency figures.

It is said that the European war has made demands upon about one-third of the coal miners in the southern field as subject to military service in the countries affected, but until Bulgaria and Italy mobilize, the statement seems excessive.

Judge Charles Cavender has ruled that 26 strikers, who are charged with murder, committed in the attack on the Chandler mines, Apr. 25, must stand trial. In his ruling, he denied a motion to quash the indictments and set trial for Oct. 5. Each defendant was required to file bond for $4000.

Coal operators of Colorado are issuing bulletins headed, "The Struggle for Industrial Freedom," in which replies are made to false statements that are circulated throughout the nation concerning acts of mine owners and the national guard. Bulletin 12 is a letter written by Governor Ammons, giving a short, straightforward history of the war and covering alleged brutal acts of militiamen and "gunmen." Bulletin 13 deals with the activities of "Mother Jones," as explained by Gen. John Chase, and is a direct refutation of the assertions made by one John Reed, who published, in the July "Metropolitan Magazine," his scurrilous version of the late disturbance as obtained from agitators and their allies. Copies may be had by applying to J. F. Welborn, 720 Boston Bldg., Denver.

In Vancouver, the strike has failed completely. It began May 1, 1913, and cost the Union more than $1,000,000 and now by a vote of the Union, the miners have surrendered.

Franklin Bache Still Undismayed

In Arkansas, the Bache-Denman Co. has desired permission from the court to open up two small mines, the Beck & Keiffer and the Griffith openings, near Prairie Creek. They say the mines can be opened in a few days and at small cost. They are near No. 4 mine, which was so completely destroyed by Union men in the recent riots. The unrest in that section is considerable, as the men refuse to go to work till a definite labor contract is signed. The attempt of Bache-Denman Co. to do anything without federal protection seems futile.

On Aug. 17, Judge I. C. Pritchard, of the United States circuit court of appeals, granted an appeal to the Supreme Court in the case of J. Mitchell, T. L. Lewis and W. B. Wilson, appellees against the Hitchman Coal & Coke Co., appellants.

The three appellees are, of course, past leaders in the United Mine Workers of America. By an opinion handed down on May 28, 1914, they were conceded the right to form a combination to induce miners in West Virginia to become members of the United Mine Workers of America and to secure the highest wages possible by peaceful methods. The Hitchman Coal & Coke Co. contests that right.

The Floodwood Power Station

About Oct. 1 a central-power station located at Floodwood, Ohio, in the Hocking Valley coal fields, will begin to supply current to a number of small municipalities and the coal mines. Later the service is expected to extend to Columbus and other cities of the central portion of the state. Mine refuse will be utilized under the boilers in connection with coal, and all fuel will be free of transportation charges.

An enterprise of this nature has been agitated for a number of years. It took definite form last spring, when Close Brothers, of London, England, took hold of the financing end, through their agent, F. C. Elliott, of Chicago.

Floodwood is a mining hamlet on the banks of the Hocking River, four miles from Nelsonville, the assembling point for rail shipment of nearly all the coal mined in the Hocking Valley. It is the center of some 60 coal-mining operations.

The concern, known as the Ohio Electric Securities Co., has 1000 acres of coal land adjoining the power station Coal will be taken direct from the mines located thereon and dumped into a hopper, passed through a crusher and elevated to bunkers which extend the full length of the boiler room It will then be spouted from the bunkers to the stoker hoppers. The same machinery is to receive the ashes from pits below the stokers and convey them outside or to cars located over the coal hopper.

A modern power house of steel, concrete and vitrified brick is now under construction. There are being installed three 1500-kw. Westinghouse-Parsons turbines, with a continuous overload capacity of 25 per cent. and a 50 per cent. overload capacity for two hours..

Surface condensers will be located immediately under the turbines. Two Alberger corliss dry-vacuum pumps, also the wet-vacuum pump and centrifugal circulating pumps, are to be located in the basement under the power units.

The exciters will consist of one 50-kw. 250-volt turbine-driven and one 50-kw. 250-volt motor-driven set. These are to be located on the main engine-room floor.

In the boiler room the installation will consist of three Flanner water-tube boilers, each normally rated at 627 hp., and Foster superheaters, the steam pressure carried to be 200 lb., with 100 deg. F. superheat. Green chain-grate stokers will be used, and each boiler will be equipped with a Sturtevant induced-draft fan.

Each complete unit is guaranteed and will be capable of being operated at 100 per cent. above normal rating. The boiler-feeding equipment is to consist of one 4-stage centrifugal pump direct connected to a turbine and one 4-stage pump connected to a motor. The feed water will be heated by a 3000-hp. Cochrane heater.

Current is to be generated at 11,000 volts, 60 cycles, 3-phase, and transmitted at that voltage to the mines and towns within a radius of 10 miles, and then trans-

formed down to the operating potential. Beyond the 10-mile limit, the current will be stepped up to 33,000 volts and transmitted at that pressure to the various substations, where it will be transformed down and then distributed. Electrolytic arresters will give ample protection against lightning disturbance.

Provision for Additional Equipment

The entire installation has been planned on the unit system, so that the building can be extended and additional equipment added from time to time as required without disturbing the operation of the plant.

Immediate consumption which awaits the opening of the plant, as now provided for in contracts and business already secured, amounts to over 5000 kw. Municipal contracts, including several county seats, have been signed up for a term of years. A number of mines have also entered into arrangements with the company, and a 15-mile trolley line will be supplied with power.

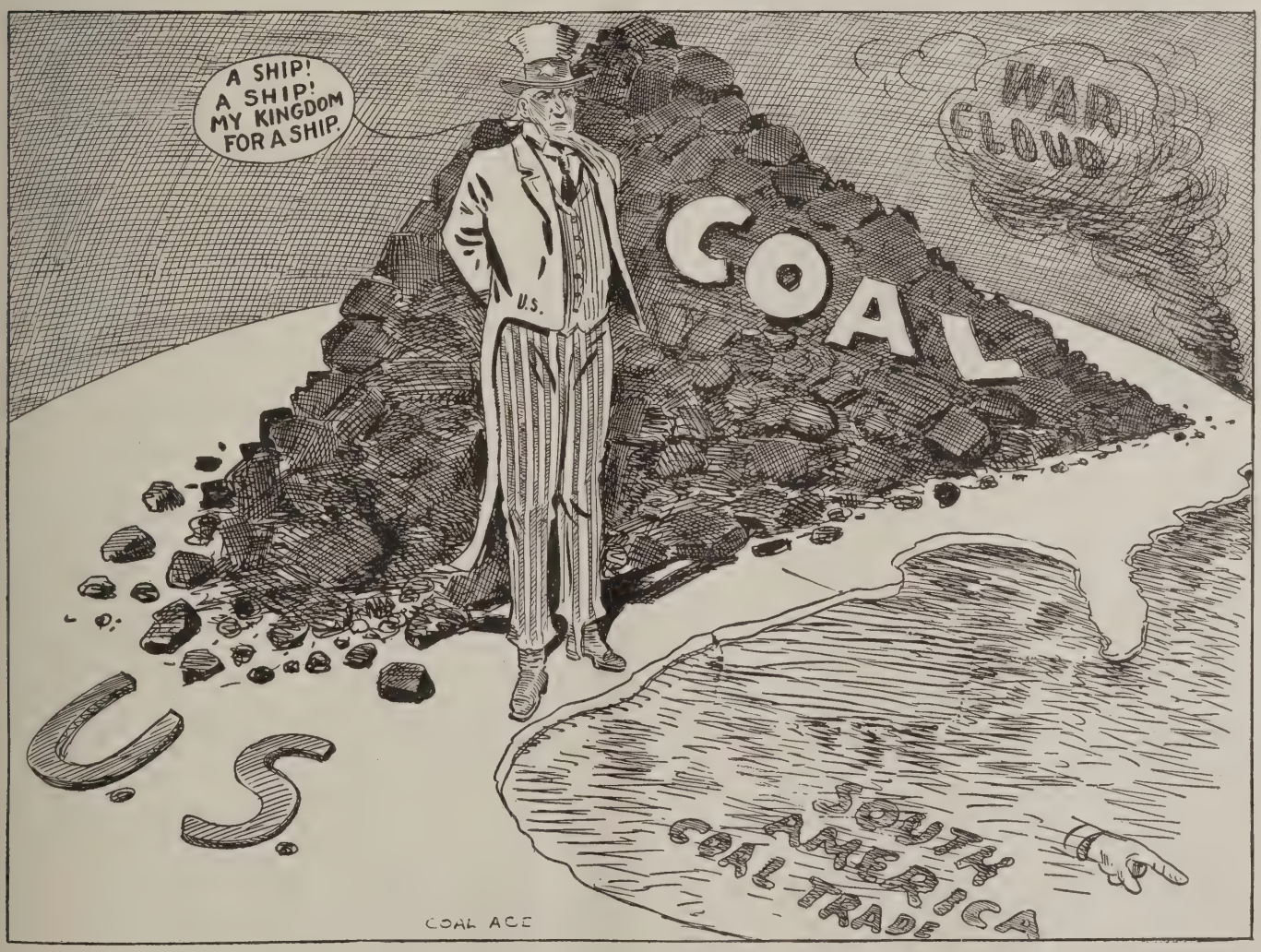
Within the general territory served by this central station are a score or more of big brick plants, one of which represents an investment of over $500,000. The great abundance of native clay, the deposits of which follow the coal measures, assures the further development of this industry, and will make an increasing market for electric power.

Anthracite Producers Burn Much Coal

An amount equal to nearly 12 per cent. of the anthracite tonnage shipped to market is consumed at the mines for steam and heat. This is shown by the latest report of the Bureau of Mines of Pennsylvania. In 1901 only 9.87 per cent. of the amount of coal shipped was consumed at the mines for these purposes. Ten years later, in 1911, the amount had risen to 11.47 per cent. while in 1912 it was 11.98 per cent.

Reduced to tons and dollars, these figures assume startling proportions. In 1901 the number of tons of coal shipped from the anthracite regions of Pennsylvania was 59,861,650, and the number of tons consumed at the mines was 5,912,900. In 1911 the figures were 79,775,010 and 9,152,073, respectively, while in 1912 they were 73,462,014 and 8,804,759.

Anthracite-coal producers are therefore, among the greatest consumers of their own product. At some of the deeper mines where much water has to be pumped over 25 per cent. of the coal produced is used for steam and heat. In order to operate all the machinery required, 531,289 hp. had to be produced by steam in 1912, as against 526,643 in 1911.



Plenty to Sell, but No Way to Deliver

Who's Who in Coal Mining

Josiah Keely

The Cabin Creek Consolidated Coal Co., in southern West Virginia, is one of the most successful operations in that little mountain state. The corporation as a whole reflects to an advantage the aggressive personality of its general manager, Josiah Keely. Mr. Keely is a "sure-enough" native of the state where his fortunes have been cast, for he was born at Charleston, the capital, in 1874, and received his first degree from the university at Morgantown, in 1896.

Josiah Keely is the sort of man who figures that the attainment of an education requires a life-time of study. It is not surprising, therefore, to find that eight



JOSIAH KEELY

years after he left the W. Va. university with an A. B. degree, he finished work at Harvard, entitling him to a still higher honor in the form of an A. M. degree from that famous seat of learning.

Following the completion of his undergraduate work at Morgantown in 1896, Mr. Keely was appointed principal of the W. Va. Preparatory School, at Montgomery. He continued in this capacity until 1907, when he decided to change his vocation from educational to mining work. Starting in as a billing clerk and payroll man for the Consolidation Coal Co., at Gypsy, W. Va., he soon obtained a valuable practical training in his new line of endeavor, at the same time completing the course of study in mining, outlined by the International Correspondence School.

Serving the Consolidation company for some time in various subordinate positions, he was finally appointed superintendent of one of their mines, which work well fitted him for his next job as assistant to the company's general mining superintendent.

After nine months' service in the last mentioned position, Mr. Keely was made district superintendent for the same company, at Acosta, Penn., leaving this place in January of this year to accept his present employment as general manager of the Cabin Creek Consolidated.

From 1902 to 1907, he was a member of the W. Va. State Board of Examiners. In 1905, he was treasurer of the W. Va. Teachers' Association, and is at present an active member of the W. Va. Mining Institute.

Johiah Keely is a broad-gage man. His early training and work in educational lines fitted him well for specialization in the coal field. Mine managers today must be able to understand something of human nature; they must be able to see and feel from the viewpoint of the man working at the face; they must be practicalists in the art of substituting themselves at all times for the men they direct—Mr. Keely is such a man, for he is the personification of modesty and humanity, with a sprinkling of perseverance to make the combination lasting.

American Mine Safety Association

The annual meeting for the transaction of business, presentation of committee reports, etc., of the American Mine Safety Association will be held at the Waldorf-Astoria Hotel, 34th St. and Fifth Ave., New York City, Monday, Sept. 7, to Thursday, Sept. 10, inclusive, in accordance with the following preliminary program:

Sept. 7—Morning—Meeting of executive committee and of other committees, in accordance with calls of chairmen.

2 p.m.—Address of welcome by city official. Reading of minutes of preceding meeting. Report of executive committee. Adjournment to give committees opportunity to meet.

Evening—Banquet at 7 o'clock.

Sept. 8—Morning—Business session. Committee reports. First-aid demonstration by team from Lehigh Valley Coal Co. Round table luncheon. Subject, "Encouragement of Training.

Afternoon and Evening—Excursion to Coney Island.

Sept. 9—Morning—Business session. Committee reports. Mine-rescue demonstration by team from Delaware & Lackawanna R.R. Co. Coal Department. Round table luncheon. Subject, "Safety Organization."

Afternoon—Visit American Museum of Safety.

Evening—Smoker at 8 o'clock.

Sept. 10—Morning—Closing business session and adjournment.

Afternoon—Boat excursion.

Following the close of the annual meeting those who can are expected to attend the annual mine-rescue and first-aid contest, to be held under the joint auspices of the American Mine Safety Association, the United States Bureau of Mines and the Coal Operators' Association of Indiana, at Terre Haute, Ind., Saturday, Sept. 12, at 10 a.m.

Guests, including ladies, are invited to attend, but will be required to pay for their accommodations at the banquet, smoker and boat excursion. Members will be required to pay for the banquet, but probably not for the smoker or excursion.

W. Hargreaves, a Yorkshire mining expert, says there can be no doubt every prudent and economical mine manager will consider the question of stone dusting at the earliest possible moment, for if ever a cheap form of insurance was put before colliery owners, this is the one. The mining industry will be greatly lacking in a sense of duty if it does not put itself into shape for taking action in advance of anything that may be suggested in the way of legislation.

Editorials

Expansion in the British Export Trade?

It will be a distinct surprise to many of the American operators, now investigating the possibilities of securing a foothold in the world's coal market, to know that England is likewise quietly laying plans for materially broadening the scope of her operations in this field. Germany, of course, has become a heavy exporter in recent years, but with her navy bottled up and acting purely on the defensive, British operators have little to fear from competition in that direction. Belgium is, of course, completely paralyzed by the incessant fighting within her boundaries, while France has insufficient coal to supply her own needs, and is a heavy importer herself.

In addition to this, the internal consumption of Great Britain will be heavily restricted, as a result of the general cessation of industrial plants, which will release large tonnages for use in other directions. It should also be remembered that the countries so far involved in the war take but a small proportion of the British coal exports—in fact, only as much as India and Australia alone. This means that there is still a large market for their production.

On the other hand, Great Britain is at the present time facing a number of severe handicaps, such as the heavy Government bond required on all foreign shipments, and the withdrawal of the Welsh products entirely from this business. It was upon the excellent quality of this latter fuel, considered by many the highest grade of coal there is, that Great Britain has reached her enviable position in the world's coal markets. The fact that it has been withdrawn entirely will now place some of the American fuels, such as, the Georges Creek, the Pocahontas and the New River grades easily in the lead among the fuels available in foreign markets.

Developments in the Export Trade

Among some of the most important developments in the world's coal markets, as a result of the European wars, has been the rigid restriction put upon foreign shipments by all of the countries involved, as well as a number of those still neutral at the present writing. Netherlands has closed down completely on all exports of coal and coke, and Italy has done likewise on foreign shipments of coal. Germany has gone even further, and prohibited not only the exportation, but also the transit, of all raw materials that might in any way be construed as munitions of war, including iron ore, coal, lignite, coke, and briquettes. Decrees have been issued in both Norway and Spain, prohibiting the exportation of coal, coke and mineral oil.

England has, of course, withdrawn her famous Welsh coal from the world's markets, prohibiting exportation even when consigned to neutral powers. Other varieties of the British product are understood to be still moving along certain channels. In this connection the exports of the United Kingdom, the current figures of which have just become available, are of particular interest to American operators. For the first seven months of the current year, the gross exports aggregated 43 million tons as compared with 44⅓ million tons for the same period in 1913.

The exigencies of war conditions have necessitated the adoption of rigorous measures which will severely handicap the British exporters. For instance, the Government now requires that bonds be deposited, aggregating three times the value of the consignments, hoping in this way to eliminate the possibility of the coal being diverted to the enemy. This measure met with such strenuous objection on every hand that it is probable that it may be somewhat modified so that more latitude will be granted consignees, about whom there can be no question as to their reliability.

The situation has been further complicated by financial difficulties involving credits. The English exporters have enormous sums owing them already on past business, and with a general moratorium in effect in all European countries, collections are at a complete standstill. But even in the face of all these enormous difficulties, the American exporter must not entertain exaggerated ideas as to his prospects, for England is still shipping much coal to foreign markets, and will gradually solve all the many problems that are now confronting her.

In view of the importance of the present export business, our next issue will contain a bibliography compiled by an authority on the export trade.

Impartiality

Now and again there comes with a letter of approbation from a reader, a request that we endeavor to be impartial. But it is not true impartiality he desires, but a blind acquiescent neutrality to all points of controversy. There is little use for impartiality of this sort in this world. Only those who take a definite stand for right can ever be successful, especially in the printing of a journal for intelligent and conscientious people. No one desires a wishy-washy defense of practices, which are known to be indefensible and of people who are acknowledged to be doing wrong, nor do they want a journal which avoids dangerous subjects on the ground that they are not technical.

But partiality must always be for the truth and for the right, and not for any special side in a controversy. Either the weaving of halos indiscriminately for opertors or the writing of untrue panegyrics of labor leaders is a type of partiality which is neither ethically nor commercially sound.

We have a mental blueprint which we desire to use as a guide in our framing. We hew with our adze to follow its lines and any chips knocked off other than those thus planned, spoil the whole value of the stick, and every

splinter left in place which the plan says should be removed, must be struck manfully away before the work is complete.

We could reduce the whole timber to kindling or leave it unhewn, but it is not our purpose so to do, and let us hope the blueprint we have made, the purpose of our labors, is as well schemed as it is well intended. To that purpose we are partial and let us hope that to it we will always give our unhesitating adherence. Those who ask us to take another viewpoint, ask of us to be false to our convictions, to make the paper an organ of this or that interest.

And when we hear that word "organ" comes the thought of a deaf man turning the handle of a hurdy gurdy. The tune is nothing to him; harmonies or discordant notes are alike to him so long as the money comes to his hand. We do not think of COAL AGE as the deaf man regards his organ. We want it to play our music, to exhibit our sense of harmony; though, to be sure, when other people would entertain the audience, we do not insist on our ideas of the perfect melody and refuse to them such liberties as we arrogate to ourselves.

The Mailed Fist

Sometimes a constitutional government finds its executive disposed to wipe away with one fell swoop all the protection that the constitution guarantees. In Colorado, the citizens passed sometime ago a law prohibiting the hiring of men outside the confines of the state to replace those who are on strike. Labor is a commodity just as is wheat or bread, but the voters of Colorado believed they could prevent their fellow citizens from buying that commodity in other states. In short, the workingmen of other states who had labor to sell were prohibited from selling it across the state lines. This it seems in itself made the "strike-breakers law" invalid.

But the United States Army has now replaced the state government in the strike districts of Colorado and has substituted its own will for both law and constitution. The following letter to a coal operator, similar to that sent to all union and nonunion operators in Colorado alike, clearly exhibits that the government despite the fact that it has a firm rein in its hands is now disposed to strengthen rather than relax its hold on the rights of the citizens.

In compliance with instructions from the War Department, dated Aug. 14, 1914, the following regulations on the employment of labor will be enforced in this district. Laborers recently hired who do not conform to these regulations will be discharged: (1) Miners must seek work at the mines. (2) Miners must not be gathered or brought in by operators. (3) Miners must be citizens of the State of Colorado. (4) Miners must have complied with the laws of Colorado which relate to miners.

I. WATERMAN,
Lieutenant-Colonel, 12th Cavalry,
Commanding U. S. Forces.

Now the definition of a man "recently hired" is open to question. All men hired since Sept. 23, 1913, when the southern strike started or even since the strike call in the lignite field in Mar. 31, 1910, might be included. The definition might even be put further back. It covers, however, a sufficiently extended period of time to leave in doubt the right to work of a large number of men in the mines, and if in force at the end of the present European war, may prevent any of the men from returning.

The first two rules are not new. They are interferences with the rights of workingmen and operators dating from last summer when the Department of War took charge of the situation. As we have said, they are clearly at variance with the constitution and could only be excused as a temporary measure.

The third rule is new. As perhaps a third of the men now employed in most mining camps especially in Colorado are not American citizens, they cannot be citizens of any of the states. If, therefore, they have applied for work and been hired recently in Colorado, they must be discharged. This regulation applies not only to miners, but to all the men working around the mine, even if they are in a degree skilled laborers. Mine foremen and engineers who are citizens of other states come under this head.

The new ukase, if the word "recently" is made to have a broad definition, will considerably reduce the output of Colorado and even if it is made to apply only to men hired since the rule went into effect, will prevent new men from being employed.

The administration has decided to destroy the opposition to the Union; it has determined to deliver the mines over to the United Mine Workers of America. We believe that the government of this country is not to be used to promote the private ends of any interest. Our good will toward a respectable unionism is not so strong that we believe the army should be invited to lift it into the saddle.

The Purchase of Coal on Specifications

Perhaps there is no single phase of the coal industry in which the practice and opinions have been so entirely contradictory as this much abused question of purchasing coal on a heat-unit basis. Fuel experts and specialists along these lines are generally in favor of the adoption of this method. But among the leading buyers and sellers of the country, there is a great diversity of opinions and the most significant fact is that we find the best informed men among the advocates on both sides.

By far the greater proportion of coal buying in this country is still conducted on the prestige of certain sections, seams or collieries; but on the other hand we find some of the most progressive companies such, for instance, as the New York Edison Co., refusing absolutely to contemplate fuel purchases on anything other than a strictly heat-unit basis. No doubt the abuse to which this system has been subjected, such as impractical specifications and ignorant sampling, supplemented by like analysis, is the direct cause of the bitter opposition which it has encountered in some quarters. Certainly, under these conditions, it may become exceedingly burdensome, if not disastrous, to the seller.

But whatever the merits of the contending theories may be, it has been deemed advisable to present an ultimate analysis of the problem. The initial article appears in this issue under the above title. The series will be written by F. R. Wadleigh, a man who has studied fuel problems in all the leading countries of the world and an accepted authority in this particular line. Discussions and comments from readers on the conclusion reached by Mr. Wadleigh are invited.

Sociological Department

First Annual First-Aid Meet of Utah Fuel Company

By A. C. Watts*

SYNOPSIS—The captains of the teams were not allowed to issue supplemental orders after the work of any team commenced. Two ladies' and one boys' team gave exhibitions of first-aid work. The report goes into detail as to the method of judging the contest. The rating of errors is not that of the American Mine Safety Association, possible demerits totaling only 53 points in 100.

To stimulate interest in, and increase the efficiency of, first-aid work among its employees, the Utah Fuel Co. has organized first-aid associations in all its mining towns. It is the intention of these organizations to educate the employees of the company, both under and above ground, in first-aid and helmet work, and to hold a competitive drill or contest annually at which time the Utah Fuel Co. will provide suitable prizes and medals for the winning team and will assist, in any way possible, to perfect and maintain a first-class first-aid organization at each of its camps. On the 24th of July, known and celebrated in Utah as Pioneer Day, the first of the series of annual meetings was held at Castle Gate, Utah. As this is a state holiday which is always celebrated with appropriate ceremonies, the First Annual First-Aid Contest partook of the nature of a celebration and reunion of old friends. It is hoped that these annual meets will serve to bring the employees of the company into closer touch with each other and establish an esprit de corps among them as well as increase the desire of all employees to learn how to care for injured fellow workmen.

Excursion trains were run from the three main districts, Pleasant Valley and Sunnyside in Utah, and Somerset, in Colorado, and brought large delegations. Altogether about 1500 visitors were present at the event and witnessed the contests. Bountiful and varied refreshments were served to all visitors, and accommodations provided for the convenience of women and children of whom large numbers were present. As the excursion trains rolled in they were greeted by bands of music and salutes of dynamite were exploded on the surrounding cliffs. When all had arrived the delegations marched to the baseball grounds headed by bands and with banners denoting the various teams and towns, and with placards boosting other places for the next meet.

The ball grounds are below the town and in the bottom of the cañon. Instead of the grass-carpeted commons and rolling tree-covered hills of the east it has the yellow clay and the bare, steep and rocky cliffs and sparkling mountain streams of the western mountains, but with the bright colored clothing of the women and the khaki and blue overalls of the contesting miners, the scene presented an equally picturesque panorama. The field for the contests was laid out on the baseball diamond and was surrounded by a rope enclosure, inside of which none but contestants and presiding officials were allowed.

Two rows of nine 12-ft. squares were marked with white paint and covered with brattice cloth. At the back of each row a wire was strung on pipe supports, and pennants having a red cross and the number of each team painted in black on them, were suspended at each square. To insure absolute impartiality in the judgment of events, no company surgeon or officials were allowed to have anything to do with the judging of the contests or allowed inside the enclosure.

The judges were:

Dr. F. R. Slopkanski, local surgeon for the Denver & Rio Grande R.R. at Helper; Dr. J. Dowd, of the Consolidated Fuel Co., Hiawatha; A. W. Dennison, in charge of the Consolidated Fuel Co. Rescue and First-Aid Work; H. H. Sanderson, superintendent, Consolidated Fuel Co., Hiawatha; J. S. Thompson, mining engineer of the Colorado School of Mines.

The supervising judges were: Roberts and Lanza, of the U. S. Bureau of Mines.

J. C. Snow was chief scorer and his assistants were W. R. Johnson, R. Wilstead, G. Conway, J. A. Thorpe, L. R. Evans and A. Elliott, of whom one was chosen timekeeper.

Eighteen teams, each of six men, competed. One man in each team was selected as patient. Castle Gate mines had 3; Winter Quarters, 5; Clear Creek, 3; Utah Mine, 2; Sunnyside, 3; and Somerset, 2 teams; besides which there were two teams of young women from Winter Quarters, and one team of boys under 17 yr. of age from Clear Creek, who gave exhibitions of exceptional skill, although they did not participate as competing teams. The young ladies will be presented with a silver loving cup.



The Squads in Review at the Castle Gate Contest

PRIZE WINNERS

The first prize for the team having the highest total average in all events was a handsome silver loving cup. The winners of the first prize in the separate events were given handsome gold medals, and the second prize winners pocket knives appropriately engraved.

The first prize belongs temporarily to the winning team, but permanent possession is obtained only by the team winning first place three times. This year the first prize was won by team No. 17 from the Castle Gate No. 2 mine, composed of:

Captain R. J. Henderson, American, machine runner; J. Ramage, American, machine helper; J. Wilson, American, driver boss; A. Wardell, American, driver; J. Lakin, English, coal inspector; J. S. Hreinson, American, machine runner; the total score being 216⅔ points.

The winner of the second prize was team No. 7 from Castle Gate No. 1 mine, composed of:

Captain J. Jones, English, mine foreman; H. Mather, English, rope rider; J. Cowan, American, machine runner; J. Yates, English, hoistman; H. Walker, English, driver; F.

*Chief engineer, Utah Fuel Co., Salt Lake City, Utah.

Levic, Austrian, machine helper; with a total score of 210½ points.

The first prize winner in the one-man event was E. H. Holland, of Sunnyside Team No. 2, and the second was J. Palmer of Sunnyside Team No. 1. The first prize winners in the two-man event were E. Lloyd and H. Stubbs, of Sunnyside Team No. 1. The second prize winners of the same event were V. Autzak and R. Etzell of Winter Quarters Team No. 3.

The first prize winners of the three-man event were J. Haddow, W. Edwards and V. Bain of Utah Mine Team No. 1. The second prize winners of the same event were A. Curtis, A. Michlog and G. Zambelis of Clear Creek Team No. 3. The first prize for the full-team event was won by No. 17 of Castle Gate No. 2 Mine and the second prize for that event by Team No. 7 of Castle Gate No. 1 Mine.

The following problems were given:

1. One-man event—A man is found in bad air, lying on his back, overcome after a gas explosion, with a severe laceration in palm of right hand, bleeding in jets. Rescue by shouldering, and carry 20 ft. to place of safety, treating.

2. Two-man event—A man is found with face and ears badly burnt, a dislocated shoulder and a sprained ankle. Treat and carry 20 ft.

3. Three-man event—A man is found under a fall of rock with a fractured jaw; also with a compound fracture of left leg 8 in. below the knee, with bone protruding on inside of leg—severe arterial bleeding. Treat.

4. Full-team event—A man is struck by a trip in the mine and found lying in the entry on his back, with back broken and simple fracture of both bones of right arm between wrist and elbow. Treat and carry on stretcher 50 ft.

The above problems were chosen by all the judges the night before the contest, and were written and placed in sealed envelopes, there being more than a sufficient number of copies to supply one to the captain of each team. The work of the teams during the contest was governed by the following rules:

SPECIAL RULES FOR CONTEST

1. A team is composed of 6 men, and the patient will be chosen from this number.

2. The teams will be numbered consecutively, beginning at No. 1, and as the captains obtain their number they will occupy their respective positions on the field.

3. The time allowed for each event will be as follows: For one-man event, 8 min.; for two-man event, 10 min.; for three-man event, 12 min.; for full-team event, 15 min.

4. All work of the first-aid teams will be carried on under the rules of the American Red Cross.

5. The judge will prepare his problems and deliver same in a sealed envelope to each captain. The captains will hold same in hand until signal is given by the judge and they will then open the envelopes and read the problems and instruct their teams. Two minutes will be allowed the captain for doing this before signal is given for work to begin.

6. In team events, the captain will control his team by giving audible commands. Such commands, however, must be given **before work is started** and no further instructions will be given while the members are performing their work.

7. At the conclusion of any event the captain will raise his hand and announce his team number. The team will remain at its post until relieved by the judges.

8. Each team will furnish its own material, which will consist of blankets, splints and other suitable articles. The triangular bandages will be the standard, although roller bandages may be used and will receive equal credit.

9. Splints, when needed, must be prepared on the field for each event. Specially designed splints may be used, but they must be assembled during the time of each event requiring their use; except that spinal splints may be prepared prior to the event.

10. In all events requiring resuscitation, rescue of the patient, and stretcher drill, the judges may require the teams to perform separately.

11. The recorders will announce the scores to the judges, and in case of a tie, the teams with the same scores will be compelled to participate in another full-team event. Those receiving the highest scores in this event will be accorded first, second and third places, respectively.

12. The chief, or first prize, consisting of a handsome silver cup, will become the temporary property, for one year, of the camp whose team will make the highest record at this contest, for full-team event, and will become the permanent property of the camp whose team may win highest honors three times.

13. In the event that any boy teams are present, they will be accorded time for an exhibition drill and contest after the regular contest is finished. Boy teams shall be composed of boys under the age of 17. A suitable reward will be given to the boys' team making the highest scores .



WOMEN'S TEAM FROM WINTER QUARTERS, UTAH



BOYS' TEAM FROM CLEAR CREEK, UTAH

14. Each judge will mark the team number, event, and discounts for each team judged, sign his name, and deliver his report to the recorder immediately after each contest.

15. No coaching or prompting from spectators or any member of the team will be permitted, and no practicing will be allowed on the field prior to the contest.

16. The contest will begin promptly at 9:30 a.m. on the baseball field.

17. The judges' scoring rules will be as follows: Each team will be given 100 per cent. to start with, and the following penalties deducted for the offenses noted:

TABLE OF PENALTIES

	Per Cent.
For failure to be aseptic	5
For not doing most important thing first	5
For inaccurate application of tourniquet	5
For lack of, or wrong artificial respiration	5
For failure to stop hemorrhage	5
For failure to treat shock	5
For assistance given by the patient	3
For captain's failure to command properly	2
For slowness in work	2
For failure to cover wound completely	2
For loose splint	2
For not padding splints properly	2
For loose bandage	2
For bandage too tight	2
For using "granny" knots	2
For awkward handling of patient on stretcher	2
For lack of neatness	2

18. The annual contest to be held at the various camps of this company will be decided by fair and impartial judges, and no official of the company will be permitted to take part in such contest or act as judges. Neither will any local physician or expert instructor be allowed to be a member of any team or act in capacity of judge. However, mine



THE DECORATIONS AT CASTLE GATE GROUNDS WHERE THE UTAH FUEL CO. HELD ITS FIRST-AID MEET



FROM LEFT TO RIGHT: CHIEF SCORER SNOW, CHIEF SURGEON F. S. BASCOM AND J. C. ROBERTS

foreman and assistants, and local engineers and assistants, may be members of any team in their district.

On assembling on the field the judges drew lots to ascertain which teams they were to judge first. There being 18 teams and 6 judges, each judge had 3 teams to inspect. The numbers of the three teams allotted to each judge were consecutive so that the judge would not be obliged to run all over the field. Team captains drew numbers corresponding with the position they would take on the field.

There was one scorer for each judge. Each scorer was furnished with a "list of penalties and deductions for same," "scorer's record," pencil and writing tablet. The judges were furnished with "judges score book" and 'list of penalties and deductions for same."

The chief scorer made records of the teams occupying each numbered position, the mine or town they came from, the captains' and men's names, the home numbers of the teams, and also the numbers of the particular teams assigned to each judge, the judges' names and the event to be performed.

As the judges inspected the work they made notes in "Judges' Score Book" of the deductions of each team, and delivered same to the scorers who added up the deductions, calculated the net points for each team, wrote the names of the contestants on the scorer's record, signed their names, sealed the reports in the envelopes marked for the event, and delivered them to the chief scorer.

JUDGES' SCORE BOOK, FIRST EVENT

Team No. —— Deduct for Penalty No. ——	Team No. —— Deduct or Penalty No. ——	Team No. —— Deduct for Penalty No. ——
" " ____	" " ____	" " ____
" " ____	" " ____	" " ____
" " ____	" " ____	" " ____
" " ____	" " ____	" " ____
" " ____	" " ____	" " ____
" " ____	" " ____	" " ____
" " ____	" " ____	" " ____
" " ____	" " ____	" " ____
" " ____	" " ____	" " ____
" " ____	" " ____	" " ____
" " ____	" " ____	" " ____

At the end of each event the score was marked on another blank as shown in the cut, and was signed by the scorer.

SCORER'S RECORD

CASTLE GATE, UTAH, JULY 24TH, 1914

1st—ONE-MAN EVENT

Score will be one-fifth of Net Amount

Each event will begin with 100 points	Team No. 1 Deduction for No.	Team No. 1 Amt. of deduction	Team No. 1 Net Points	Team No. 2 Deduction for No.	Team No. 2 Amt. of deduction	Team No. 2 Net Points	Team No. 3 Deduction for No.	Team No. 3 Amt. of deduction	Team No. 3 Net Points
Deductions for penalties as shown below.									
Total deductions									
Net amount									
One-fifth of net amount makes final score of									

CONTESTANTS

Team No. 1
Team No. 2
Team No. 3

(Signed) .....
Scorer.

After judging three teams for one event the judges passed on to the next three teams (next higher numbers) in line, taking the scorers with them. For each event the same procedure was followed so that no judge could examine the same team twice.



FIRST-PRIZE WINNERS, ALL EVENTS, CASTLE GATE NO. 2 MINE



WINNERS OF SECOND PRIZE, ALL EVENTS, CASTLE GATE NO. 1 MINE

One set of blanks was given for each event.

For the one-man event, $\frac{1}{5}$, for the two-man event, $\frac{2}{5}$, and for the three-man event $\frac{3}{5}$ of the total was taken as the result. For the full-team event 100 minus the deductions was taken as the score. Thus the highest possible figure attainable was 220.

As the events were decided the sealed envelopes were handed to Chief Surgeon F. S. Bascom, State Coal Mine Inspector J. E. Pettit, and Chief Engineer A. C. Watts. The chief surgeon opened the envelopes, called off the score to the chief engineer who recorded them, and then handed them to Mr. Pettit, who verified them. Thus in a few minutes after the last events the results were known. These, however, were not given out until ties for first and second places in the first three events were announced and worked off, and then not until after dinner, which was served in the various halls of the town, and until after the judges had all met and gone over the results.

The problems given for deciding the ties were decided upon by the presiding judges just before work was started and read to the teams upon commencement of the work . They were as follows:

One-Man Event

For second place—Man is found under a fall of rock with both feet badly crushed and bones broken. Treat and carry 20 ft.

Two-Man Event

For first place—Man is found with compound fracture of right forearm 6 in. above wrist, severe bleeding and body burned over chest and stomach. Treat.

Three-Man Event

For second place—Man is found with dislocated left shoulder and a compound fracture of right thigh (intermediate) with severe bleeding. Treat.

The closeness of the contest is shown by the fact that eight teams tied for places in the different events. The total scores varied between $189\frac{1}{5}$ and $216\frac{2}{5}$.

FUTURE MODIFICATIONS

As this was the first attempt by the company to have a full contest there were, of course, some particulars which may not have been provided for as adequately as they might have been. General Superintendent Williams and other officials are now gathering suggestions as to the manner of handling future events with the idea that little slips made this time can be corrected next. For instance one of the superintendents has suggested that the field of contest be arranged in the form of a V with the wide end facing and close to the grand stand so that relatives and other interested spectators may have a better view of the whole proceedings. The announcements will be made through megaphones. The rules governing the contests will be revised with the assistance of outside experts so that a thoroughly standard set of rules may be formulated, and penalties enlarged. Also future contests may have mine conditions represented so as to create a more realistic scene of operation.

After dinner a closely contested and exciting baseball game between the Somerset and Castle Gate mines was played resulting in a victory for the latter team by a score of 5 to 4 During the game the results of the first-aid contests were announced and prizes awarded by General Superintendent Williams, who acted as chairman for the entire occasion.

Following the baseball game the football teams of Castle Gate and Clear Creek gave a fine exhibition of the favorite British pastime, resulting in a victory for the Castle Gate team by a score of 2 to 0.

The balance of the day until time for the excursion trains to leave was spent in general merrymaking. With fine weather the day was passed very pleasantly, and it is hoped will mark the beginning of a like series which will be looked forward to with eager anticipation.

This article would not be complete or do justiee to all if it did not acknowledge the good spirit which has actuated the employees of the company at the various mines. The officials take general pleasure in acknowledging that it was due to a very great extent to the energy, enthusiasm and faithful work of the men of the mines, many of whom made sacrifices in order to help the work, that the first-aid movement has started so auspiciously. In a large measure, the future of the movement will be due to the continuance of the zeal exhibited in the preparation and execution of the first meet.

The Education of Foreign Miners

SPECIAL CORRESPONDENCE

SYNOPSIS—The writer directs attention to the increasing number of foreign miners in Illinois and gives an account of a conference in that state. He details Peter Roberts' system of instruction by which the men are taught verbs first. Ear training precedes that of the eye. Men who do not know foreign languages can teach English to a class consisting of men of all nations.

An increasing number of non-English speaking men are entering the mines in Illinois. Formerly the coal miners spoke English, and were either American by birth or had come to the United States directly from England, Scotland, Ireland, Wales or Germany, where they and their forefathers had been engaged in mining. At present the bulk of the mining is being done by men from southeastern Europe; Slavs, Huns, Poles, Italians, Greeks and Lithuanians. These men when in Europe were mainly agriculturists, and although many of them had no knowledge of mining prior to coming to America, they are frequently put into the mines soon after landing, without preliminary training, and too often before they can speak or understand the English language.

For these men, the Illinois Miners' and Mechanics' Institutes have a special mission, to instruct them in the general principles of mining and in the rules and regulations for safety, and at the same time to increase their knowledge of colloquial English. In order to bring this important subject to the attention of miners, operators, teachers and others whose interest is centered in communities where a large portion of the population is made up of foreigners, the institutes offered, under the auspices of the Summer Session of the University of Illinois, a conference and short course on the education of people speaking foreign languages. This occurred at Urbana, Ill., from July 14 to 17, inclusive.

PROGRAM OF THE CONFERENCE

July 14. 10 to 12 a.m. Conference, R. Y. Williams, director of the Illinois Miners' and Mechanics' Institutes, in charge. "Helping Communities of Foreign-Speaking People." Prof. R. E. Hieronymus, community advisor, University of Illinois; Peter Roberts, secretary, international committee, Y. M. C. A.; John H. Ross, superintendent, Superior Coal Co.; C. H. Johnson, professor of education, University of Illinois; F. E. Held, assistant in German, University of Illinois.

July 14. 1:30 to 4 p.m. Conference. "Teaching English to Foreign-Speaking Men." Demonstration. Peter Roberts.

July 15. 8 to 9 a.m. "Requirements in Teachers Training Foreigners." Peter Roberts.

July 15. 7:30 to 9:30 p.m. Stereopticon lecture on "The Foreigner and His Need," with discussion during the last hour on "How Best to Meet These Needs." Peter Roberts.

July 16. 8 to 9 a.m. "Ethnic Factors in Immigrants to North America." Peter Roberts.

July 16. 4 to 5 p.m. "How to Start Work for Foreigners." Peter Roberts.

July 17. 8 to 9 a.m. "The Foreigner as an Asset to Industrial Communities." Peter Roberts.

CHANGE IN CHARACTER OF MINING COMMUNITIES

According to the census of 1890, less than 10% of

the mining population in Illinois were immigrants from southeastern Europe. During the decade 1890 to 1900 there was a change in the racial composition of the mine workers in Illinois due to the development of two additional sources of labor supply: (1) An influx of mine workers from other coal fields of the United States, (2) the arrival of immigrants from Southern and Eastern Europe. The migration from other fields in this country was made up principally of the English, Scotch, Irish, Welsh and Germans, who left the mines of Pennsylvania and other eastern mining states because of labor disputes and the pressure of races of more recent immigration who were entering the industry in those states. The European races which at the time were securing employment in the Middle West were north and south Italians, Lithuanians, Poles, Russians, French and Franco-Belgians, and a few Magyars.

More than One-Half Were Born Abroad

After the year 1900, the movement of immigrant races of Southern and Eastern Europe into the Middle West steadily continued, and was especially marked during the period 1902 to 1907, on account of the extraordinary development and the opening of new mining districts. During this period a movement of the races of older immigration out of the mines of the Middle West to other mining localities, especially those of Kansas and Oklahoma, under the pressure of the recent arrivals, was also noticeable. In 1910, it was estimated that slightly more than one-half of the total number of employees in the coal mines of Ohio, Indiana and Illinois were of foreign birth, and that almost three-fourths of the foreign-born belonged to races of Southern and Eastern Europe.

The situation at the present, therefore, as regards the racial classification of mining employees, is in strong contrast to that prior to 1900, and it is evident that since that year there has been a constant and increasing influx of races from Southern and Eastern Europe into the mines of Illinois.

An element of danger to those working in the mines is the fact that many of the recent immigrants do not speak English with any degree of fluency or understand it when rapidly spoken, and almost none are able to read or write the language. Because of these facts it is probable that the instructions of those in authority are frequently misunderstood. A mine foreman, for instance, tells an immigrant miner, in English of course, that his roof needs propping. The miner seems to understand, but does not, and in consequence a fall of top may result in injury to the miner. Printed signs used to indicate the presence of gas or other peril, are unintelligible to many of the foreigners.

Roberts' Method of Teaching English

A successful method for teaching English to foreigners has been developed by Peter Roberts, of the International Committee of the Young Men's Christian Association. The main feature of this method is to tell a story in a series of short, pointed sentences arranged in logical sequence so that the general flow of thought will not be broken. In this scheme the verb has been given great prominence, as it is the most difficult element of the language. The sentence is considered as the unit of language, contrary to the usual teaching that the word is the unit.

It is considered that the ear is the organ of language, and therefore the method is applied without the use of text-books, the pupils beginning to talk simple English sentences at once.

A sample lesson is given below—the first lesson in the general course:

Awake	I awake from sleep
Open	I open my eyes
Look	I look for my watch
Find	I find my watch
See	I see what time it is
Is	It is six o'clock
Must get up	I must get up
Throw back	I throw back the bed-clothes
Get out	I get out of bed
Put on	I put on my pants
Put on	I put on my stockings and shoes
Wash	I wash my self
Comb	I comb my hair
Put on	I put on my collar and necktie
Put on	I put on my vest and coat
Open	I open the door of my bedroom
Go down	I go downstairs

The Meaning of the Sentence Is Illustrated by Dumb Show

The instructor first divides the lesson into three sections, as indicated above. He then repeats to the class the verbs in each sentence of the first section, conveying to the men the idea that they are to repeat the words after him. When the class has become familiar with the verbs, the instructor repeats the first sentence, "I awake from sleep," using appropriate gestures to convey the meaning of the sentence to the class.

Several repetitions are sometimes necessary before the men grasp the idea, but finally the men can repeat the sentence themselves, while the teacher simply acts it. The second sentence is then taken up in the same manner; "I open my eyes," and when the men have learned to repeat this without assistance from the instructor, the succeeding sentences are taken up in order, the entire number which have been studied being repeated in order as soon as each one is learned.

The Lesson Chart Is Shown after Words Are Learned

It is found that about half an hour is required for the men to be able to repeat the entire lesson without the aid of the instructor. After this, a large chart containing the printed lesson is placed on the wall, and the instructor reads the first sentence, pointing to each word as he pronounces it. Soon the class understands that the printed characters represent just what they have been learning to say, and they repeat each sentence as the instructor points to it. After the entire lesson has been read over a few times, the instructor begins to skip around the chart, and the men read the sentences as he points to them.

Following the reading lesson, small lesson sheets containing both the printed and the written sentences of the lesson are handed to the men, and they are told that they are to copy the writing. It is found that the men who are able to write in their own language are the first to learn to write the lesson, even though the characters of the alphabet with which they are familiar are entirely different from those they are now learning.

Then the chart is covered up, and the teacher asks "What is the first sentence"? The men clearly do not understand, but when the teacher repeats the question, and then acts the sentence, they grasp the idea quickly enough, and soon the entire lesson is repeated, the in-

structor uncovering each sentence after the men have repeated it correctly.

Following a demonstration by Dr. Roberts with a class of Italians, only one of whom could speak any English, the method was discussed and heartily endorsed by the educators present at the conference.

Illinois Will Follow These Methods

Individual instruction in the method was given to the instructors in the Illinois Miners' and Mechanics' Institutes, in order that when they take up their field work in the fall, they may be able to assist the communities in which they are stationed, in educating the members of the community who cannot speak English. While the classes in mining will prevent these instructors from giving their attention to the work of teaching English to foreigners, yet they will be in a position to assist and advise those who do this work, thus fulfilling one of the objects of the Institutes, "to promote the technical efficiency of all persons working in and about the mines."

It is planned by R. Y. Williams, the director of the institutes, to publish a bulletin containing copies of the lectures given at the conference, with the discussions which followed them. A copy will be sent, on publication, to all persons interested in the work. Requests for the bulletin should be made to the Director of the Illinois Miners' and Mechanics' Institutes, Urbana, Ill.

The Woodward-Pettebone Meet

The Woodward-Pettebone Meet is a meet with the Woodward-Pettebone teams left out and this peculiarity is worthy of explanation. Last year the Woodward and Pettebone first-aid men decided to raise money for the construction of a hall by holding a first-aid meet, and they thought well to keep out of the contest so that there could be no suggestion of unfairness in the management of the field.

Their efforts have been entirely successful. Though most of the competing teams were from Delaware, Lackawanna & Western Coal Department collieries, there were some also from the Raub and the Temple coal companies. It is gratifying to know that despite the liberal prizes offered, the Woodward and Pettebone first-aid men are making these meets most profitable ventures.

On Aug. 15, no less than 21 cars, forming three trains ran over the Lehigh Valley R.R. to the meeting place, Harveys Lake, and carried between 3500 and 4000 people. A great improvement in technique over that exhibited last year was noted by the judges. The events for the men were as follows:

(1) Simple fracture of both collar-bones; punctured wound over left eye, and laceration of right ear. (2) A compound and simple fracture of the upper third of the left thigh and a punctured wound of the left side of the abdomen, about 6 in. above the upper fracture; bleeding from both wounds; also a fracture of the right elbow joint. (3) After an explosion of gas, a man is found unconscious and burned about face, neck, ears, chest and hands.

The boys' teams, of which there were two, did their work at the same time as the teams of men. Apparently, one of these teams was misled by seeing the men dressing a left leg as required and they also dressed that leg, though their own problem called for the right. One team represented the Bethesda church and only one of the teams came from a mine. This team represented the Truesdale Colliery. The boys' events were:

(1) Simple fracture of left collar-bone and laceration of scalp, also laceration of the palm of the right hand. (2) Compound fracture of right leg with bleeding, and two first fingers on left hand crushed.

Following these was a one-man event open to the captains of the teams or to any individuals they might name. This event was the making of a roller-bandage dressing of the left arm and chest.

To avoid ties, it was arranged that the most rapid execution should decide any equalities in rating, the most rapid of two teams whose work was otherwise of equal merit getting the higher award.

Auchincloss Colliery of the D., L. & W., took the first prize of $50, and each member of the team received a Baldwin acetylene lamp. The second prize of $25 went to the Harry E. colliery team of the Temple Coal Co. Two D., L. & W. teams took third place on dead reckoning, Truesdale No. 1 Slope and Truesdale No. 6 Slope, but the first being the more rapid, took third prize of $15 and the second, the fourth prize of $10. A Koehler safety lamp was awarded to the captain of each of the four winning teams.

The Bethesda Church team took the first prize for boys, which was $15. The Truesdale boys received $10. The captains' contest was won by Isidor Hochreiter, of Harry E. col-



The Prize Winners of Auchincloss Colliery of the Delaware, Lackawanna and Western Coal Department



H. G. Davis, General Superintendent, and H. H. Hitchins, Mine Foreman, at D. L. & W. Co.'s Auchincloss Colliery

liery; John Cummings, of the Shawneeites, made an equal rating, but was placed second, owing to his being slower than his opponent. Both received Koehler aluminum safety lamps as prizes.

The standing of the teams was as follows: Auchincloss, 98⅔; Harry E, 98; Truesdale No. 1 Slope, 97⅓; Truesdale No. 6 Slope 97⅓; Pyne 96⅔; Bliss, 96⅓; Shawneeites, 96⅓, Truesdale Tunnel, 96⅓; Storrs, 96; Raub, 95⅓; Avondale, 95; Central 94⅓; Temple Coal Co., 94.

The Bethesda boys' team received 97 points and the Truesdale, 96½. The captains' contest had the following result: Harry E. and Shawneeites, 99. Pyne and Avondale, 98; all others, 97.

The Terre-Haute Meet

The United States Bureau of Mines and the American Mine Safety Association will conduct a national first-aid and mine-rescue meet at Terre Haute, Ind., Sept. 12. The program is under the auspices of the Indiana Bituminous Coal Operators' Association with the coöperation of the United Mine Workers of America, District 11, and the American Red Cross. This is the first meet of its kind ever held west of Pittsburgh and is attracting the interest of the miners and operators of the Central West.

Contests of first-aid and mine-rescue teams and individuals will be held during the morning and afternoon. Individuals trained in the work will have an opportunity to compete in the morning and in the afternoon the teams will compete. All work will be judged by representatives of the American Red Cross, and will consist of treating scalp wounds, broken limbs, lacerations and other work requiring first aid.

Prizes will be awarded winners in the contests and as there will be several prizes, a large number of contestants is expected. The large Bureau of Mines explosion chamber will be brought to Terre Haute and erected for the day and in it mine-rescue work will be demonstrated. During the evening a smoker will be held for all taking part in the meet. Short addresses will be made by J. A. Holmes, director of the Bureau of Mines; J. P. Reese, president of the American Mine Safety Association; Governor Ralston and others.

Many teams have entered the meet through Dr. August F. Knoefel, of Terre Haute, vice-president of the Mine Safety Association. G. F. Powell, superinendent of Car No. 3, of the Bureau of Mines, has trained several teams in mine rescue during his trips through the state and several of these teams are expected to enter. Mr. Powell will be here on the day of the meet with his special car.

British Views on Oil from Coal

Special Correspondence

Considerable interest has been aroused in London regarding the reported plan of the government for acquiring a coal field from which to produce fuel oil for the use of the navy. One of the leading English experts on oil extraction from coal, when interviewed, disclaims any knowledge of such a government plan, but would not dismiss the project as impossible.

While doubtful of any large production of oil from coal on a commercial basis, he pointed out that as a war measure it might be practicable to obtain this fuel for the navy from some Lancashire, North Wales and Scottish coals. He explained that the only coal which can be expected to yield fuel oil on a commercial basis at present, is cannel coal, such as comes from the Irish cannel deposits at Ballycastle, near the Giant's Causeway, to exploit which a company was recently organized.

Apart from this use, cannel coal is at present a drug on the market, and there is no prospect of the deposit mentioned yielding anything like 400,000 tons of fuel oil per year. It might, however, be expected to yield possibly 20,000 tons annually.

If the government could secure a field of coal exceptionally suitable for the production of oil, the quality verging on cannel, it might be worth while acquiring as a war measure. It is doubtful, however, if such a field could be found sufficiently large to yield the quantity required for any considerable number of years. It is improbable that there are extensive fields of absolutely suitable coal in Britain.

A Coal-Field Acquisition Would Be a War Measure

It is not necessary, however, to consider the problem of fuel oil for the navy on a purely commercial basis. It would be a war provision and from that point of view many coal fields might become practicable. Welsh steam coal would be of no value, and ordinary house coal would not be of much use except as a last resort. For instance, ordinary Durham and Midland house coal would be at present out of the question unless a demand for certain byproducts, which does not now exist, could be created.

In Lancashire, on the other hand, there are coals which give a high yield of oil, although they might not be quite commercially practicable at present prices. This region has large deposits verging upon cannel. There are also some suitable measures in North Wales and some in Scotland.

The kind of fuel required for the navy is the heavy mineral oil that is often called "Diesel" oil. It is heavier than kerosene and until recent years has not been in demand. It is of a high flash point, the Admiralty specification requiring a flash point of over 200 deg. Fahrenheit.

To produce 400,000 tons yearly of such fuel, would require 5,500,000 tons of coal annually. The figures of extraction from such coal as may be found in Lancashire are about as follows: Maximum yield of crude oil per ton of coal, 30 gal.; oil suitable for navy fuel per ton of coal, about 15 gal.; 400,000 tons of oil equals 84,000,000 gal., and at 15 gal. per ton, this means 5,600,000 tons of coal.

The total amount of coal at present produced in the kingdom is about 250,400,000 tons. As has been stated, the most suitable deposits are found in Lancashire, Cheshire, North Wales and Scotland. The total production from these sections is as follows: Lancashire and Cheshire, 23,063,198 tons; Scotland, 39,500,000 tons; North Wales, 3,259,000 tons. This gives a total production of 66,000,000 tons of coal per year, from which the Admiralty's 5,500,000 might be found.

It may be taken for granted that the Admiralty is closely watching the development of all processes for the extraction of fuel oil from coal.

When quick burning briquets are wanted remember that large briquets are harder to light than small ones; the same is also true of briquets made of fine slack, or of very dense briquets. It is also worth noting that inorganic binders tend to make the briquet slow to fire. Increase of inorganic matter in the slack also gives the same result.

Discussion By Readers

The Ohio Situation

In reading the article entitled "The Labor Situation," COAL AGE, Aug. 8, p. 232, my attention was arrested by the following statement made in relation to the Ohio situation:

> The agreements in other sections being based on the promise that no concession would be made to eastern Ohio operators, the Union, it would appear, should make an equal concession to the other Ohio mine owners, should it permit the eastern Ohio operators to make a more favorable scale, etc.

If I understand the situation and am correctly informed, there was, in the beginning, a more or less distinct understanding on the part of the coal operators, to which the mine officials gave tacit consent, that the run-of-mine law was not to interfere with last year's scale of prices. The present situation would seem to indicate that this tacit agreement has either been lost sight of or is being purposely ignored by the mine officials.

According to the reported statement of Pres. W. R. Woodford, of the Pittsburgh Vein Operators' Association, of Ohio, published in the Wheeling *Intelligencer*, Aug. 7, the miners, in his opinion, were showing too much obstinacy at the present time, and had manifested the same disposition from the beginning of the strike, Apr. 1. It was this feature that made it impossible to reach an agreement with the operators at the recent Wheeling conference. Pres. Woodford is quoted as saying further:

> We have stated to the men and reiterated time and again that the operators of Ohio stand ready to meet the men, at any time, in a conference where a scale that will be the equivalent of last year's contract will be considered. I want to say that the miners of Ohio have earned more under the two years' contract that expired Mar. 31, 1914, than they ever did before in the history of the industry.

I understand that the miners' officials have averaged the percentage of slack made at the mines in the Hocking Valley, Cambridge, and eastern Ohio districts, as 28, 34 and 36 per cent., respectively, making an average in these three districts of $32\frac{2}{3}$ per cent. The last year's screened-coal rate was 69.5c. per ton of screened coal, which was $100 - 32\frac{2}{3} = 67\frac{1}{3}$ per cent. of the total output. To equalize this scale, on the run-of-mine basis, the mine officials figure that the payment should be $0.67\frac{1}{3} \times 69.5 = 47$c. per ton.

However, the injustice of this lies in the fact that the Hocking Valley miners have been reduced 2½c. per ton, while an advance of 2½c. per ton has been placed to the credit of the eastern Ohio miners, which allowances, as far as the operators are concerned, certainly give the Hocking Valley operators an advantage of 5c. per ton over last year's prices.

In closing, permit me to say that if the miners' officials have only been guessing at these figures and are not quite certain as to what the run-of-mine prices in the different districts should be, it would seem proper that they should appoint a scale committee to meet a committee of the operators in an endeavor to arrive at some fair settlement of the matter, instead of adjourning their meeting as hurriedly as was done at the recent Wheeling conference.

COAL OPERATOR.

Eastern Ohio.

An Important Feature of the Coal Industry

I read with deep interest the article by Eli T. Conner, published some time since, COAL AGE, Vol. 5, p. 912. Mr. Conner deserves much credit for the able way in which he has discussed a feature of growing importance in the coal industry. He is thus encouraging the public to think along lines in which they are vitally concerned, and in regard to which his years of experience in the producing end of the coal business enable him to speak with authority.

Mining men acquainted with conditions in the anthracite field of Pennsylvania are reluctantly compelled to admit that the methods of mining coal in that region have not been as carefully guarded, from an economical standpoint of extraction, as should have been the case. While, in a few instances, the percentage recovery of coal per acre has been quite satisfactory, in the large majority of cases wasteful methods have been employed, and considerable areas of coal have been abandoned for deposits that would better meet the requirements of the market and bring quicker returns on the capital invested. Viewed from the standpoint of the conservation of natural resources, the results are, admittedly, a disgrace to scientific mine management.

The burden resulting from these unhappy conditions falls not on the operators, but on the miners and the consuming public. They are the ones who must eventually pay, and are today paying for the economic errors of the industry. Such errors on the part of the management increase the cost of production; and the difference, instead of being deducted from the dividends or proceeds of the business, are either met by a curtailment of operating expense, or reduction in the price paid for mining, or they are added to the selling price of the coal. It is to be regretted that, in the operation of large industries, the question of maintaining dividends receives greater consideration than that of paying living wages to the miner and selling the output at living prices to the consumer.

The statement made by the late George F. Baer, and referred to by Mr. Conner, draws attention to a natural law laid down by Anderson, Malthus, Ricardo, Smith and other writers on political economy, which is to the effect that:

> The price of the entire supply of anything necessary for a community will be regulated by the cost of production of that portion of the necessary supply which is produced at the greatest expense.

This law is true today, because of the strong competition in the sales departments of the several coal companies operating in the anthracite field.

It must be remembered that the laws of economics are quite as fundamental and inexorable as the laws of science. Sir Isaac Newton would have freely admitted that the apple would not fall to ground if he had the power and the inclination to bind it fast to the tree. In like manner, any political economist, from Malthus down to the latter-day Mills, would be compelled to admit that *the price of the entire supply of anything necessary for a community is regulated by those that have the power and inclination to fix the price.* Suppose for a moment the selling price of anthracite coal, the wages paid the miner and the dividends declared were in the hands and controlled by a quasi judicial board, it is fair to assume that, with careful management in the operating end of the industry, a more equitable distribution of the returns would be possible; and capital, mine workers and the consuming public would be better served.

We may ask what does Mr. Conner mean to imply by quoting this statement in this connection. The logical conclusion to be drawn is that the price of anthracite will continue to rise, owing to these conditions, until controlled by some adjudicating power. Mr. Conner's suggestion is that the industry as a whole should be directed by a board of trustees or commissioners; and he says he makes this suggestion with a view to provoking discussion of the subject. In addition to the duties outlined by Mr. Conner for the guidance of such a commission, may I be permitted to suggest that they should prescribe the manner and the amount of taxes to be paid on all coal mined.

I would like to ask Mr. Conner if there is any reason why the commission he suggested should not be appointed, and whether or not the action recently taken by the government has in any sense divorced the railroad companies from their coal-mining interests? Surely, if the police powers of the state and nation can be invoked to regulate labor, the same powers should be available to regulate the transactions of capital. It would seem that this, and this alone, can effectually regulate and control the conflicting interests in the several mining districts of the country, so as to conserve the coal, and harmonize general labor and market conditions to the best advantage. Who can suggest a method by which these results can be effectively attained?

PROGRESSIVE.

Bluefield, W. Va.

Conservation of Surface Values in the Extraction of Coal

Referring to the letter on this subject, COAL AGE, Aug. 15, p. 277, I want to endorse what Mr. Parfitt has said in regard to the growing need of the adoption of means and methods, in the mining of coal, that will afford more general support to the overlying surface, much of which has a more far-reaching value than the mineral lying below.

Both coal and surface are valuable assets of present-day civilization and each must be so regarded. The principle of conservation does not apply to one of these assets more strongly than to the other. There can be no economy in sacrificing the value of surface holdings, in order to realize a temporary income from the mineral that underlies the same. The mining engineers of large coal companies must devise and put into execution more stable methods of mining coal.

A MINING ENGINEER.

Scranton, Penn.

The Coal Miner

I was glad to note the references made by Mr. Hanger, COAL AGE, Aug. 15, p. 278, to the proper treatment of miners by their foreman with a view to maintaining discipline in the mine. While Mr. Hanger emphasizes the need of certain punishment for any violation of the mining law or mine regulations on the part of the men, he states plainly that "In no case should a personal indignity be inflicted" by the use of epithets that only give rise to resentment.

In view of the many hardships and dangers that are the daily experiences of miners, a foreman should exercise the greatest thoughtfulness and kindness in dealing with their eccentricities. The public owe much to these men, many of whom have devoted their lives to the mining of one of the greatest necessities of civilization. Perhaps the majority of miners can look forward to *one* of two forms of death—being killed in the mine, or succumbing finally to that dread disease, miner's asthma.

It is these considerations that should command for the miner the highest regard in respect to his surroundings and necessities. The fact should not be forgotten or overlooked that his family and home are just as dear to him as to other men. He is as anxious to do well by those who look to him for support as is the foreman or superintendent, or others holding better and more lucrative positions. Enforced idleness, due to an accident in the mine or other cause, or such drawbacks and hindrances as the thinning out of the coal or a heavy fall of roof in his chamber greatly impair the miner's income, and call for due consideration on the part of the foreman in dealing with such conditions. The thoughtful word and kind treatment of a foreman go far to alleviate the troubles that fall to the lot of the miner.

There have been instances where the complaint of the miner that the roof in his chamber is "bad," has brought the harsh and thoughtless reply from the foreman, "You are no better to be killed than any other man." The request by a miner for a "better place," that he may increase his earnings to meet special expenses for which he is in no way responsible and therefore could not avoid, has, in many cases, called forth a curt and profane reply.

Such treatment of a miner by his foreman can only arouse ill feeling and enmity in the mind of the man who is compelled to work under difficult conditions. The ill feeling is due more to the fact that the miner realizes that his foreman has no sympathy for him in the matter, but regards him simply as a human machine. As a result, the foreman is often charged with favoritism. It is needless to say that such treatment on the part of the foreman produces very poor returns when there is urgent demand for coal, and it is necessary that every man do his best to increase the daily output of coal. The treatment the miner receives from his foreman does not encourage him to give other than the same in return. As a result, there is great lack of coöperation in the mine, and discipline is at a low ebb.

THOMAS R. PIERCE.

Scranton, Penn.

Permissible Electric Mine Lamps

Referring to the inquiry relating to schedule No. 6, recently sent out by the Federal Bureau of Mines, making certain suggestions in reference to the details of construction of electric mine lamps, COAL AGE, Aug. 15, p. 280, we believe it would only have been fair to the Bureau of Mines, as well as to others interested in the subject, had the name of the correspondent been attached to the inquiry. The reason for this is, to us, most obvious.

As indicated in the editorial comment following this inquiry, these suggestions may have been necessitated by the requirements, in the proper testing of the lamps submitted to the Bureau. The subject of electric safety lamps is a new one in this country, and we consider that extensive experiments will be required before standard methods can be adopted for testing, and standard instructions issued in regard to the use of such lamps.

We consider that the Bureau of Mines has been fair throughout, particularly so as regards the manufacturers who have submitted their products for tests to the Bureau. In every case, the engineers of the Bureau have spared no pains to give all the assistance in their power, to render the tests satisfactory and efficient. For these reasons, we consider correspondent's inquiry as unfair to the Bureau of Mines, as well as to other interested parties, and think that his name should not have been withheld, but should have appeared with the publication.

X.

——, Penn.

[As is well known, the Discussion department of COAL AGE is open to the frank and honest criticisms of all readers of the paper, and the discussion of any points and methods that are of practical interest. The purpose is to draw attention to matters, in regard to which an interchange of views and opinions will be helpful and of advantage. It is particularly desirable that personality shall be eliminated, and the writer of the contribution has the right to request that his name be withheld from publication, which request is invariably respected.

In the present case it is quite obvious that all manufacturers of electric mine lamps should appear incognito, in the discussion of a question that is of common interest to all, and which it is the province of the Bureau of Mines, as adjudicator, to decide. The publication of a name to such a contribution would appear, in some cases, as a bid for favor, while, in other cases, the criticism would unjustly prejudice the Bureau and render an impartial consideration, on their part, difficult.—ED.]

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

The following tables give the average specific gravities of most solids and liquids of importance in coal mining. The important mine gases are tabulated elsewhere.

Comparison of Standards—Hydrogen, air and water are the three standards commonly used in the determination of the specific gravity of gases, liquids and solids. The relative densities of these standards are as follows:

Air (dry) is 14.418 times as heavy as hydrogen, at the same temperature and pressure, volume for volume.

Water (max. density, 4° C.) is 773 times as heavy as dry air at 32 deg. F., bar. 29.92 in.; and 815 times as heavy as dry air at 60 deg. F., bar. 30 in., volume for volume.

SPECIFIC GRAVITIES AND UNIT WEIGHTS OF SOLIDS AND LIQUIDS

Substance	Average sp. gravity (Water = 1)	Average weight (Lb. per cu.ft.)
Alcohol, pure	0.793	49.5
commercial	0.834	52.1
Aluminum	2.66	166.
Asphalt (1 to 1.8)	1.4	87.
Brass, cast (7.8 to 8.4)	8.1	506.
rolled	8.4	525.
Brick, pressed	2.4	150.
common, hard	2.	125.
Brickwork, masonry (1.8 to 2.3)	....	110 to 140.
Bronze (8.7 to 8.9)	8.8	550.
Clay (1.8 to 2.6)	2.2	137.5
Coal, anthracite (1.3 to 1.7)	1.5	93.75
bituminous (1.2 to 1.5)	1.3	81.25
cannel, gas coal (1.18 to 1.28)	1.23	76.88
lignite, brown coal	1.1	68.75
Coke, loose piled	....	20 to 25.
Concrete	2.3	144.
Copper, cast (8.6 to 8.8)	8.7	543.
rolled (8.8 to 9)	8.9	556.
Earth, dry, loose to well rammed	....	76 to 95.
moist, loose to well rammed	....	78 to 96.
wet, flowing mud	....	105 to 115.
Granite (2.56 to 2.88)	2.72	170.
Gold, cast (18.29 to 19.37)	18.83	1176.
Gravel, loose	....	95 to 100.
Gypsum, ground or calcined, loose	....	56.
well shaken	....	64.
Ice	0.92	57.5
Iron, cast (6.9 to 7.4)	7.2	450.
rolled	7.68	480.
wrought, sheet (7.6 to 7.9)	7.8	485.
Lead (11.3 to 11.47)	11.38	710.
Lime (quicklime)	1.5	93.75
ground, loose (66 lb. per bus.)	....	53.
Limestone	2.7	168.
Marble (2.5 to 2.8)	2.65	165.
Mercury (32 deg. F.)	13.593	850.
(62 deg. F.)	13.555	847.

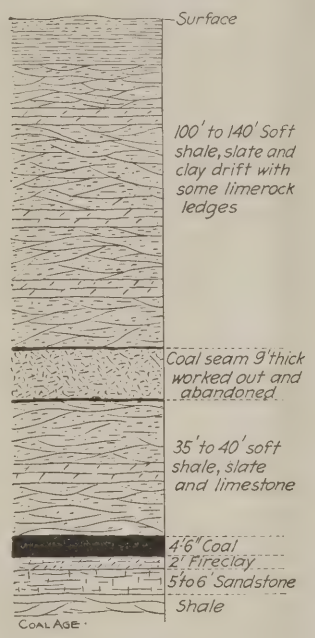
The Coal Age Pocket Book

Oils (0.910 to 0.975)—weight given in lb. per gal.		
Animal—lard	0.916	7.64
sperm (pure)	0.880	7.34
whale	0.925	7.72
Vegetable—cottonseed	0.923	7.70
linseed (raw)	0.933	7.79
(boiled)	0.780	6.51
olive	0.917	7.65
rape (colza)	0.915	7.63
Mineral—petroleum (crude)	0.77-1.06	....
gasoline	0.700	5.84
kerosene (coal oil)	0.800	6.68
naphtha	0.730	6.09
Pitch	1.155	72.
Platinum	21.6	1348.
Rosin	1.1	68.67
Sand, dry	....	100.
wet	....	130.
Sandstone (2.1 to 2.7)	2.4	150.
Shale (2.4 to 2.8)	2.6	162.
Silver	10.5	655.
Slate (2.7 to 2.9)	2.7	169.
Steel (7.8 to 7.9)	7.85	490.
Sulphur	2.	125.
Tallow	0.94	58.7
Tar	1.	62.5
Tin, cast (7.2 to 7.5)	7.35	459.
Traprock	3.	187.
Water (max. density, 4° C.)	1.	62.428
(pure, 62° F.)	0.999	62.366
(pure, 212° F.)	0.958	59.806
sea, average	1.028	64.176
Wood, dry, seasoned—		
Ash, white		38
Birch		41
Cedar, white		23
red		35
Cherry		42
Chestnut		41
Elm		35
Ebony		76
Hemlock		25
Hickory		53
Mahogany, Spanish		53
Honduras		35
Maple		49
Oak, live		59
white		48
black, jack, etc.		35 to 45
Pine, white		25
yellow, Northern		34
Southern		45
Poplar (cottonwood)		33
Spruce		25
Sycamore		37
Walnut		37

Inquiries of General Interest

Method of Working Underlying Coal Seam

I am interested in the problem of working a seam of coal 4½ ft. in thickness and lying from 35 to 40 ft. below another seam 9 ft. in thickness, which has been worked out and abandoned. I submit the accompanying vertical section showing approximately the geological features of the strata.



A Vertical Geological Section

As here shown, the seam of coal it is proposed to work is 4 ft. 6 in. thick, and underlaid with about 2 ft. of fire clay, beneath which is from 5 to 6 ft. of sandstone, again underlaid with the usual shale formation. Above this coal and between it and the 9-ft. seam that has been worked out and abandoned, the strata consist of from 35 to 40 ft. of soft shale and slate, interstratified with an occasional ledge of limestone, varying from 1 to 3 ft. in thickness. Above the 9-ft. seam there are from 100 to 140 ft. of soft shale, slate and clay, with occasional ledges of limerock.

The 9-ft. seam of coal was worked on the advancing room-and-pillar system, with the result that a large number of surface caves took place. From the nature of the strata forming the roof of the underlying seam, the same trouble may be expected in mining that coal. Indeed, owing to the increased depth of the seam and the liability of the pillars still remaining in the upper seam breaking through into the lower workings, the trouble will probably be experienced to a greater degree than in the mining of the upper seam. In this strata, a heavy fall of roof in the mine generally causes a break that reaches to the surface, and these breaks are of frequent occurrence. The same feature, however, eliminates the danger of a squeeze or creep occurring in the mine, which is a thing practically unknown.

It has seemed to me that the most practicable method of working this lower seam is to drive the entries to the boundary, and then work out the coal on the room-and-pillar retreating system, drawing all pillars as quickly as the rooms are finished. It is understood, of course, that ample provision must be made for drainage in every portion of the workings.

It should be stated that, unfortunately, no reliable survey and plan of the workings in the upper seam have been preserved or are available, and it would be impracticable to assume that the pillars in the lower seam can be kept vertically under those in the upper seam, the most of which have probably been removed. The greater portion of the mining in the upper seam was performed many years ago, when it was not considered necessary to mine the coal in any regular fashion or to survey and map the workings in an accurate manner. I believe this condition is not an uncommon one in many mining districts, and that its discussion will prove of interest to many readers who are mining coal under similar conditions. I hope, therefore, that this inquiry will bring forth many valuable suggestions.

G. E. Lyman, Mining Engineer,
Madison Coal Corporation.

Glen Carbon, Ill.

As subjects for discussion, the methods of working coal seams under varying conditions have proved most interesting. The methods and plans suggested have come from practical men who have worked out their details as the conditions in the mine required. Many of these methods are the results of long years of experience, coupled with a knowledge of mining principles that make them of great practical value. Many readers of Coal Age have profited by these suggestions, and much coal has been recovered that would otherwise have been lost for lack of a proper method or plan.

The case suggested by this correspondent represents, as he says, no uncommon occurrence in coal-mining fields. In response to his request, Coal Age will be glad to give space to a full discussion of the difficulties presented by these conditions, and the best method of overcoming them.

Problem in Algebra

Kindly solve the following, which is Problem No. 10, p. 270, of Wentworth's Higher Algebra:

"A," in running a race with "B," to a post and back, met him 10 yd. from the post. To make it a dead heat, B would have to increase his rate $47^3/_7$ yd. per min. But, if without changing his pace B had turned back on meeting A, he would have reached the starting point 4 sec. later than A. What is the distance from the starting point to the post?

Lincoln Place, Penn. Student.

Solution—Let r = B's rate (yd. per min.); $r + 47^3/_7$ = A's rate. Calling the required distance to the post, x, A travels $x + 10$, while B goes $x - 10$. These distances being proportional to the rate,

$$\frac{x + 10}{x - 10} = \frac{r + 47\frac{3}{7}}{r}$$

which reduces to

$$83x - 35r = 830 \qquad (1)$$

The 4 sec. ($^1/_{15}$ min.) B is behind A, at the finish, represents a distance $r/_{15}$ yd., to gain which required $r/_{15} \div 47^3/_7 = 7r/_{4980}$ min. In that time A has gone $x - 10$ yd; hence

$$x - 10 = \frac{7r}{4980}(r + 47\tfrac{3}{7}) \qquad (2)$$

Combining equations 1 and 2, gives finally for the required distance to the post, $x = 116^{42}/_{83}$ yd.

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—What is ascensional ventilation? State also the advantages and disadvantages of its use.

Ans.—In mining, the system known as ascensional ventilation is that in which the air enters the mine workings at the lowest point and from thence circulates to the rise, in its passage throughout the mine. In this system the downcast or intake communicates directly with the lowest part of the dip workings, while the upcast is located at the highest point of the rise workings.

The great advantage of ascensional ventilation in mining is derived from the fact that the intake air is usually cooler than the mine air. On passing into the mine, it shortly becomes heated and rises naturally to the higher levels, by virtue of its decreased density due to the increase in its temperature. Where a mine is properly arranged, there is no disadvantage in the use of ascensional ventilation, except it may be for a short time in the summer season when the outside air entering the mine has a higher temperature than that in the mine and conditions of ventilation are consequently reversed.

Ques.—Does a high velocity of the air current assist in producing an explosion, in a wet mine?

Ans.—A high velocity of the air current, by which is meant a greater velocity than what is required to properly ventilate the workings of the mine, is always favorable to the development and propagation of a mine explosion, this being true in either a dry or a wet mine. In a dry mine, a higher velocity of the air current means a larger quantity of dust carried in the air, greatly increasing the explosive conditions of the mine air. In either a wet or a dry mine, a higher velocity of the air current means a larger supply of oxygen per minute, which increases, to that extent, the possibility of the inflammation of gas or dust. In coal mining, the best ventilation is secured where the quantity of air supplied at the face of the workings is only sufficient for the complete removal of the gases generated in the mine, and where the velocity of the air current is sufficient for this purpose, but not such as to increase explosive conditions in the mine either from an excessive supply of oxygen or from the suspension of dust carried in the air current.

Ques.—Is there any danger in the installation and use of a gasoline motor in a mine?

Ans.—A gasoline motor is not an ideal motor for use in a coal mine. Under certain possible conditions, common to mining practice, the discharge from such a motor rapidly vitiates the mine air. Aside from this, the handling of a highly explosive oil, as gasoline, is always a dangerous factor in a mine, owing to the liability to fire or explosion. Notwithstanding these possible dangers, there are a number of gasoline motors employed for various purposes in coal mines throughout the country. The danger of their use is greatly increased by the possibility of a mine wreck when the gasoline tank might be injured and its contents take fire.

Ques.—In a mine subject to fires caused by spontaneous combustion, what is the first evidence of the existence of such a fire; and what steps should be taken to overcome the trouble?

Ans.—An experienced miner will detect the presence of a fire in the waste or abandoned workings, by the peculiar odor perceptible in the air current and which would escape the notice of one less familiar with coal-mining conditions. The presence of mine fires is also indicated by the heating of the walls inclosing the space where the fire is in progress. As time progresses and the fire gains strength, smoke and gases are produced in abundance.

The treatment of mine fires depends so largely on conditions that it is impracticable to outline a method of procedure that would be applicable in all cases. In the early stages of a gob fire, the burning material can frequently be removed and carried out of the mine. While such a fire may often be extinguished by water, the later heating of the waste material in the gob is greatly accelerated by the presence of the moisture and the trouble thereby increased.

Where it is possible to isolate the fire by building stoppings to prevent the entrance of air to that portion of the workings, the fire can often be smothered and extinguished by such means. In some cases, carbon dioxide (CO_2) has been injected into the inclosed area with good effect. Where a mine fire has gained considerable headway, and these remedies fail, recourse must be had to drowning the fire out by flooding the mine with water.

Ques.—Mention the particular characteristics of coal, in respect to chemical composition and texture, that render it more liable to cause an explosion, in the processes of mining.

Ans.—The bituminous and lignite coals containing from 30 to 40 per cent. of volatile matter are the most inflammable. When the texture of these coals is such as to produce a fine impalpable dust that is readily thrown into suspension in the air, there is the greatest liability to explosion in mines. Briefly stated, the liability to explosion depends chiefly on the inflammability of the dust and the fineness of the floating particles.

Ques.—State the advantages and disadvantages of large slow-running fans, as compared with small high-speed fans, in the ventilation of a mine.

Ans.—A large slow-running fan possesses a greater margin of expansion; or, in other words, possesses a wider range of capacity than a small high-speed fan designed for the same conditions. If an emergency arises in the mine calling for a large increase of air, the large slow-running fan is more capable of producing such increase than is the case with a small fan that is already running at a high speed in performing its normal work.

The chief advantage in a small high-speed fan is the reduction in the first cost or the cost of installation, owing to lighter foundations being required and a less weight of material being used in the construction of the fan wheel and its housing.

Coal and Coke News

Washington, D. C.

Advices brought to the Federal administration from competent sources are to the effect that, up to date, in spite of the dislocation of affairs caused by the development of war conditions, there has been but little effect on the revenues of railroads in consequence of the disturbance.

Thus, for example, in the case of the Chesapeake & Ohio Ry., it is stated that the earnings of the concern have not been at all affected by the war, but that coal loadings during a recent week since the opening of the war assumed record proportions, while those of the period just before and just after this exceptionally prosperous week were likewise very satisfactory. Other coal roads report similar conditions, notwithstanding that at some mines there has been a shortage of hands for operation, owing to the circumstance that many of the former operatives have been leaving this country in order to participate on one side or the other in war-like operations in Europe.

To some extent, it is stated here, the places of these men will be taken by operatives who have not heretofore been fully employed or who have been employed on part time and whose work has consequently not been a maximum. It is also believed that a certain number of men will be attracted back into mining from other occupations in which it is found that the war situation necessitates a reduction of running time or in other particulars limits the quantity of the output that can be furnished to the market. Some of these men are former miners who have been withdrawn by the more favorable opportunities in other lines of activity.

It also appears that immigration of laborers from nations which have heretofore furnished a considerable number of practical miners is likewise being resumed so that there will be some influx of European laborers that will offset the shortage caused by the withdrawal of those who have gone abroad to perform military service.

Plans for Coal Exportation

The action of the administration in urging upon Congress a war risk insurance measure, which has just passed the Senate, and a bill authorizing the President to purchase a large number of ships for the purpose of creating the nucleus of a steamship line, has been confessedly taken in part for the purpose of maintaining and facilitating our export of fuel, which, along with foodstuffs, constitutes conditional contraband under a good many circumstances.

It is stated by the administration representatives that there is every reason to suppose that much coal can be sold in South America, and that, assuming the new government line to be established as proposed, it will be the endeavor of those in charge to make exceptionally favorable rates to American coal presented for exportation to the Isthmus of Panama and to countries south of the canal.

None of these countries will be able to import coal from Europe, and it is supposed they will turn to the United States. Special attempt is being made to facilitate the financing of South American business generally, and the understanding now is that a substantial degree of success has been attained in making these arrangements. It is asserted at the Department of Commerce that particular inquiries are already being made in South America concerning the details of conditions surrounding the sale and shipment of consignments of fuel.

There is every reason to suppose that the war risk insurance bill will be adopted, thereby eliminating the probability of losses due to the seizure of fuel which is in process of transit from the United States to foreign buyers. More resistance is being offered to the passage of the ship purchase bill, but that also is believed likely to become law in some form before a great while. With the improving outlook as to foreign exchange, this is expected to relieve the export situation materially.

Many Bills Have Been Introduced

During the past week, there have been introduced or acted upon in Congress a number of bills affecting mining products and coal particularly in one way or another. One which has received some attention is represented by Representative Deitrick, forbidding the exportation of mining products, and reading, in part, as follows:

That it shall be unlawful for any person, firm, association or corporation to export any goods, wares, merchandise or products of the soil or mines; provided, however, that the President of these United States may from time to time permit the exportation of such articles and in such quantities as in his judgment the general welfare of the country will permit.

Sect. 2. That any person, firm, association or corporation, and any agent, director or officer who is found guilty of violating any of the provisions of this act shall be punished by a fine not exceeding $10,000 and by imprisonment for a period of not less than one year nor more than five years.

Sect. 3. That all cases arising under the provisions of this act shall take precedence of all other cases in the courts having jurisdiction thereof, and the President is hereby authorized to appoint such additional judges and all necessary court officers to secure the prompt trial and determination thereof, both in the courts of original jurisdiction and in any other court.

Sect. 4. That this act shall take effect upon passage.

An important measure relating to the disposal of coal and mineral deposits in Indian lands has just been passed by the Senate in the following terms:

That where the coal or other minerals contained in any lands embraced in any Indian reservation which has been opened to settlement and entry, have been reserved from disposition, the reservation of such coal and other minerals shall inure to the benefit of the Indian tribe or tribes to whom such Indian reservation belonged, and all proceeds arising from the disposal of such coal or mineral deposits as may be determined by law shall be deposited in the Treasury of the United States and shall be applied in the same manner as the proceeds derived from the disposal of the lands contained in the reservation within which such coal or mineral deposits are located.

The Senate has also passed an act providing for the purchase and equipment of a mine-rescue car to operate in the Southwestern coal fields especially. The bill for this purpose contains the following provision:

That the Secretary of the Interior is hereby authorized and directed to purchase and equip a mine-rescue car for advancing mine safety work in the Southwestern coal fields, with headquarters at Fort Smith, Ark.; and there is hereby authorized to be appropriated for the purchase and equipment of such car the sum of $10,000, and for the operation and maintenance of said car during the fiscal year 1915 the sum of $16,500.

The Senate has also passed and sent to the House of Representatives an important act intended to amend the act extending the homestead laws of the United States, and providing for right-of-way for railroads in Alaska. This amendatory act refers primarily to agricultural land, but has a direct bearing upon the coal situation in Alaska as seen in the change made in that part of the law which fixes the price of the land to be homesteaded, but exempts mineral and coal lands. Sect. 10 of the amended law, which is the provision bearing on this subject, reads as follows:

That any citizen of the United States, 21 years of age, or any association of such citizens, or any corporation incorporated under the laws of the United States or of any state or territory, now authorized by law to hold lands in the territories, hereafter in the possession of and occupying public lands in the District of Alaska in good faith for the purposes of trade, manufacture or other productive industry, may each purchase one claim only not exceeding 80 acres of such land for any one person, association or corporation, at $2.50 per acre, upon submission of proof that said area embraces improvements of the claimant and is needed in the prosecution of such trade, manufacture or other productive industry, such tract of land not to include mineral or coal lands, and ingress and egress shall be reserved to the public on the waters of all streams, whether navigable or otherwise.

PENNSYLVANIA

Anthracite

Bellevue—A fire on Aug. 19, in the Diamond vein of the Von Storch colliery of the Delaware & Hudson Co., shut off 15 workmen from the slope entrance and they had to go several miles in a roundabout way to escape. The city fire department extinguished the blaze.

Pittston—Fearing that a mine cave may occur at any moment, a portion of upper Williams St. was roped off on Aug. 20, and traffic on the street near the Erie R.R. crossing is barred. The spot where the cave is expected is guarded with a fence around it. Passengers on the trolley lines are transferred to cars at another point. The company officials expected the cave to occur at any time. It is believed that several properties will also be seriously affected by the cave.

Harleigh—A fire of mysterious origin totally consumed the boiler house of the Harleigh-Brookwood Coal Co. on Aug. 15, but the breaker, which is located nearby, was saved. The blaze, which started shortly before midnight, originated in the pump room in the extreme eastern end of the building. Two of the boilers next to the pump house were not in use at the time, and as only electric lights were used in the building, the management is at a loss as to account for the origin of the fire. Arrangements have been made for immediate repairs, so that work at the colliery can be resumed at an early date. The fire did not interfere with the pumps in the mines, as they are operated by electricity.

Sunbury—Judge Moser, in the Northumberland county courts, on Aug. 17, filed an opinion refusing to materially lower the assessments on 15,000 acres of coal lands, the taxable value of which has been fixed at $17,369,841 by the board of county commissioners for the three years ending with 1915. The rate for the previous three years had been but $7,674,212, which makes the increase approximately $9,000,000. Because of the ruling, increase in taxes to the county will be $120,000 for the three years. After the commissioners raised the valuation to that fixed by Judge Moser, the Philadelphia & Reading Coal & Iron Co, the Mineral R.R. & Mining Co., the Lehigh Valley Coal Co., owners of the bulk of the land, took appeals, and an exhaustive inquiry was made.

Bituminous

Punxsutawney—The Buffalo, Rochester & Pittsburgh R.R., which has been making heavy shipments of coal into Canada since the outbreak of the European war, must hereafter ship no coal to the Dominion except in Grand Trunk Ry. cars. This is a result of the government's neutrality embargo, and will bring the coal shipments of this road to Canada to about 100 cars a day, whereas it has been shipping in the last few weeks from 500 to 1000 cars a day.

Johnstown—W. M. Brown, superintendent, and two mine foreman, Thomas Townsend and J. C. Patterson, of the Miller shaft of the Shoemaker Coal Mining Co., have been held for court on charges of violating the state mining laws. The informations were preferred by State Mine Inspector Thomas D. Williams. Brown is alleged to have failed and refused to instruct his foremen to provide safe and available passageways from the mainway to the interior of the mine workings. The foremen are charged with failing and refusing to provide the animal and mechanical haulage roads in the mines with holes for shelter, 4 ft. deep, at intervals of at least 15 ft.

Bentleyville—The West Penn Lighting Co. has secured the contract for furnishing power to several mines being opened on the line of the Montour railroad. These are at McDonald, Bishop, Thompsonville and Hills, and the Henderson Coal Co.'s new mines at McPherson Mills. Three miles of line will be constructed to the last named mine, where current for 1100 hp. will be supplied. The West Penn company recently secured the contract for furnishing power for the Pittsburgh-Buffalo Co.'s Hazel mine, at Cannonsburg.

Somerset—Somerset County is the scene of great activity along electrical lines. The Penn Electric Service Co., which has absorbed a number of smaller concerns in Somerset and adjoining counties during the past several years, is bending its energies toward the completion of high-tension transmission lines. The lines will carry current for light and power on a large circuit, which will include many of the principal towns and coal companies of the county. It is expected that the Somerset loop will be completed by fall. The route is from Johnstown to the new mining town at Cairnbrook and several other little mining towns. Other towns will be connected next year. These will probably include the mining towns of Rockwood, Garrett, Meyersdale and Salisbury.

Colver—The Colver drift is now averaging between 3500 and 3800 tons of coal per day, the rated capacity being 4000 tons. More rolling stock and other new equipment is being purchased, and this will probably bring the output up to its full capacity. Reports have been circulated concerning the opening of a new mine, but these are unconfirmed.

Wehrum—Four hundred miners will be temporarily out of employment as the result of a fire at the plant of the Lackawanna Coal & Coke Co.

WEST VIRGINIA

Charleston—Announcements have been made by the Department of Mines that examinations for mine foremen and firebosses will be held at Welch, Sept. 15 and 16; at Logan, Sept. 23 and 24; at Mt. Hope, Sept. 29 and 30; at Charleston, Oct. 6 and 7, and at Grafton on Oct. 13 and 14.

Accident returns for the month of July showed that, despite the fact that some of the miners of West Virginia are still risking their lives by violation of state mining laws and the rules of the company, the number of fatalities is decreasing. As in previous months, many miners who violated rules, lost their lives thereby. Thirty-three men were killed in the state during July, as against 41 for the month of June.

Fayette—For the purpose of raising funds with which to install new electrical machinery, the Lynchburg Colliery Co. and the Deity Colliery Co., on Gauley, have given deeds of trust on the property to H. A. Robson, of Charleston, and C. L. Christian, of Lynchburg, trustees, to secure a loan of $65,000. Of this sum, $30,000 is for the Lynchburg operation and $35,000 for the Deity company. The installation of the new electrical equipment will make the mines the best equipped properties on Gauley.

ALABAMA

Birmingham—Henry L. Jackson, administrator of the estate of Claude N. Jackson, has filed suit against the Brilliant Coal Co. for $50,000 damages for the death of the latter, who was recently killed while in the employ of the above company. This is one of the largest suits ever filed in this district for the death of an individual.

Edgewater—The Tennessee Coal, Iron & R.R. Co. has just appropriated $5000 for improvements to its bath house. This bath house is acknowledged to be one of the most modern and complete in the United States, and the above appropriation is for enlargement.

TENNESSEE

Coalfield—The Coalfield Coal Co., employing about 50 men, has closed down its mines for a period of 90 days on account of an utter lack of orders. The mines have been running on short time for several months, but this is the first time in years that they have been shut down altogether.

Vasper—The Vasper Coal Mining Co., organized some time ago, it is stated, has begun to open mines on its holdings of 1000 acres. Plans for machinery have not yet been decided upon. C. P. Harley is president and T. C. Jacks, secretary and manager.

KENTUCKY

Barbourville—Coal-mine operators in this section are confronted with a labor shortage, numbers of Hungarian and Austrian laborers having departed for the coast with the intention of sailing for home, provided they can get passage, to report for service in the armies. Mines are running to capacity hereabouts and a big increase is expected if the war in Europe is to be prolonged.

Lexington—Coal traffic over the Louisville & Nashville R.R. will be greatly expedited by the belt line which the Louisville & Nashville has just completed. The line connects the Lexington & Eastern branch with the Cincinnati and Louisville lines, and will not only save mileage, but will obviate the necessity of switching coal trains about in the city yards. The line, with the right of way, involved an expenditure of about $40,000.

OHIO

Bailey's Mills—The Dixler & Ohio Coal Co. and the Coalburg Co. have signed an agreement with the men employed b ythem under which the 47c. scale demanded by the union will be allowed. Preparations are under way for the resumption of work at the two mines, which employ about 250 men.

Massillon—The Massillon Coal Mining Co., the largest producer in the Massillon district, has placed three of its mines in operation. It is also announced that three new shafts will be operated late in the fall. Over 1500 men will be employed.

Logan—The first shipment of coal made by the Coonville mines of the Starr-Hocking Co., since the mines went into the hands of a receiver, was recently made. The financial affairs of the company are being adjusted, and it is the prevalent feeling that better times are ahead.

Columbus—Application has been made before the Ohio Utilities Commission for permission to waive the collection of demurrage charges and the suspension of car service rules on fine coal. This was done because of the lack of demand for the small sizes.

All of the sales agents and district managers for the New York Coal Co. made an inspection trip of the mines of the company in the Hocking Valley and the washery, Aug. 22. They were under the charge of C. W. Thompson, secretary, and J. A. Teegardin, sales manager. It is the plan of the company to apportion the output of the washery among the various salesmen.

Congo—State Mine Inspector J. M. Roan, assisted by a number of deputies, opened the Congo mine of the Sunday Creek Co., last week. The mine caught fire several months

ago, and was at that time sealed up under the direction of the mine department. It was found that the fire had burned itself out, and the mine will be placed in condition to operate.

INDIANA

Terre Haute—A trust deed given by the Grant Coal Mining Co., of Chicago, to the Drovers National Bank in that city, for $125,000, has been recorded here. It is for 6 per cent. gold bonds, payable $5000 May 1, 1915, and $20,000 annually thereafter.

The Jackson Hill Co. is sinking a new mine northwest of this city. A switch is being laid to the Miami Coal Co.'s new mine in the same territory. The court decided against those property owners who held that their land could not be condemned for railroad right-of-way for a mine switch only, and not for regular railway traffic.

It has been decided not to merge the miners of the bituminous and block fields of Indiana.

Clinton—The Miami Coal Co. has changed its headquarters from Brazil to this city.

ILLINOIS

Springfield—It is estimated by Duncan MacDonald, secretary-treasurer of the United Mine Workers, that 10,000 miners are out of work in the state. There appears to be no great prospect for decided betterment in the industry, and many of the workmen are crowding into other lines of labor and are not waiting for the fall work to commence.

Carlinville—The injunction suit of the Carlinville Coal Co. against the Ohio Oil Co. has been adjusted at the cost of the defendant. The Oil company stipulated that it will do no more drilling in this vicinity, and practically none on any portion of the complainant's coal field.

Pana—A small but troublesome fire recently broke out in the casing of the Penwell coal mine shaft, and for a time promised to give a hard fight. The city fire department, however, got it under control in about half an hour.

Cambria—The entire top works of the Donnelly-Koenecke Coal Co. was recently destroyed by fire, with no insurance. The loss on the rescreening plant and on the other property will amount to between $40,000 and $50,000. This property went into the hands of a receiver last winter, W. O. Potter, of Marion, being appointed to take charge of the property, which has been idle since that time.

Johnston City—The Lake Creek mine, near here, owned by New York parties affiliatd with the Cotton Belt R.R., and the output of which for the past year or so has been taken entirely by that railroad, is now equipped to ship commercial coal.

COLORADO

Denver—In a suit filed in the United States District Court, the government charging that the estate of Allen M. Ghost is holding 836 acres of coal land in Las Animas County illegally obtained in 1901 by Ghost and associates. This land is now considered to be worth over one million dollars, and the government asks that the patents be cancelled.

FOREIGN NEWS

London, England—It is stated that in spite of the removal of the embargo on exports of coal, the business is almost at a standstill, owing to the high freight rates. Sellers are demanding at least partial cash payment.

News comes from Bern, Switzerland, that notwithstanding the assurances that Germany is provided with plenty of coal, it is known that women are being put to work in the collieries of the Rhenish provinces.

PUBLICATIONS RECEIVED

University of Illinois, Illinois Miners and Mechanic's Institutes, Circular No. 1. "Education of Foreign Miners." Six pages, 6x9 in., illustrated.

University of Illinois, Illinois Miners' and Mechanics' Institutes, Bulletin No. 1. "Education of Mine Employees," by H. H. Stoek. One hundred and thirty six pages 6x9 in. with many tables and illustrations.

TRADE CATALOGS

National Transit Co., Oil City, Penn. Bulletins Nos. 10 and 11. Pumping machinery. Illustrated, 6x9 in.

Chain Belt Co., Milwaukee, Wis. Catalog No. 54. "Chabelco" steel chain belt. Illustrated, 32 pp., 7x10 in.

American Concentrator Co., Springfield, Ohio. Bulletin No. 2. Coal and ore testing laboratory. Illustrated, 4 pp., 6x9 in.

The Cement-Gun Co., Inc., of New York, "The Cement Gun." One hundred and seven pages, 6x9 in., illustrating and describing the apparatus, process and product.

The Allison Coupon Co., Indianapolis, Ind. "Allison Coupon Books," 64 pages, 8x10½ in., illustrating and describing coupon books and their uses.

Chicago Pneumatic Tool Co., Chicago, Ill. Bulletin No. 34-N. Class N steam and power driven enclosed compressors. Illustrated, 16 pp., 6x9 in.

Alberger Pump & Condenser Co., 140 Cedar St., New York. Catalog E. Alberger centrifugal pumps, Alberger-Curtis steam turbines. Illustrated, 56 pp., 6x9 in.

Chicago Pneumatic Tool Co., Fisher Building, Chicago, Ill. Bulletin No. 34-W. Class A-O "Giant" fuel oil engines. Illustrated, 16 pp., 6x9 in.

Yarnall-Waring Co., Philadelphia, Penn. Catalog. "The Log Book of the Power Plant." Lea V-notch recording liquid meter. Illustrated, 88 pp., 6x9 in.

The Automatic Reclosing Circuit Breaker Co., Columbus, Ohio. "Automatic Circuit Controllers.' Twelve pages, 3½x6 in., illustrating and describing automatic circuit controllers as applied to mining.

The Harris Air Pump Co., Indianapolis, Ind. "Twentieth Century Pneumatic Pumping Systems," 22 pages, 6x9 in., with many illustrations and tables on the installation, operation, and results or air lifts.

The Standard Roller Bearing Co., Philadelphia, Penn. "What Our Twelve Years' Experience Means to the User of Annular Ball Bearings." Twenty-eight pages, 7x10 in., with many illustrations and tables.

The Marion Steam Shovel Co., Marion, Ohio. Catalog 91. "Stripping Coal with Economy and Speed," 40 pages, 5x7 in., showing the use of Marion steam shovels, in coal stripping throughout different regions of the United States.

Sullivan Machinery Co., 122 S. Michigan Ave., Chicago, Ill. Bulletin No. 66B. "Sullivan rock drill mountings and accessories." Illustrated, 36 pp., 6x9 in. Booklet No. 13. "Core Drilling by Contract." Illustrated, 32 pp., 3½x5½ in.

The Creamer Lamp & Engineering Co., Ltd., Leeds, Eng., in Coöperation with the American Safety Lamp and Mine Supply Co., 1321-1333 Capouse Ave., Scranton, Penn. "Miners' Safety Lamps." Forty pages, 8x11 in., illustrating safety lamps, accessories, cleaning machines, etc.

The Jeffrey Mfg. Co., Columbus, Ohio. Bulletin No. 129. "Arcwall Coal Cutters for Over Cutting System of Mining." Eight pages, 8x10 in., illustrating and describing the application of "Arcwall" machines which require no loading or unloading and will cut in any slate or clay band in the coal measure

PERSONALS

H. P. Dowler, formerly superintendent of the coal operation at Heilwood, Penn., is contemplating starting in coal mining for himself.

Michael Hartneady, sheriff of Carbon County, Penn., was recently re-elected president of the United Mine Workers of the Panther Creek Valley.

J. H. Bovard, president of the Northwestern Coal Co. and general manager of the Farmers' Coal Co., at Kansas City, is at business again after four weeks in a hospital for an operation. He is recuperating rapidly.

W. J. Richards, president of the Philadelphia & Reading Coal & Iron Co., recently visited Boston and inspected the various re-handling plants of his company. He was accompanied by R. J. Montgomery, general coal agent.

Thomas R. Keating, assistant mine foreman at No. 4 shaft of the Ewen colliery, Pennsylvania Coal Co., has severed his connection with the company to accept a position as general superintendent with the Mohawk Coal Co., of Carbondale.

John Conlon, mine foreman for the Delaware & Hudson Coal Co. in Plains Township, has started the erection of a new breaker to conduct secondary mining operations in that township. The old Union slope is the section to be mined, it being stated that large quantities of coal still remain in the operation, which was abandoned years ago before more improved methods of mining were practiced.

CONSTRUCTION NEWS

Kittanning, Penn.—The Queenstown Coal Co., which has been engaged for some time in opening its mine in Brady's Bend Township, is now about ready to begin the shipment of coal.

Bentleyville, Penn.—It is expected that the Montour R.R. will have trains running over its new line by Sept. 15. The road is about completed and what construction work remains to be done can be finished in about a month.

Blairsville, Penn.—A contract has been awarded by the Pennsylvania R.R. Co. for the construction of a three and a half mile single-track extension of the Homer & Cherry Tree branch, to tap some new coal lands in Indiana County.

Winchester, Ky.—The Winchester-Irvine extension of the Louisville & Nashville R.R. has been completed from here to Red River, a distance of 14 miles. Construction work has progressed rapidly on the other side of the river, between there and Irvine, and it is expected that steel will be laid into Irvine shortly. There is about a month's work on the Red River bridge. This branch will open up a rich coal territory.

Henderson, Ky.—Officers of the Deepwater Coal Co., with engineers, are examining sites in Henderson and across the Ohio River, in Evansville, for the projected manufacturing plant of the Ohio & Mississippi Valley Barge Co. This latter firm, it is alleged, is to construct barges, to convey the coal of the Deepwater company from the mines in Kentucky, to the Gulf of Mexico. Surveys of the river front are being made.

NEW INCORPORATIONS

Tuscumbia, Ala.—The Southern Mining & Milling Co. has been incorporated with a capital stock of $100,000.

Birmingham, Ala.—The Margaret Coal & Sales Co. has been incorporated, with a capital stock of $2000. Charles DeBardeleben is named as president, W. W. Fulghum secretary-treasurer, and W. C. Adams, sales manager.

Charleston, W. Va.—The Jackson Coal Co. has been incorporated with a capital stock of $5000, which will probably later on be increased to possibly $600,000. The incorporators are F. J. Harry, H. W. DePue, J. S. Scott, L. S. Echols and Mrs. L. S. Echols.

Charleston, W. Va.—The Superior Block Coal Co., of Beckley, has been organized with a capital of $65,000. This firm will operate in the Duvall district of Lincoln County. The incorporators are G. C. Helrick, B. J. Shumate, John Anderson, G. H. Spalding and John Morris, all of Beckley, W. Va.

INDUSTRIAL NEWS

Pittsburgh, Penn.—Ernest Borra and Joe Barline, miners, of Bridgeville, on Aug. 21, pleaded guilty in Criminal Court to a charge of violating mining laws, in that they tamped shots with coal dust instead of clay. Sentence was suspended on payment of costs.

Peoria, Ill.—Judge Leslie D. Puterbaugh has been appointed receiver for the Horace Clark & Sons Co., mine operators. The application for the receiver was made by the Philadelphia & Reading Ry. Liabilities are listed at $330,000, with assets estimated at $650,000.

Pittsburgh, Penn.—I. W. Seamans has brought suit against J. A. Hillman & Sons Co. to recover $162,750 alleged to be due because a tract of coal sold to Seamans shows to be 70 acres short of 240 acres, the number he supposed he was getting, and which was all mineable.

San Francisco, Cal.—The tramp steamer "Mazatlan," which has flown variously the Mexican and German flags, was forbidden, Aug. 20, to leave port until she discharged 500 tons of coal in sacks, which it is alleged was intended to be transferred to the German cruiser "Leipsic," at sea.

Chicago, Ill.—Officials of the Illinois Central R.R. are making a tour of the United States and Canada, with the hope of finding a solution for the problem of storing bituminous coal. The company is seeking a method of storage to prevent deterioration and the danger from spontaneous combustion, also excessive costs in handling.

Venice, Italy—It is stated that all kinds of trades, steamships and railways in Italy are suffering from a shortage of coal. Nearly all the fuel used in Italy comes from England, and although the British Government has given permission for coal to be sent, English shippers have not complied, probably feeling that the Italians cannot pay cash.

Columbus, Ohio—The Ohio Utilities Commission has granted the request of the Hocking-Sunday Creek Traction Co. to issue $300,000 twenty-year bonds for the purpose of building and equipping the line from Chauncey to Athens. The line will then be opened between Nelsonville and Athens. It is planned to extend the line to Lancaster along the canal bank.

Cincinnati, Ohio—Orders have been placed by the receivers for the Cincinnati, Hamilton & Dayton R.R. Co. for 35 new locomotives to be used in hauling freight trains. The equipment of the company is in bad shape, and these locomotives will be used to bolster it up. Of the order, 30 are of the large Mikado type, and the remainder are smaller engines.

New York, N. Y.—The bituminous coal export market received a decided impetus Aug. 22, with the announcement that the Spanish interests at Madrid had made contracts for the delivery in Argentine and Uruguay of 3,800,000 tons of steam coal to be delivered over a period of two years at Buenos Aires, Montevideo and Rosario, and as rapidly as vessels can be procured to carry it.

Cincinnati, Ohio—The receivers of the Cincinnati, Hamilton & Dayton R.R. have ordered from the Mt. Vernon Car Co., 1000 box cars, and have also placed an order with the Cambria Steel Co. for 1000 gondola cars. It is understood, however, that these orders are made conditional upon the successful completion of arrangements for financing the road early this fall.

New York, N. Y.—Coal exporters only recently began to take advantage of the war to send fuel to Europe by way of the Mediterranean ports. On Aug. 19, the "Sweden," a neutral vessel, cleared with 6800 tons of coal. It is believed that more boats from neutral countries will be received here and the end of the war will probably find that the United States has a large export trade of coal to the Mediterranean countries.

Bluefield, W. Va.—The Norfolk & Western's official statement of coal carried during the month of July, 1914, is as follows: Pocahontas field, 1,314,478 net tons; Tug River, 263,240; Thacker, 288,643; Kenova, 100,600; Clinch Valley, 140,751. Other Norfolk & Western territory, 2735 net tons. From the Williamson and Pond Creek roads, 90,819 tons, and from all other railroads, 301,796 tons, making a grand total of 2,503,062 tons. This is 33,445 tons less than was shipped during the corresponding month of 1913.

Kansas City, Mo.—The Boycourt Coal Co. was the subject of involuntary bankrupt proceedings in the federal court at Kansas City, Aug. 20, the petitioners being Samuel Feller, the Baker & Lockwood Tent & Awning Co. and the Richards & Conover Hardware Co. The allegation is made that the State Bank of Ottawa, Kan., acquired $22,000 of stock of the company, under an agreement to pay the company's obligations, receiving a mortgage on the mines, and paid $6000 of the debts.

Washington, D. C.—The report of the Department of Mines, recently made public, states that 180 men were killed in and about the coal mines of the United States during the month of June, as compared with 192 during the same month of 1913. The number of fatalities in the coal fields of Pennsylvania was: Anthracite, 43; bituminous, 34. During the six months ending June 30, 1914, 288 men were killed in the anthracite region and 206 met death in the bituminous field. During the corresponding month of 1913, 336 men were killed in the hard coal field, and exactly the same number in the bituminous field of the state.

Coal Trade Reviews

General Review

Heavy all-rail shipments in anthracite and business is moderately active already. Eastern bituminous situation still improving. Orders and shipments for foreign markets are being reported. Trade slowly expanding and will be active shortly. Lake shipping better.

The anthracite trade is characterized by an unusually early buying movement that has created an excellent undertone and placed the market in a strong position. This is still confined mostly to the interior points, which continue absorbing unexpectedly heavy tonnages; naturally this has eliminated the possibility of any accumulation at Tidewater, which has also participated in the general improvement. The better demand has resulted in an increased working schedule at nearly all collieries, which is most unusual this early in the season.

The bituminous situation at Tidewater is still distinctly mixed and no definite developments of any kind have occurred. In spite of many reports to the contrary, there is no doubt that substantial tonnages of new business have been negotiated as a result of the European war, but it is equally true that this has caused a stoppage in other channels. As a rule the markets are not quotably changed, although rumors of substantial premiums are heard on export business. An interesting development of the week in the export trade was the clearing of a cargo from Hampton Roads for Stockholm, the first shipment ever made to that point. It is also a significant fact that the Hampton Roads piers worked last Sunday for the first time in a year. There is feeling that the domestic market is gradually broadening and a firm situation is anticipated in the very near future.

The exhaustion of consumers' stocks has forced additional buying and created a slightly better situation in the Pittsburgh district; prices continue irregular. Canadian buying is slowing down somewhat in all lines except the railroads which appear to be taking on extra supplies; rumors are current that much of this coal will eventually find its way into the British navy, but this is emphatically denied in official circles.

Though the effects of the general slowing up as a result of the war are being felt in the Ohio fields, the improvement in the Lake trade has steadied the market up in good shape. The Lake movement is now at the maximum of the year. Some local buying is being done, and operations in the mining districts are being accelerated.

The Southern trade is feeling the effects of the adverse conditions prevailing in cotton so that the market is irregular at the moment, though the outlook is bright. Heavy sales of pig iron indicate a strengthening in the industrial situation, and prices are showing a rising tendency. Middle-Western operators are firm in their convictions of a stronger market shortly, in spite of the interruptions incident to the war. The improvement is particularly noticeable in the domestic grades, the steam market showing a weakening tendency. Business so far is about normal for this period of the year.

ATLANTIC SEABOARD

BOSTON

Hampton Roads market steadily strengthening. Consignees are taking supplies freely. Pennsylvania grades develop an active business and Georges Creek shippers are well supplied with orders. Water freights hold recent gains. Anthracite fall prospect excellent.

Bituminous—The situation of Pocahontas and New River shows steady improvement. Prices are firm and the market is strengthening. Rumors are heard of what might be called "fancy prices" for export, but so far, confirmation is lacking. There can be no question, however, that the market will broaden materially during September. The Norfolk piers worked all day last Sunday, the first time in more than a year, due to the large number of steamers awaiting berth.

In New England, cargoes at the distributing points are being more freely absorbed; so far as reported, the on-car prices established a few weeks ago still prevail, and the trade is generally in a healthy state. Arrivals are heavier, the corporations apparently taking on coal as fast as storage will permit. The upward trend in water freights has also somewhat accelerated the demand from smaller buyers, but no real spot market for cargo lots has developed as yet.

The more popular grades from Pennsylvania are showing a spurt. Orders are beginning to accumulate with most of the operators, a pleasant contrast with conditions a month or two ago. Prices are hardening, although no pronounced movement has so far been in evidence. Some of the foreign ports that have hitherto shipped exclusively from England are likely to learn something of the merits of coals from the Pennsylvania districts as well as those from West Virginia. The lower-priced grades are also improving in demand.

There is no change to report in the Georges Creek situation. The shippers are well supplied with orders and the movement to New England is regular and in fair volume.

Water Freights are holding to the quotations of a week ago and owners still decline to name rates more than a few days in advance. All kinds of tonnage are in good request and the transportation interests are optimistic over the outlook.

Anthracite—The European war and the higher prices on other commodities have started the retail demand much earlier than usual. This is apparently true all over New England, although it is hard to foresee any upset in anthracite that can possibly result from the war. Stove size is in notably short supply with a number of the shippers, and certain of the steam sizes are also shortening up. The prospect is excellent for fall business.

Quotations on bituminous at wholesale are about as follows:

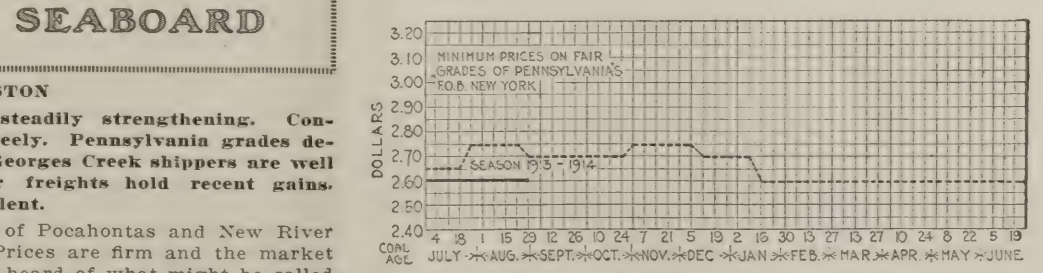
	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.90@1.50	$1.25@1.70	$1.67@1.77	
Philadelphia*.....	2.15@2.75	2.50@2.95	2.92@3.02	
New York*.....	2.45@3.05	2.80@3.25	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.85@2.95
Boston†.....	.....	.....	.....	3.68@3.83
Providence†.....	.....	.....	.....	3.60@3.68

*F.o.b. †On cars.

NEW YORK

Bituminous shows a better tone. Estimated that 350,000 tons of new business has been closed since the war began. Mines working better. Anthracite trade opening up in excellent shape. Prices stiffer.

The Bituminous situation shows a slight improvement over that prevailing a week ago. The spot demand appears to be a little better and in some cases prices for prompt delivery are five cents per ton higher. The greatest stagnation is in bunker coal and that has improved so far as tramp steamers is concerned, although not yet normal by any means. The delivery to foreign ports is also below normal, though the situation appears to be clearing steadily. So far there seems to have been about 350,000 tons of new business booked for foreign shipment and steamers are commencing to report for loading.



Many inquiries are in the market for future shipment both for foreign and local delivery. As a rule shippers are inclined to look askance upon this class of business, confining their sales to prompt shipment, although at the same time some considerable tonnage has been closed on contract during the last week or two at usual figures.

Mines in most instances are working better, many of them nearly full as against half time in July. Others are

not doing so well, having a class of business which has been effected adversely through the war situation. Labor is still plentiful and cars in good supply with the exception of one or two r ads, that are filled up with loaded cars.

The outlook is good and shippers are still hopeful of seeing a very heavy demand at better prices within the near future. The market is quotable as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

In Anthracite the market continues to show an improved tone. At present the demand is good, particularly on the line, for all sizes, and mines are working full time without any trouble in moving the product. Stove is still the active size and the supply is not equal to the demand; it is the means of moving some of the other sizes that have accumulated at the piers during the recent dull period.

Small sizes are moving well, the better grades being actually short in several instances. Prices vary according to quality, but in no case does there seem to be any accumulation.

Quotations are now as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	$4.60@5.00	$4.95	$4.55@4.95
Egg	5.25	5.15@5.25	5.20	5.00@5.20
Stove	5.25	5.25	5.20	5.20
Chestnut	5.50	5.30@5.50	5.45	5.25@5.45
Pea	3.55	3.45@3.55	3.50	3.25@3.50
Buckwheat	2.80	2.75@2.80	2.50@2.75	2.15@2 75
Rice	2.30	2.25@2.30	2.00@2.25	1.70@2.25
Barley	1.80	1.75@1.80	1.75	1.30@1.75

BALTIMORE

Less coal on sidings following resumption of heavy bunker trade. Sales at the mines slow and prices continue flat. Anthracite conditions listless.

There is a decided improvement as regards the amount of coal awheel here and on demurrage. A big grain fleet has been moving out of Baltimore for the past week, and with it went a large quantity of coal in bunkers. This has proved a distinct aid to the local situation, and there is now little talk of sacrificing at tide.

Mine conditions are slow. Poor demand toward the Lakes, a general industrial flatness, including almost a complete suspension in much of the cement trade and the steel business, stand as the underlying causes. Three-quarter gas is selling in West Virginia around 90c.; slack is freely offered to the trade at the mines at 50 and 55c. Steam coals are a little better, calling for from 95c. to $1. Best grade Pennsylvania coals hold firm around $1.35, but there has been sacrificing of small lots; a sale on the latter basis of a well known high-grade coal was noted this week at $1.15. Poorer grades are selling at from $1 to $1.10.

The Export trade remains an almost negligible quantity. After a few shipments a week ago, there was a decided lull. Foreign purchasers, mostly through London connections, are making cable inquiries, but the fact that no cash exchange has been arranged for this side is apparently holding up a business that will probably develop a little later.

Anthracite dealers generally are complaining of dull times. Few deliveries of any consequence are being made. The trade is living in hopes that September will bring a change of conditions.

Coastwise Chartering is light, most of the movement being in company-owned colliers or on long-time charters. Free offerings to New England ports have established a low rate in that direction. Offerings for Southern hauls are rather scarce and rates are higher in proportion. The approach of the hurricane season is showing its influence there.

HAMPTON ROADS

Large shipments, foreign and coastwise, and inquries are still coming in. Government takes 12,000 tons. Prices remain at circular.

Shipments, both foreign and coastwise, are good. The number of bunker vessels has not been large, but under the existing war conditions, bunker loadings show up fair.

Inquiries are in the market for large quantities of coal for export, and bids have also been asked for supplying 3000 to 12,000 tons of bunker coal to United States transports now at Newport News. The inquiries for export coal are coming from both European and South American ports usually supplied with Welsh coal, and already sales have been made and shipments moved. It is difficult to ascertain at what prices the export coal is being sold, but it is not believed quotations have been over $2.85, though perhaps some may have been made at $2.90.

There is a little above the normal supply of coal at Tidewater, with a fair amount coming forward from the mines, and, unless the demand should greatly increase, there is no prospect of a shortage during the next few weeks.

Export shipments during the week have been made to St. Lucia, Port Antonio, Port of Spain, Havana, Kingston, Rio de Janeiro, Santos, Stockholm, Las Palmas, Aalesund and Toulon. Stockholm, Aalesund, Las Palmas and Toulon buy almost all of their coal from the Welsh market; Rio de Janeiro and Santos also buy Welsh coal, but Atlantic coast ports supply some coal to these and other Brazilian ports. It is said that the coal sent to Stockholm was the first cargo of coal to be shipped from Hampton Roads to that port, and that its sale was due to inability of buyers to get a supply from Wales.

COAL CHARTERS

The demand for tonnage to carry coal to South America and Mediterranean countries continues active and rates have eased up. A charter made early this week for coal carriage, September loading, from Virginia to Rio Janeiro was closed at $5.40 against $6 being paid for the same voyage last week. Quite a few boats have been fixed to carry coal to Las Palmas and Italian ports and chartering agents report that they expect the demand for tonnage in this trade to continue for some time after the conclusion of the war in view of the fact that the English Admiralty has commandeered most of the coal stored by the Welsh operators, and that mining operations have been seriously hampered by the calling to arms of miners. American coal operators state that New River, Pocahontas and other high-grade coals have been sold in large quantities for early shipments. Spain, Portugal and Egypt have sent in large buying orders as well as Italy and South American countries.

It is stated that freight and insurance rates on coal vessels had eased up considerably, but that the English moratorium was to some extent holding up the final consummation of many contracts. It is the general practice to make all bills for coal shipped to foreign ports payable in London and for this reason operators are insisting that shippers have bills payable in New York on the surrender of the proper documents. To a certain extent where coal is urgently needed this has been done, but the recent improvement in the foreign exchange situation and the general attitude taken that exchange will shortly assume a normal aspect lends color to the statement that large sales of coal to Europe and South America will soon start under the usual terms of sale with bills payable in London.—"Journal of Commerce."

Coal charters have been reported as follows:

Vessel	Nationality	From	To	Tons	Rate
Navisbrook[2]	British	Atlantic Range	Bahia	1965	$6.00
Egda[2]	Norwegian	Baltimore	Puerto Barrios	1610	
Kennebec[2]	.....	Baltimore	Boston	1913	
Van Allens Boughton[1]	.....	Philadelphia	Boston	1909	
Kelbergen[2]	Dutch	Norfolk	Rio Janeiro	2674	6.36
Josephine[1]	.....	Philadelphia	Halifax	842	1.74
Chehaw[3]	.....	Port Reading	Savannah	982	1.10
Hugin[2]	Norwegian	Baltimore	Havana	1174	
J. E. Bignon[1]	.....	Philadelphia	Savannah	468	
Rob Roy[1]	.....	Philadelphia	Charleston	684	
Romera[2]	British	Virginia	Rio Janeiro	3189	
Jethou[2]	Norwegian	Norfolk	Mediterranean	2781	5.40

[1] Schooner [2] Steamer [3] Barge

LAKE MARKETS

LAKE TRADE

The business has had its ups and downs in past years, but it has never before received such a variegated assortment of rebuffs as this season. It opened lamely enough, but hope burned brightly. Everybody believed that things would get better in about a month and vessel owners did not lose hope, but merely postponed their expectations, arguing that the furnacemen could not stay out of the market forever.

But now comes a staggering conflict of armed forces abroad and the export trade goes glimmering. Vessel charters are cancelled; grain is loaded into vessels and then unloaded at the loading port; other vessels leave and are recalled, and still others that deliver their cargoes cannot get their freight money. Meanwhile the elevators fill up and there is stagnation and delay all around. Time is being eaten up and the ships are not earning anything, and altogether a state of demoralization prevails, of which no one can see the end. Vessels are going to dock by scores, because there is nothing for them to do. The year 1914 will be long remembered on the Lakes as the worst on record.—"The Marine Review."

PITTSBURGH

Mining continues at about 70% of capacity. Manufacturing demand slightly better. Circular prices still purely nominal, but slack a shade firmer.

The local coal situation has shown very little change for

several weeks, but such as has occurred has been in the direction of improvement. The demand from manufacturers is, on the whole, measurably heavier than two or three weeks ago, due partly to the practical exhaustion of the last of the stocks laid in against the expected suspension last April, and in part to slightly heavier operations at mills and factories. The steel trade is running at a slightly better rate than in July, an increase in shipments to domestic consumers having more than made up for the sharp decrease in exports caused by the war.

Shipments in the Lake trade have improved slightly, but they are not at as great a rate as was expected would be the case a month ago. Production of coal in the Pittsburgh district is at approximately 70% of capacity, on an average, but some mines are operating almost full and others are running at less than 50%.

Prices continue to be very irregular, slack suffering a greater discount from list than any other description, although it is slightly firmer than a fortnight ago, at 55@60c. for steam-coal slack and 65@70c. for gas-coal slack. Mine-run can be had on desirable contracts at $1.15, while spot lots can sometimes be had at close to a dollar a ton. Regular circular prices, which are purely nominal, remain as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Canadian roads stocking heavily in anticipation of treaty complications cutting off the supply. Other lines slowing down and requirements light. Unusually large amount of early buying in anthracite.

Bituminous—The demand is still below normal, owing to the European war. Canadian factories in numerous instances are doing little, and there is not much prospect of immediate resumption of business there, as everyone is taking a great interest in the war, and many lines of trade are upset. Sellers are looking closely after collections, which as a whole are said to be poorer than usual in the Dominion.

The heaviest buyers in Canada today are the railroads, and they are stocking up more freely than usual. The movement across the International Bridge has lately been above normal, the bulk of the coal being for railroad use. The stories that much of this coal is intended for use of the British Navy has been authoritatively denied. The railroads are simply getting prepared for any possible shortage this fall.

Offerings at low prices are somewhat less common than they were a short time ago. The market could easily become congested at present, if consignment shipments were sent in to any extent. Prices are on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. There is not much call for slack just now. Allegheny Valley coal is selling at about 25c. below the Pittsburgh.

Anthracite—Early buying has been the feature of the anthracite market this season. A large part of the business that would ordinarily not be placed until weeks later has already been covered, so that September will find a great many retailers carrying heavy supplies. This is true especially of Canada, where there has been alarm over the supply on account of the war abroad. There will undoubtedly be a reaction sooner or later to make up for the almost unprecedented amount of early ordering this month, but August trade will be considerably above the average.

The Lake shipment of anthracite is slightly less than early in the summer. But the docks at the Upper Lake ports are said to be well supplied and there is not much prospect of any shortage this winter. The start of the grain movement this fall will bring a good many boats here looking for return cargoes, and a larger amount of coal will be shipped. The shipments of the past week amounted to 97,500 tons.

TOLEDO

Lake shipping greatly improved. Domestic grades gaining strength. Slack touches the lowest point in years. Railroads buying from hand-to-mouth.

There is a noticeable improvement in the demand for domestic coal, and prices are improving; in fact, it is predicted that there will be a substantial advance in prices by Sept. 1. On the other hand, nut, pea and slack are extremely hard to move and have reached the lowest ebb known in years. The Lake movement is heavier than it has been for months past, and boats are being loaded and cleared with great rapidity. Considerable coal is being shipped to Canada. Shippers and buyers are anticipating complications in connection with the war, and are moving the coal while they can.

The situation at the mines remains practically unchanged. The Pittsburgh No. 8 field is no nearer a settlement. Merchants in the towns affected by the strike declare that business is absolutely paralyzed and demand that the miners take some action looking toward a settlement. Railroads are buying little, as they are hoping for a settlement of the Pittsburgh No. 8 difficulties and are holding off their yearly contracts in the hope of securing this coal. The railroad men generally consider the Pittsburgh No. 8 coal as best fitted for their purposes.

COLUMBUS

Production gradually increasing and prices are holding at fair figures. Indications of an advance in the circular after Sept. 1. Eastern Ohio is still idle. Lake movement quite large.

Activity prevails in both the domestic and Lake trade. The steam trade is still slow, but that is to be anticipated when business conditions are taken into consideration. On the whole, the tone of the market is fair and the prospects for the future are not bad.

The Domestic Trade is probably the strongest point in the market. Dealers are placing orders for immediate delivery, as the stocking season is at hand. They are in the market for domestic lump from Ohio districts as well as Pocahontas and West Virginia splints.

The Lake Trade is active and a large tonnage is being shipped to the Northwest. During the week ending Aug. 21, the Hocking Valley docks at Toledo handled 108,000 tons, as compared with 100,000 tons the previous week. A total of 1,500,000 tons has been handled by the docks since the opening of navigation. The demand for fuel from the Northwest is strong, and docks are generally in good shape.

Production in the various Ohio districts is gradually increasing, and many mines are up to the limit. Others are being placed in shape for operation, and tipples are being rebuilt as fast as possible. Eastern Ohio is still idle because of the failure to settle the wage scale.

Prices in the Ohio fields are:

	Hocking Valley	Pittsburgh	Pomeroy	Kanawha
Rescreened lump	$1.60	....	$1.75	$1.50
1¼ in.	1.50	....	1.60	1.50
¾ in.	1.30	$1.20	1.40	1.30
Nut	1.15	....	1.50	1.15
Mine-run	1.10	1.05	1.15	1.10
Nut, pea and slack	0.45	....	0.50	0.45
Coarse slack	0.35	0.35	0.40	0.35

CLEVELAND

Spot coal about equals the demand, and consignments are hardly a factor. Business is on the basis of 60 per cent. of normal. Lake shipments light, but reports indicate the movement from upper Lake docks is steadily increasing.

Prices are holding steady on all grades and the supply is as large as necessary. The market for slack shows a little more strength, which is due probably to the erratic buying that characterizes this grade. Though prices have not changed materially, the demand is stronger just now. Operators have found the Cleveland market too uncertain to warrant consignment coal, and, with one or two unimportant exceptions, have ceased to ship on speculation. The only increased demand is from Canada.

Youghiogheny and Pan Handle coals are the principal offerings, especially on slack. The Fairmount operators are sending in some coarse coal. Goshen and Cambridge are shipping a little of this grade, but only a few mines are working, because the clean-up work has not been finished.

No. 8 Operators have arranged to meet the miners in joint conference Thursday afternoon at Wheeling, W. Va. This is neutral ground, and it is thought the old arguments can be avoided and a new viewpoint brought out. This is the only hope operators have of a settlement.

Lake Shippers are having trouble getting boats of the 3000-ton class to go to Lake Superior. There is no demand for these boats in traffic that furnishes down cargoes and the owners are keeping them in the Lake Michigan trade. The shippers have so little dock space they require small boats. Shipments from Duluth-Superior docks are on the basis of 20,000 tons a day, as compared with 30,000 tons a day last year. The grain movement is light at Duluth-Superior and the railroads are taking very little coal for that reason. The country trade is said to be without much coal on hand.

Quotations are as follows:

	Pocahontas	Youghiogheny	Fairmount	No. 8 W.Va.	Massillon
Lump	$3.60				$3.20
Lump, 1¼ in.		$2.25	$2.05	$2.10	
Lump, ¾ in.		2.25	2.05	2.10	
Egg	3.60				
Mine-run	2.60	2.10@2.15	2.00	2.00	
Nut		2.20			3.20
Slack	2.35	1.60@1.65	1.70	1.55@1.60	

CINCINNATI

Steam market severely restricted by decreased industrial activity on account of the war. Domestic movement is still slow, but increases are predicted soon. Heavy rush expected in the fall.

Cancellations of European orders for machinery and other products manufactured locally have made the resumption of normal activity among industrial plants seem only a remote possibility. But, on the other hand, the energy being displayed in securing a stronger footing in South American and Asiatic markets gives promise of ultimate success. Just now, however, prospects are not good for the hoped-for strengthening of the screenings market, which has for some time hampered the movement of domestic coals.

While the local domestic market continues dull, there is every indication of an early change in this situation. The usual summer storing movement has already been delayed considerably, and when it does begin it will mean an unusually heavy volume of business in a short period. It is also the unanimous opinion of operators interested in the Virginia, West Virginia and eastern Kentucky fields that those sections will be called upon very shortly for large quantities of coal for export, and this can hardly help stimulating the market very materially.

DETROIT

Some activity in Hocking coals, which are popular in this district. Steam coals slower.

With the opening of the Hocking mines in Ohio, there has been considerable negotiation on these fuels, which are among the most popular in the local market. Hocking lump is now quoted at $1.60, f.o.b. mines, which is about the same as last year. Steam business is not so active, manufacturers withholding orders until the outlook is better defined. Prices continue low on the steam grades, slack being quoted over a wide range from 50 to 75c., with most of the business being negotiated more nearly at the lower figure.

SOUTHERN

BIRMINGHAM

Outlook favorable though adverse conditions prevail in the cotton business. Large sales of pig iron.

There has been very little change in either the lump or steam coal market this past week. While the demand is still far below the possible production, some orders are coming in, and quotations seem to have steadied up to the circular prices.

While the prospects for an increased activity are evident, still, there is some uneasiness that the usual oil mill trade will be greatly curtailed, due to the fact that the farmers are inclined to hold their cotton, without even ginning it, which would naturally shorten the oil mill season. Blacksmith coal seems to be in a satisfactory condition, both as to tonnage being moved and prices, which remain firm at $2 to $2.25 f.o.b. mines for the best grades. Furnaces report heavy sales of pig iron, the average price being about $10.25 f.o.b. Birmingham. Some furnaces are obtaining a price slightly in advance of this.

LOUISVILLE

Crop and business uncertainties making the market irregular. War adversely affecting the situation. Prices lack steadiness.

Market conditions in Kentucky are "spotty." Some companies are doing very well, while others are reporting slow sales and cut prices. The Southern market is in bad shape, due to suspensions and curtailment of operations on account of uncertainty as to how the cotton crop will be handled.

The interior market is not looking as well as was expected; crops have not been as large as anticipated, while in certain sections adverse tobacco prospects are affecting buying power and credits. However, the mines are running nearly full again, but it is generally admitted that the momentum gained before the war unsettled conditions has been lost, and that there is considerable handicap to overcome.

Nut and slack and most steam coals are weak in this section, the former being especially long on the Louisville market. For the first time, too, West Virginia coals from mines located on the Cheapeake & Ohio R.R. are being quoted in this market. Eastern Kentucky block coals are quoted at from $1.65@1.90, egg at from $1.15@1.40, while steam run-of-mine ranges from $1@1.05 and is hard to move. Nut and slack vary from 60@70 to 40@50c., with the lowest grades hard to move at any price.

COKE

CONNELLSVILLE

Market stagnant, present consumers being covered by contracts and no additional consumption in immediate prospect. Prices not quotably changed and production and shipments decreased a trifle.

The Connellsville coke market continues absolutely stagnant. There has been no increase in consumption by interests which do not make their coke, and the present consumers are fully covered. Production is regulated quite closely to requirements and no coke is being dumped on the market. There may be a little buying for September by furnaces which bought only for July and August, but as a rule present contracts are for third quarter or the entire half-year. The market is quotable as follows: Prompt furnace, $1.75; contract furnace, $1.75@1.90; prompt foundry, $2.25@2.35; contract foundry, $2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Aug. 15 at 257,340 tons, a decrease of 6730 tons, and shipments at 260,490 tons, a decrease of 9478 tons.

BUFFALO

Little is being done in coke in this market, and most handlers say that their sales are only a small part of what they usually are at this time. The quotations show no change, being down to a basis where lower prices seem rather unlikely. They are on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.25 for stock coke.

BIRMINGHAM

The market on both furnace and foundry coke remains unchanged from last week. There is no demand, and prices are low.

CHICAGO

A greater demand for byproduct coke in the domestic trade has been reported. This has been strong enough to confirm the new circular price of $4.85 f.o.b. Chicago. Quotations now are: Connellsville, $4.90; Wise County, $4.75; byproduct, egg, stove and nut, $4.85; gas house, $4.25.

MIDDLE WESTERN

INDIANAPOLIS

Domestic grades moving better and mines are on half-time. Operators anticipating good September movement. Falling off in requirements of railroads or factories not yet felt in coal trade.

The coal trade of Indiana preserves its usual August tenor, showing a slight improvement in the movement of domestic grades over July. There is the usual routine demand from railroads, no better buying by factories, plenty of cars available, mines operating about three days a week and a respectable demand at retail for the winter's supply. Both wholesalers and retailers expect September to bring improvement. The two unusual price advances this summer have done much to hurry up purchases.

Some mines are averaging four days a week, mostly those working the fourth vein. There seems to be a sentiment that the industrial situation is not as good as it has been, due to the war shutting off exports of factories, but if this is so, it has not yet made itself felt in the local coal trade. Coal men say a falling off in demand from factories will mean a reduction of the requirements from railroads. Operators report that the war has done nothing yet for the Indiana trade. Prices are somewhat easier, due to the keen competition. Offerings of mine-run are reported as low as $1, with screenings down to 70c.

CHICAGO

Larger sales are being made in almost every grade of coal. Supply of Hocking coal unequal to demand. Price of Springfield lump advanced 10c. a ton.

Increased activity in almost every grade of coal has been noted in Chicago during the past week. The betterment is attributed to the fact that manufacturers are concentrating their attention on home business. Market observers point out that our internal business is bound to be good regardless of the interruption to export trade due to the European war.

The lowest price quoted for Pocahontas and New River coal, even on off-grades, is $1.25, and a number of the larger producers find it easy to obtain $1.40. The chief reason for

this is the buying of supplies for apartment houses. Demands for Hocking coal are in excess of the supply. An improvement has also been noted in the splint-coal situation. It is reported that operators in the Kanawha district have sold a large amount of this coal for export. Dealers report an unusually good demand for Carterville lump and egg, and No. 1 washed. The demand for Springfield lump coal is increasing and operators have advanced the price to $1.35, making a rise of 10c. a ton. The sales of Indiana coals has been substantially increased.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07	$2.45@2.65	$2.17@2.27	
Steam lump	1.87@1.92		1.97	
Egg		2.45@2.65		$4.05
Mine run	1.87	2.15@2.25	1.87	3.30@3.45
Screenings	1.47@1.52	1.65@1.70	1.47@1.52	

Quotations for Harrisburg coal are: Domestic lump and egg, $2.40@2.55; steam lump, $2.25; mine-run, $2.15@2.25; screenings, $1.65@1.70; No. 1 nut, $2.25; No. 2 nut, $2.40.

Carterville prices are: Lump and egg, $2.40@2.55; No. 1 washed, $2.55@2.70; No. 2 washed, $2.35@2.40.

ST. LOUIS

General trade better, although the Standard market is completely demoralized.

The market still continues to improve on high-grade coals for the domestic sizes, while prices are gradually dropping on the steam grades. The Standard market, however, has not improved at all, and, if anything, it is getting worse. Standard 2-in. lump has sold as low as 85 and 90c., while screenings are going at from 40 to 50c. In the middle of summer, the lump sold for 75 to 80c., and screenings from 70 to 80c. This averaged 75c. mine-run, but it is an easy matter to figure out what the result is when 70% of the output is sold as lump at 85c. and 30% as screenings at 40c.

In the Mt. Olive, Staunton and Sparta Fields, fairly good prices are being maintained, and a tonnage satisfactory to the operators.

The past week saw the clearing away of all the cheap Carterville and Franklin County lump coal, and the cheapest Carterville lump now on the market is quoted at from $1.35 to $1.40 and $1.45. The higher grade coals from the Franklin and Williamson County fields are going at from $1.50 to $1.75, and the demand exceeds the supply.

The Washed Coal Market is improving as far as Nos. 1 and 2 are concerned, but the other sizes are still weak. Anthracite from the Pennsylvania field still continues to move in, in fairly good tonnage, and there seems to be an increased call for Arkansas this year to take the place of unsatisfactory West Virginia smokeless.

In a general way, the future of the local market is exceedingly good, as far as the high-grade operators are concerned, but little encouragement is offered to operators in the Standard field in the way of either business or profits.

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	.....	$0.85@0.95	$1.10
3-in. lump	.....	....	$1.30	....	.....
6-in. lump	$1.60@1.75	....	1.40	1.00@1.15	1.25
Lump and egg	1.85@2.15	$2.25	.....	....	1.15
No. 1 nut	1.20@1.40	....	.....	....	.....
Screenings	0.70@0.75	....	0.80@0.85	0.40@0.50	0.45@0.55
Mine-run	1.00@1.15	....	.....	0.75@0.80	.....
No. 1 washed nut	1.40@1.50	2.25	1.50	....	.....
No. 2 washed nut	1.25@1.35	....	1.35	....	.....
No. 3 washed nut	1.15@1.20	....	.....	....	.....
No. 4 washed nut	1.10@1.15	....	.....	....	.....
No. 5 washed nut	0.65@0.70	....	.....	....	.....

KANSAS CITY

Trade shows improvement with a distinct indication of the fall opening. Prices are steady.

There is a marked inclination to hold off on winter coal purchases, in anticipation of a repetition of last year's conditions when warm weather in November caused a decline. Farm demand is lighter, because of temporary check to threshing, many preferring to postpone this rather than pile wheat on the ground, since bins and all available storage is filled because of congested movement. Prospect of lower prices, due to war, is a factor in the situation.

The more favorable situation of the Kansas Natural Gas Co., that will enable it to supply abundant gas, has not influenced many householders yet. Local trade was slow early in August, but has improved greatly, and the fall movement seems well begun. Slack coal is growing scarce because of the strike.

The market is quotable about as follows:

	Mines	Delivered
Cherokee lump	$2.00	$2.80
Cherokee nut	2.00	2.70
Mill coal	1.60	2.30
Slack	1.50	2.20

PORTLAND, ORE.

Prediction that prices will advance Sept. 1 as result of reduced importations and increased demand. Retail business active.

Coal dealers here have been busy the past few days booking orders. It is predicted that prices will advance 50c. per ton Sept. 1 on Wyoming and Utah coals, and this will probably mean a similar advance all along the line. Because of the slow movement during the summer months, dealers have not been storing up heavily, and as the mines advanced quotations Aug. 1, the wholesalers here contend that they will be compelled to follow suit.

Coal from the Centralia district is now being laid down here at a cost that permits its being retailed at $6 per ton

From the Coos Bay country comes the report that efforts will be made to ship coal here in larger quantities than in years past. The railroad into Coos Bay is not yet connected up but will probably be completed during the winter. In the meantime coal will be shipped here by boat, the service having been increased considerable since last winter. At that time the Coos Bay coal sold at $8 per ton, delivered in ton lots.

PRODUCTION AND TRANSPORTATION STATISTICS

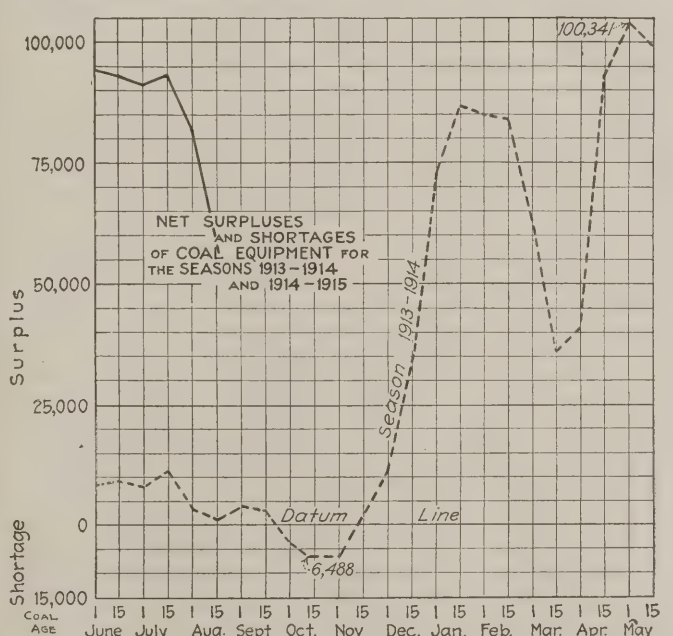
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Aug. 15, as follows:

	Surplus	Shortage	Net*
New England Lines	985	0	**985**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	15,866	0	**15,866**
Ohio; Indiana; Michigan; Western Pennsylvania	24,963	0	**24,963**
West Virginia, Virginia, North & South Carolina	2,552	0	**2,552**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	2,954	0	**2,954**
Iowa, Illinois, Wis., Minn.; North & South Dakota	3,153	18	**3,135**
Montana, Wyoming, Nebraska	656	0	**656**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,861	472	**1,389**
Texas, Louisiana, New Mexico	266	4	**262**
Oregon, Idaho, California, Arizona	3,304	2	**3,302**
Canadian Lines	0	0	**0**
Total	56,560	496	**56,064**

	Apr. 15	May 1	May 15	June 1	June 15	July 1	July 15	Aug. 1
Surplus	92,139	100,370	99,664	94,770	93,520	91,280	93,509	82,284
Shortage	24	29	313	7	49	430	292	110
Net*	**40,440**	**92,115**	**100,341**	**99,351**	**94,763**	**90,850**	**93,217**	**82,174**

***Bold face** type indicates a surplus.



PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for July and seven months of 1913 and 1914, in short tons:

	July		Seven Months	
	1914	1913	1914	1913
Anthracite	693,545	719,944	6,347,822	6,138,175
Bituminous	3,966,357	4,551,528	27,521,539	28,833,947
Coke	847,135	1,183,070	6,075,020	8,569,978
Total	5,507,037	6,454,542	39,944,381	43,542,100

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for June, 1913-14, and for the twelve months ending June, 1912-13-14, in long tons:

	12 Months			June	
Imports from:	1912	1913	1914	1913	1914
United Kingdom	6,846	9,398	11,025	648	341
Canada	1,082,522	1,336,387	1,005,693	80,533	67,511
Japan	13,168	79,072	85,689	260	1,838
Austria and Tasmania	195,713	150,150	251,977	9,325	21,896
Other countries	1,993	3,257	3,618		5
Total	1,300,242	1,578,264	1,358,002	90,766	91,591
Exports:					
Anthracite					
Canada	2,922,531	4,545,976	3,897,365	414,901	427,710
Uruguay			84		
Other countries	56,571	79,505	61,665	5,764	5,546
Total	2,979,102	4,625,481	3,959,114	420,665	433,265
Bituminous,					
Canada	10,671,982	11,981,443	11,472,397	1,418,113	793,856
Panama	511,802	483,974	362,427	40,725	25,810
Mexico	344,712	443,884	296,392	37,635	15,866
Cuba	1,121,580	1,273,945	1,129,954	106,264	81,575
West Indies	692,534	601,431	577,541	51,376	45,433
Argentina			139,409		9,977
Brazil			239,082		10,023
Uruguay			62,452		6,200
Other countries	1,367,237	1,298,424	1,425,312	237,458	196,826
Total	14,709,847	16,083,101	15,704,966	1,891,571	1,185,566
Bunker coal	7,092,255	7,350,404	7,811,913	683,910	687,386

FOREIGN MARKETS

GERMANY

Production, imports, exports and consumption of the German Empire during the first six months of this year and last year were as follows, in thousands of tons:

	Coal	Lignite	Coke	Briquettes
Production—				
1913	93,778	15,944	41,900	13,183
1914	94,148	15,974	44,351	14,515
Imports—				
1913	5,028	253	3,503	72
1914	4,776	295	3,184	79
Exports—				
1913	16,372	3,431	30	1,638
1914	18,170	2,630	31	1,622
Consumption—				
1913	82,234	12,786	45,373	11,617
1914	80,754	13,639	47,504	12,972

The Rhenish-Westphalian Coal Syndicate has reported fuel exports for the past six years as follows:

Year	Coal	Coke	Briquettes	Total
1908	9,018,220	2,745,801	726,372	13,206,744
1909	10,766,034	2,909,084	802,626	15,234,046
1910	11,925,573	3,493,472	1,210,013	17,517,673
1911	13,087,977	3,677,478	1,578,519	19,254,930
1912	14,004,439	4,519,631	1,685,763	21,349,738
1913	15,602,770	4,401,433	1,642,792	22,757,003

GREAT BRITAIN

The London coal trade has been very erratic during the past week. In some cases prices have been reduced and in others slightly advanced. The difficulty in obtaining fuel has been relaxed somewhat, but there is still the grave danger as to what it may mean in the near future. With the return to work after the holidays, serious problems have made themselves felt in a variety of ways. So many horses and vans have been commandeered by the Government that it is becoming a very serious matter as to how the coal on order can be delivered. This difficulty seems likely to extend to the colliery end also, for it is currently reported that many of the Midland collieries have had to bring up the pit ponies in order that the Government may examine and report on the number available in an emergency. At the same time the calling up of the Territorials and Reservists has thinned the ranks of the regular workers very considerably, both in the offices and at the depots.

A considerable quantity of South Yorkshire and other qualities of steam coal and house coal usually sent to the coast for shipment have found their way to the London markets, and kept the supply well up to the demand. There is no denying the fact that the general public during the first few days of the outbreak of the war completely lost their heads and rushed in orders far beyond their actual requirements. Business has been very irregular in London during the whole of the week, and there are still many collieries who are declining to enter any orders whatever, except for contract coals. All colliery quotations are still withdrawn, so that buying is limited to very small proportions until the position of affairs is better known.

One of the first features of the effects of the war is the shortage of pit props and oil, and it is feared by some that this will considerably lessen the output unless the local supplies can be made serviceable. In the seaborne market no Durham or Yorkshire qualities are offering. Vessels are, however, still running along the coast, and on Monday, 15 contract boats were reported as entering the Thames, and on Wednesday 9, all sold. Manufacturing fuels, whether of the large coal or the nutty slack varieties, were in good demand, and fetched good prices. The lowest summer prices are still the prices in operation for the public delivery. In some cases, however, the advertisements have been withdrawn, as so many orders have been received over and above the normal requirements.—"The Colliery Guardian."

BRITISH EXPORTS

British exports for July of the past three years were as follows:

To	1912	1913	1914
Russia	648,018	880,066	870,385
Sweden	472,276	402,713	423,349
Norway	224,229	180,898	172,368
Denmark	287,886	227,245	228,900
Germany	1,000,068	867,036	922,088
Netherlands	209,714	194,047	143,249
Belgium	179,548	162,492	127,892
France	1,047,511	1,161,473	1,090,169
Portugal, Azores and Madeira	124,539	114,952	107,931
Spain and Canaries	337,096	304,505	301,918
Italy	967,491	965,225	881,721
Austria-Hungary	87,677	103 976	84,596
Greece	60,821	72,022	66 999
Roumania	39,931	25.987	47,061
Turkey	55,766	36,869	66,674
Egypt (including Anglo-Egyptian Sudan)	348,765	290 891	262,224
Algeria	99,233	97,581	101,719
Portuguese West Africa	48,332	18,937	2,456
Chile	52,131	44,626	32,426
Brazil	110,667	153.575	130,979
Uruguay	64,590	70.815	31,945
Argentine Republic	322,833	360,119	285.422
Channel Islands	22,414	20,729	19 101
Gibraltar	26,843	22,923	28,586
Malta	39,721	54,319	35,317
Aden and dependencies	12,169	14,229	11,156
British India	10,251	1,379	5,591
Ceylon	31,759	14,032	27.141
Other countries	109,587	111,550	90,118
Coke	85,978	99 605	107 954
Briquettes	191,945	200,814	210,418
Total	7,319,789	7,275,630	6,917 853

FRANCE

So far the war is having no direct effect upon French coal markets, except that, of course, the demand has fallen off greatly, owing to the shutting down of the big iron works of the North and East, as well as many factories throughout the country. At the same time, however, the authorities have extended the mobilization orders for miners to 45 days, so that the personnel of the collieries has not been diminished to any great extent. This assures the supply of the national requirements, more particularly the railways, the armament constructors, and the shipbuilding yards, all of which are working at high pressure. There are also quite a few demands for a new business to take the place of the German and Belgian imports now stopped, but the prices are being kept at their previous level. Transport at present is a problem, for the railway facilities are enormously reduced, and even water carriage is interfered with through lack of men to man not only the barges, but the discharging plant. However, the Northern collieries are loading up as many as they can obtain, and despatching them to Paris and the South. The question of pit props is being settled by the same means; many of the big barges which come to Paris with wine are now going through laden with timber. Towage is a further problem, and is handicapping this traffic, for the big barges can only move with tug boats, although the smaller coal barges from the North can move with horse towage.

The household trade in Paris is pretty much at a standstill through lack of local delivery wagons; consequently, middlemen are enabled to ask very much enhanced prices, not justified by the colliery prices, but simply on account of their own personal difficulties. At the moment all price lists are cancelled, and prices may be anything. American exporters are making a bid for Government business here just now, but so far without much success.

The Americans will hardly do much business yet, because in the first place they do not seem prepared to quote on a c.i.f. basis, and local dealers have no means at present of chartering. Today there was a quotation from America for New River at $3 a ton, f.o.b. Newport, which would work out at a price quite unacceptable under present conditions here. —"The Colliery Guardian."

COAL AGE

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Our Opportunity

By Berton Braley

Written expressly for Coal Age

While the hosts at Armageddon know the awful blight of war
While the rifle bullets whistle and the cannon crash and roar,
We can look with bitter sorrow at the horror of it all
But we need not weep and mutter with our faces to the wall,
We are free of all the conflict which a war-mad monarch made,
And the world is ours to conquer with the mighty force of trade,
While the other powers struggle, with a continent at stake,
All their vast and eager markets are for us to win and take.

Now's the time for trade expansion, with prosperity the goal,
South America is calling for its huge supply of coal,
And a hundred other markets scattered round the surging sea
Look to us for prompt assistance—this is Opportunity!
Let us turn again to mining, cease to mourn in sodden woe,
For the war cloud has a lining with a richly golden glow,
While our rivals burn and slaughter, while their wealth and strength decrease,
WE can conquer distant borders with the glorious hosts of peace.

If we haven't ships, we'll buy them, if we cannot buy, we'll build,
Till the face of all the oceans with our merchant fleets is filled,
Till the flag that rode triumphant in the clipper days of old
Shall be fluttering at mastheads of our vessels manifold,
And the good black coal of commerce, wrested from the hill and plain,
Shall be sent in bulging cargoes forth upon the rolling main,
While the powers clash in conflict, while the shot and shell are hurled,
WE shall gain stupendous treasure from the markets of the world.

The United States and the World's Coal Markets

The annual production of coal in the entire world is approximately 1,350,000,000 short tons. The United States produces 575,000,000, or more than 42 per cent. Great Britain produces about 305,000,000, or 22 per cent., while Germany produces 265,000,000, or 19 per cent. Other countries in their order of production are Austria-Hungary, 50,000,000; France, 45,000,000; Russia, 28,000,000; Belgium, 25,000,000 and Japan, 19,000,000 short tons. It is true, therefore, that of eight countries producing 97 per cent. of the world's coal output, the only one not now engaged in war is the United States.

Great Britain is still producing a large tonnage, and is endeavoring to maintain her place as the world's most important exporter of fuel. Her foreign business in coal amounts to approximately 110,000,000 tons annually, leaving 195,000,000 tons for domestic use. There is no doubt but that production in Great Britain will be curtailed, but it is likewise certain that her domestic consumption will materially lessen, so that considerable coal will still be available for export. She has ships, and commands the seas, so that she must be regarded still as a most formidable competitor for the export business. The chief condition against her is the recent order prohibiting the export of her best Welsh grades. We doubt if importers will be satisfied with an inferior English coal.

In Germany, Austria-Hungary, France and Belgium, the coal industry is completely demoralized, only enough colliers being left in the mines to supply fuel for the railways, armament mills, and the more important national requirements. Japan can hardly supply enough coal for her own uses, so it is evident the United States and Great Britain must furnish the world's fuel while the present war continues.

The average consumption of coal in the principal countries of the world (excluding tropical countries) is approximately 4 tons per head of population. In the United States the consumption is greater than anywhere else, being 5.5 tons per inhabitant.

Four million men are employed in mining the world's coal, of which number 1,100,000 are British, 850,000 Americans, 710,000 Germans and 200,000 are French.

South America alone needs $70,000,000 worth of coal annually, of which amount at present the United States furnishes $5,000,000 and Great Britain, $55,000,000.

If the present time is not *the* supreme opportunity to make the United States the chief fuel exporting nation of the world, then surely the chance will never come.

Shaft Ventilation at Butler Colliery

SYNOPSIS—A 6x14-ft. fan direct connected to a steam engine, operating at 130 r.p.m. delivers 215,000 cu.ft. against a 2.8-in. water gage. The machine is operated continuously at this rate.

Of the many mine-ventilating installations in the anthracite and bituminous fields of the United States, one of the most interesting is that of the Hillside Coal & Iron Co., at the Thomas shaft of the Butler colliery at Pittston, Penn.



A General View of the Top Works, Showing Fan House

Interest centers in this installation because of its high-efficiency as regards volumetric output and its exceedingly simple, but staunch, construction.

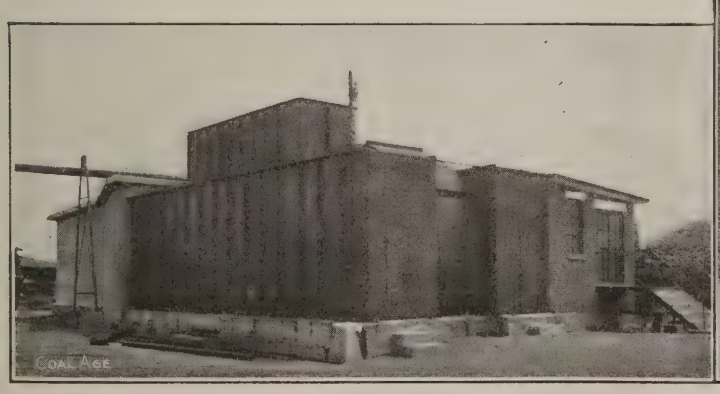
The fan—14 ft. in diameter, with a 6-ft. face—is of the double-inlet, exhaust, multivane type, with three-quarters steel casing and steel airways extending out to the concrete air shaft. For accessibility, the casing is provided with air locks through which the attendants can pass to oil and care for the machinery.

The main shaft, of 0.40 carbon steel, is 11 in. in diameter, and extends through the airways on one side to the direct-connected steam engine. The cast-steel fan hub, which is 30 in. long, is pressed on and keyed to the shaft. A center steel-plate disk is secured to the hub by fitted bolts in reamed holes. There are two steel-plate rings on either side of this center disk. The curved vanes are riveted to these rings.

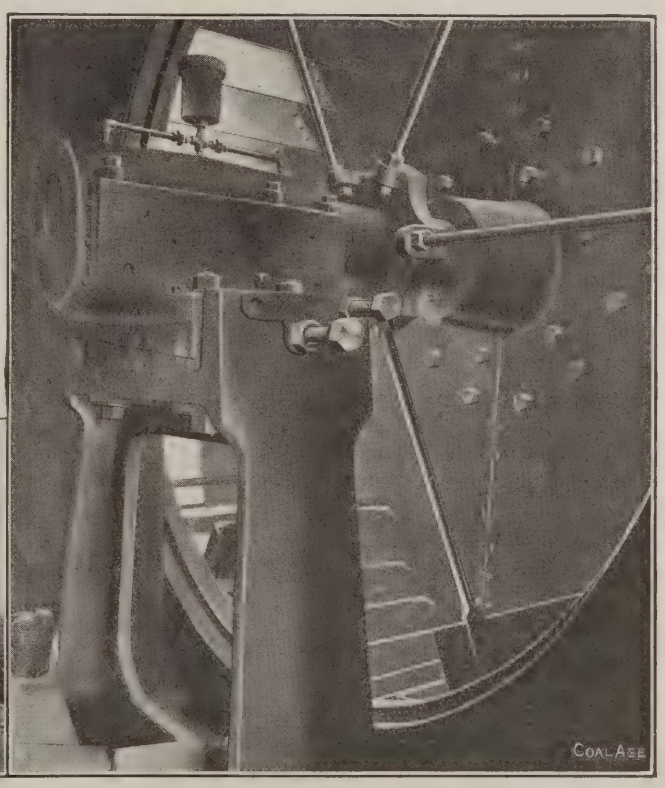
Heavy steel rods are riveted to the outside rings and extend to the shaft, where they are held in the cast-steel spider shown in one of the illustrations. The spider, which is keyed to the shaft, is an important factor in the maintenance of face alignment, in that it supports the adjusting nuts with which the steel rods are fitted.

The fan wheel is supported on its foundations by two heavy cast-iron pedestals. The tops of these pedestals are machined to form bearing surfaces for the adjusting wedges on which the journals rest. These are for vertical adjustment. Longitudinal adjustments are made by heavy setscrews. The main bearings are of the chain-oiling type, with an outer water jacket; this permits the connection of a water system for rapid circulation and cooling, when necessary. The bearings are liberal in their proportions and have large oil cellars.

The rigid steel construction of the fan wheel and the accurate balance that such a construction permits, has a definite engineering advantage beyond that of great strength with comparatively little weight, in that it allows a high peripheral speed, which results in large volumes of air at high water-gage readings.



Near View of Fan House and Casing



View Inside the Fan Casing, Showing Structure of Wheel and Pedestal Bearing

This fan is running continuously—24 hr. per day—and is delivering 215,000 cu.ft. of air per minute at 130 r.p.m., with a water-gage reading of 2.8 in.; at 190 r.p.m., the air delivery is increased to 315,000 cu.ft. and the water-gage rises to 6.2 in.

There is no question but what service of this nature is arduous in the extreme, since the fan has no opportunity for rest and it is strictly "up to" the design and workmanship, as well as the material, to keep the fan in service. This machine was designed and built by the Vulcan Iron Works, of Wilkes-Barre, Penn.

Butler colliery is known as one of the most modern in the anthracite field and is thoroughly equipped for handling its monthly production of 65,000 tons. It is within the system of the Pennsylvania Coal Co. and comes under the jurisdiction of W. P. Jennings, district superintendent at Scranton, Penn.

Double-Entry System in Arkansas

Special Correspondence

SYNOPSIS—The single-entry system dies slowly in Arkansas, both miners and operators desiring in some cases to keep it in operation. The inspector is trying to get the courts to stop mines which are being worked without double entries.

On Oct. 10, 1913, Thomas H. Shaw, the state inspector of mines, served notice on the Southern Anthracite Coal Mining Co., of Russellville, Pope County, Ark., to install the double-entry system as required by Section 7, Act No. 225, passed in 1905. The section reads:

> The owner, agent, lessee or operator of any coal mine in this state, if said mine is worked on the room-and-pillar plan, shall cause such work to be prosecuted in such mine in the following manner, to-wit: Two entries parallel with each other must be driven for the ingress and egress of the air, and crosscuts must be made at intervals not to exceed 40 ft. apart. Where gas exists, they shall be driven 30 ft. apart, or a crosscut be made at any other place ordered by the management to do so. No room shall be turned inside the last course cut*

The Southern Anthracite Coal Mining Co. drives only one entry instead of two. It opens from this double-necked rooms, which are 40 ft. wide. When the necks are in 12 ft. they are widened squarely toward each other till they meet, and as the rooms are driven up, a dirt wall is erected between the two-room roadways. Crosscuts are driven between the rooms 12 ft. from the entry.

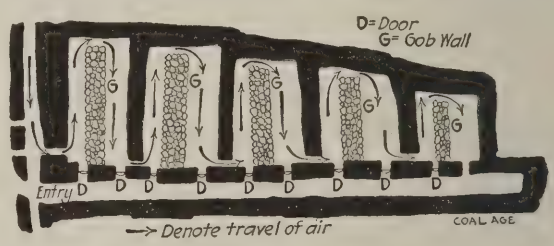
Doors were placed on the mouth of each roadway and the air is thus driven up one road and down the other, and so long as the doors are closed and tight, the ventilation is uninterrupted. But as soon as any doors are opened, all the air beyond becomes stagnant. In such cases, it is always found that at least one door is standing open. Seeing that only 100 cu.ft. of air per minute is required by law per man employed, it is easy to see that if this is provided when the doors were all duly closed, the current will be only barely sufficient to do the work. With doors frequently opened, the air must become extremely foul.

Another trouble arises from the fact that, as the air courses up to the face of every room, when a heavy shot of coal is made, it fills up the space between the rib and the gob wall, and largely prevents the air from circulating.

Was the Law Violated?

Lee McDowell, the superintendent, declared that the system was in accord with the law and suggested that perhaps the breaking of the continuity of the air current by gob pillars in the counter airway composed of crosscuts and rooms, was the only manner in which the law was violated. So he proposed to cut the gob pillars and let the air circulate in a straight line through the initial crosscuts. The inspector insisted that this would only make conditions worse, as the air would then not circulate to the faces of the rooms.

Finally, the superintendent agreed to make a double entry, such as was doubtless contemplated by the framers of the bill, providing that the Ideal Anthracite Coal Mining Co. mining nearby was compelled to operate in a similar manner. W. H. Barrett, the general manager of the company, promised to do so and has kept his engagement, and Mr. McDowell agreed to do the same, but in April, 1914, he was still using the same system.



How Some Arkansas Mines Are Still Operated

The Miners Side with the Company

Five men elected by the local union of the United Mine Workers of America tried to get the inspector to meet them in the hope that they might persuade him to withdraw his objection to the method of working as they claimed it would reduce their wages if the work was done on the double-entry system. It is difficult to see how that could be. The inspector refused to meet the men, as the requirements of the law were not rightly, in his belief, a matter for compromise.

Little Law and Not Much Provision for Enforcement

On Apr. 29, 1914, the inspector applied in the Circuit Court for an injunction to close the mine, alleging that it was dangerous for the workmen, owing to the foul air and the lack of ventilation to remove standing gas. Judge Basham ruled that he could not grant an injunction, as he was without jurisdiction, and he dismissed the case, so on May 9, 1914, the inspector sought to enjoin the Southern Anthracite Coal Mining Co. in the Pope County Chancery Court, to cease the operation of their mine, alleging dangerous conditions and open violation of the law. He also served notice on the prosecuting attorney, requiring him to prosecute the company for not ventilating the mine and for driving single headings in open violation of the law. The injunction was brought under Sec. 5349.

Chancellor Sellers ruled that the Act 225 of 1905,

*We suppose "ordered by the management to do so," means "when the management is ordered so to do by the mine inspector." "Course cut" is evidently an error and should be "crosscut."

amending the mining laws by implication, repealed the act granting the courts power to serve an injunction by which any company could be required to close its mine. He stated that the only remedy at law was to have the prosecuting attorney proceed against the company as a misdemeanant. In this case the company would possibly pay the fine and not discontinue its practice.

So the inspector has appealed to the Supreme Court to reverse the decision of the chancellor. If this court decides in favor of the chancellor's decision, the law rests entirely with the prosecuting attorney in this and other provisions and so far he has not shown any disposition to act in a case of this kind.

The Miners Want the Inspector to Acquiesce

When the suit was commenced, the men supported the company. Thomas King, one of the organizers of the United Mine Workers of America, went to Russellville and "roasted" the men so severely that they changed their stand and quit work. After the decision, P. R. Stewart, district president of the Union, wired the inspector to meet him at Fort Smith, as Mr. McDowell was clamoring for the men to return to work. The inspector refused to modify his stand and the Union officials, being afraid to order the men to return to work in what was declared to be an unsafe mine, left it open to the men to do as they pleased and they have returned to work.

A few of the larger companies have shown a disposition to comply with the law, but the rest are unwilling to do so, inadequate as it is in many of its details.

Belgian Coal Exports

Coal is the greatest by far in quantity of any article exported from Belgium, and is sent for the most part to France, which received 4,340,500 tons in 1911. Germany received 293,000 tons, and the Netherlands 266,000 tons, the remainder being in small quantities, the chief of which is 113,000 tons to Luxemburg. As a Consular Report (British) indicates, the total figure is largely composed of bunker coal placed on board vessels bound to the countries to which it is credited as exports in the statistical returns. The exports of Belgian coal during the years 1902-11 were:

Year	Quantity in Tons	Year	Quantity in Tons
1902	5,073,000	1907	4,732,000
1903	4,923,000	1908	4,754,000
1904	5,067,000	1909	5,077,000
1905	4,705,000	1910	4,973,000
1906	4,972,000	1911	5,169,000

The least objectionable feature of boiler soot is that it is unburned fuel. The worst features are its ability to screen the boiler tubes from the heat, the quantity of sulphur in it which corrodes the tubes, and its interference with draft so that a greater pressure has to be put on the fire.



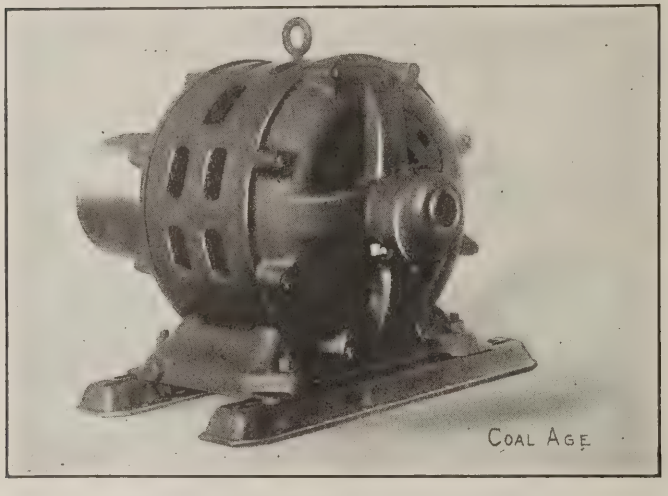
The Miner—Guess I'll Stick and Play Safe

A Two-Speed Alternating-Current Motor for Mine Ventilation

By William H. Easton*

SYNOPSIS—It is often advantageous to vary the speed of mine fans. With direct current this is easily accomplished. Where alternating current must be employed, a slip-ring motor gives the required speed variation, but is subject to some serious shortcomings. The two-speed induction motor is perhaps on the whole the machine best adapted to fan driving when constant speed is undesirable.

It is frequently desirable to alter the speed of motors driving mine fans. Less air is required at nights and on holidays than while work is in progress, and a reduction in the speed of the fan at such times effects



The Two-Speed Motor Complete

a decided economy. Again, an increased volume of air is demanded from the fan as extensions below ground are made, and this extra supply is most easily obtained, up to a certain limit, by increasing the normal speed of the fan.

When a direct-current motor is used for fan driving, no difficulty arises as to speed changes. The speed of a direct-current motor can be readily varied over a wide range in any desired number of steps.

But the increasing use of alternating current from central stations and the many desirable features of the motors using this energy supply—such as reliability, simplicity and ability to utilize current of a high voltage—have developed a demand for a suitable alternating-current motor for fan drive, one of the characteristics of which should be speed variation.

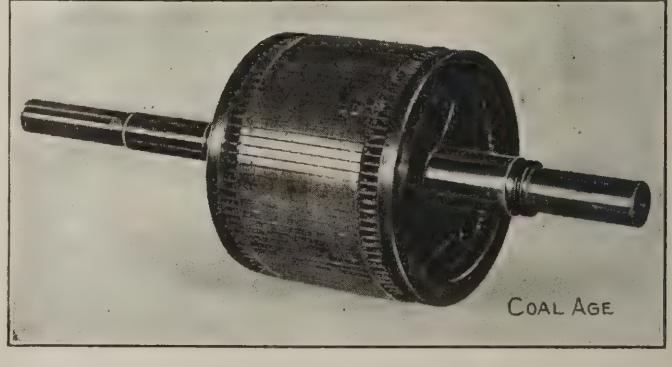
This demand has created a serious problem for the motor manufacturers to consider, because the alternating-current motor does not lend itself readily to speed variation. The ordinary squirrel-cage motor, for example, well suited to mine service in many respects, is essentially a constant-speed machine, and no method of changing its rotational velocity is now considered practicable.

With the slip-ring (or wound-rotor) motor, speed variation can be obtained by introducing resistance into the rotor circuit. For this purpose, a drum controller is employed and resistance connected into the rotor circuit through the slip rings. For services where the operation is intermittent and the motor runs on low speeds but a short total time each day, as in hoist, crane and elevator service, this type of machine is eminently satisfactory. But where operation on low speeds for long periods of time is necessary, the slip-ring motor becomes uneconomical because much energy is wasted in the resistance.

Thus a 20-hp. slip-ring motor has an efficiency of 87 per cent. when driving a fan at full speed. But when operating the same fan at half speed, its efficiency (including losses in the resistance) drops to 37 per cent., which means that but little more than one-third of the total power received (and paid for) is being transformed into useful work.

When the fan must run at a slight speed reduction or at low speeds for short periods only, a slip-ring motor can be recommended. But for long operation on low speed, some more efficient substitute should be found.

One type of motor that has proved entirely satisfactory whenever it is applicable is the two-speed squirrel-cage induction motor. This has been used extensively for machine-tool and other service, and has been applied to mine-fan drives for years, although it has only recently become conspicuous in this latter field. This motor is similar in its mechanical construction to the ordinary squirrel-cage machine. It has the same simple and reliable mechanical construction throughout. It has only two wearing parts, the bearings; it has no sliding electrical contacts, and its rotor is practically indestructible. The stationary windings are arranged differently, however, although they are mechanically just as strong and



Rotor of the Two-Speed Motor

present no outward differences with the exception of the fact that a greater number of leads are brought out.

The Operation Is Simple

The method of operation of this machine is simple. The speed of any squirrel-cage motor depends on the number of its "poles." Thus, on a 60-cycle circuit, a two-pole motor has a no-load speed of about 3600 r.p.m.; a four-pole motor, 1800 r.p.m.; an eight-pole motor, 900 r.p.m., etc. It is therefore evident that by changing the num-

*Westinghouse Electric & Mfg. Co., East Pittsburgh, Penn.

ber of poles, the motor speed can be varied proportionately.

This is what is done on the two-speed motor. The windings of the stationary part are so arranged that by connecting them in one way a certain number of poles is formed; while by changing the connections, twice the number of poles is secured and the speed is reduced to one-half. The horsepower is also reduced one-half. In either condition, the motor's operation and characteristics are similar to the ordinary squirrel-cage machine having the same number of poles.

The reason why this type of motor is particularly suitable for fan service is that half speed is just the reduction that many mines require during nights and holidays. Hence its range of application is broad.

In this machine, the excellent mechanical features of the ordinary squirrel-cage motor are retained intact, as mentioned above, no commutator or other complication requiring attention being necessary.

The change in connections is effected in the simplest possible manner. A double-throw knife switch is provided, which when placed in one position, gives one speed, and in the other gives the second speed. Otherwise, it is started in the same manner and with the same appliances as the ordinary squirrel-cage motor.

The efficiency of operation on low speed is excellent, being nearly the same as that on high speed. The reduction of horsepower at low speed is of no consequence in fan driving, since the power required to operate a fan falls off rapidly as the speed is decreased.

Gradual increase in the speed of the fan to keep pace with extensions is taken care of by changing the motor and fan pulley ratios to give a higher fan speed as development work progresses.

It will be noted that the two speeds provided by this motor are as 2 to 1. This is the most practical condition for this type of machine. In this case, the entire winding of the motor can be used for both speeds; hence the machine is economical both to build and to operate. Were the ratio different, say 3 to 1, two separate windings would have to be used, one providing three times the number of poles that the other secures. Such a motor is expensive to build and its operating efficiency is not so good, although it has been used in many installations. An interesting instance is a 4 to 1 speed motor, where two two-speed windings are employed, giving no-load speeds of 1800, 900, 450 and 225 r.p.m.

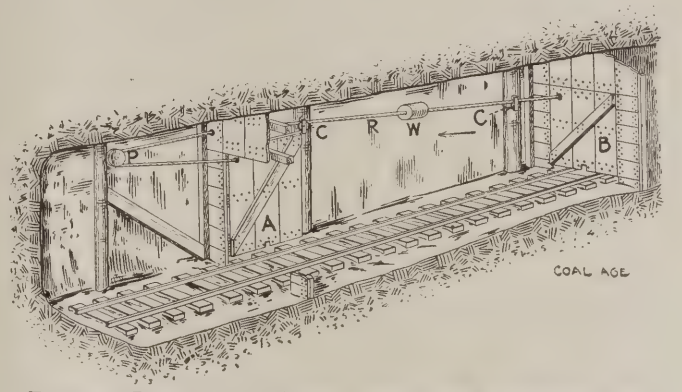
The two-speed 2 to 1 motor, however, fills the demand for ventilating service so well and has so many specific advantages that it is certain to become a feature of the electrical equipment of coal mines.

The Ramsay Mine-Door Closer

The setting open of a mine door, through the thoughtlessness, carelessness or malicious intent of mine workers, is not only a source of continual annoyance to the officials in charge of the ventilation of the mine, but is a menace to the safety of the men working therein.

The purpose of a door erected in a main airway or in a crosscut between two airways, one of which is the intake and the other the return, is for the purpose of permitting the passage of men and animals and preventing the air current from short-circuiting at this point. Such doors are called "division doors" when placed in the crosscut between the main intake and return airways of a mine. At all such important points, two doors or, as we say, "double doors," are erected in the same crosscut. The purpose of the double doors is to prevent the momentary short-circuiting of the air when one of the doors is open for the passage of men or animals. One of these doors should always be closed when the other is open, so as to prevent the air current from short-circuiting at such a time.

The accompanying sketch shows a device, recently invented by Thos. Ramsay, mine foreman for the Northwestern Improvement Co., Roslyn, Wash. It consists of a rope or wire *R*, of sufficient strength, attached to and connecting two mine doors *A* and *B*, located in a crosscut between the intake and return airways. Between the doors, the rope is supported by two pulleys *CC* and, passing through a hole in the brattice at the door *A*, is carried over a tail-pulley *P* and attached to the inby or



Ramsay Device for Operating Division Doors in Mines

return side of the door *A*. As shown in the cut, a heavy weight *W* is attached to the rope between the carrying pulleys *CC*, its purpose being to take up any slack in the rope and to keep the doors closed, should either of them be opened by accident or by heavy concussion of the air. From a study of this arrangement, it is evident that only one of the doors *A* and *B* can be opened at one time, and the short-circuiting of the air when men or animals are passing through the doors is thereby prevented.

This device has been in successful use for several months in one of the mines of the Northwestern Improvement Co., at Ronald, Wash., where it was installed to test its practicability in the mine. As a result, its practical working and usefulness for the purpose, intended have attracted much attention and favorable comment.

A New Dust-Laying Fluid

British engineers have met the dust problem in a unique way. Nature's way of laying dust is to turn it into sandstone or clay by slow infiltration of colloid fluids. Man needs to do the same quicker. In the F pit of the Washington Coal Co., southeast of Newcastle-on-Tyne, there was shown on Mar. 21 a commercial scale trial of the new Belger colloid dust-laying process.

About 400 yd. of a main haulageway, along which pass 1000 tons of coal a day, had been sprayed with the Belger fluid during the previous two months. The fluid, whose main components are glue and a 40 per cent. solution of calcium chloride, is sprayed from a 100-gal. tank, devised by A. Owen Jones.

This tank can come down the shaft in the cage and

is then placed on wheels. The air used is at a pressure of about 2 atmospheres. It enters the tank by several small openings, so as to churn the fluid into foam, and a small jet of air is led into the outflow pipe to help the treacly liquid to become spray. The nozzles are of rubber, to enable solid particles to pass.

Humorists said the Belger process meant making the miners walk on flypaper, and any looker-on whose hand was accidentally sprayed found himself collecting every speck of dust which came near him for the rest of the day. But the track where the process has been used feels like a peaty path in dry weather, being slightly springy and not at all sticky.

Outside the sprayed area the track is several inches deep in fine dust. The sprayed roof and walls are sticky and look for a week or two as if whitewashed, then the gathering dust blackens them, but it does not appear that a fresh spraying will be needed for three months. The liquid is used warm, at 50 deg. C. to lessen its surface tension, but the spraying is not followed by evaporation, so no falls of roof result. Indeed, the liquid preserves rock from erosion and timber from decay, and does not, like water, encourage ankylostomiasis and other low forms of life.

The cost of using this spray in coal mines is about 50c. per yard per year.

A Pipe Flume for Mine Water

By H. M. Kanarr*

In the development of the Trout Run Mine of the Jefferson & Clearfield Coal & Iron Co., near Reynoldsville, Penn., a heading was driven to the dip to daylight, which provided drainage for almost the entire mine. The water from this heading was liberated on a branch of the stream which supplied the Eleanora Mine of the Rochester & Pittsburg Coal & Iron Co. with water for the boilers.

In order to avoid contaminating this water supply, the water from Trout Run Mine was carried past the Eleanora dam by means of a surface ditch which followed the contour of the hillside for almost its entire length of 3600 ft., except at one point where it became necessary to carry it across a ravine for a distance of about 100 ft.

This was done by means of a flume composed of 18-in. sewer pipe supported on 35-lb. mine rails, which in turn were carried by bents composed of 60-lb. rails bent so as to give a batter on the legs of 3 in. in 12 in. and embedded in concrete piers cast around the base.

Details of Construction and Advantages of the System

The longitudinal rails were bolted together with fishplates, and also fastened securely to each bent with U-bolts. A concrete entrance and discharge were provided so as to give some head to the water entering the flume, and to properly release it at the lower end. No bracing of any kind was used on the bents, but the flume was trussed longitudinally with two 1¼-in. mine-haulage ropes passing over each bent and under a 12-in. I-beam bolted to the 35-lb. rails at mid span. The ropes were secured to the concrete walls at one end by means of eyebolts embedded in the concrete, and at the other by a turnbuckle, part of which was similarly embedded, and which formed a convenient means of bringing the flume to a uniform grade.

The spans were 14 ft. center to center, but could have been longer if desired, as the flume was amply strong for longer spans. The character of the country in which it was built is shown by the accompanying photographs, one of which was taken to show the method of construction, the other showing the finished flume, looking up stream.

The advantages of this construction are that the flume contains no inflammable material and will not be endangered by forest fires. It will last considerably longer than a timber structure, and was cheaper and more quickly built. The joints of the pipe were cemented and should carry water better than timber, which would be subject to weather changes.



The Flume during Construction and after Completion

The cost of the finished structure is given by the superintendent in charge, as follows:

Labor	$162.54
Cement, 21½ bbl. at $1.40	30.10
Sand	22.95
102 lin.ft. of 18-in. sewer pipe	58.14
Total	$273.73

The completed flume was painted black and the sewer pipe red, making a pleasing contrast and a job which would add to the appearance of any plant, but which in this case must "blush unseen" to a great extent, due to its isolated location.

*Chief engineer, Rochester & Pittsburgh Coal & Iron Co., Punxsutawney, Penn.

Common Sense and Economy in Fan Ventilation

By J. C. Gaskill*

SYNOPSIS—An excessive amount of air unnecessary for the proper ventilation of a mine. Circulation under a low water gage desirable. Necessary requirements to produce a low mine gage. The need of two or more main intake and return airways shown by several illustrations in actual practice. The saving in fuel consumption shown to be important.

In the following article, I, first, want to give some facts relating to the conditions we have met in mine ventilation in respect to the distribution of the air in the mine. Most readers are to some extent familiar with mine ventilation, but it is probable that many do not understand what constitutes *good* ventilation in the mine.

First, it is not necessary for a mine to have an excessive volume of air in order to be properly ventilated; but it should have a sufficient quantity to give to each of the air splits what air is needed. Air splits are necessary in order to avoid using doors on the main-haulage roads. This quantity of air should be furnished with a reasonably low water gage. The question of what constitutes a "low water gage" will depend on the quantity of air required, the length of the airways, number of air splits and the daily output of the mine.

For example, take a mine producing, say from 400 to 500 tons of coal per day. This mine can be ventilated with a 3x12-ft. fan that will deliver from 50,000 to 55,000 cu.ft. of air per minute. It is possible to do this with one main airway, providing the distance to the first air split is not too great. It must be remembered, however, that as the cross-headings are worked out and abandoned, the distance to the first split increases; and, instead of a 1-in. water gage, there is now required a 3-in. gage to circulate the same air volume. Moreover, a larger volume of air is now required.

After due consideration, it is decided to install a high-pressure fan, which, it is believed, will give the necessary air volume. It often happens that when this installation has been made at a large expense, the result is only partially satisfactory and the blame is laid on the fan, when, as a matter of fact, the real trouble lies in the main airway, which is too small for the growing requirements of the mine. Instead of a single main airway, there should now be two airways, which would pass the same volume of air under one-fourth the water gage. The horsepower required for the circulation would likewise be reduced to one-fourth of the power required for a single airway. This refers, of course, to the horsepower consumed in the main airways only.

A Comparison of Duplicate Fans

The Consolidation Coal Co. is at present operating two fans of the same make and duplicates of each other, in every respect. In October, 1910, one of these fans was installed at Mine No. 43, that had, at that time, been in operation about 18 years. There were four main-return airways, each 7x10 ft. in section and 4000 ft. long. Up to this time, the mine had been ventilated by a Capell fan, 8 ft. wide and 11 ft. in diameter, running at a speed of 224 r.p.m. This fan was now replaced by another 6 ft. wide and 20 ft. in diameter, which delivered 202,320 cu.ft. of air per minute, under a 3.5-in. water gage, at a speed of 90 r.p.m. This yield would correspond to 100,000 cu.ft. per min., under a water gage of 0.855 in., which shows a volumetric efficiency of 119 per cent. The peripheral speed of the new fan, at 90 r.p.m., is 5654 ft. per min. To deliver the same quantity of air, under the same gage, requires a peripheral speed of 7728 ft. per min., showing an increase of 2086 ft. per min., in favor of the new fan.

The duplicate 6x20-ft. fan, to which I have referred, was installed at Mine No. 119, in 1912. This mine had then been in operation six years. It had three return airways, each 3 ft. 8 in. high by 16 ft. wide. The distance from the air shaft to the first air split was 4200 ft. on the intake; and the corresponding distance on the return was 3800 ft. At a speed of 71 r.p.m., this fan delivers only 71,000 cu.ft. per min., against a 1.9-in. water gage, which corresponds to a circulation of 100,000 cu.ft. per min., against a 3.77-in. water gage; or 200,000 cu.ft. per min., against a 15-in. water gage, which shows a volumetric efficiency of only 53 per cent.

These data afford a practical illustration of two fans that are duplicates in every respect, but operated under conditions that differ widely in regard to the mine. In both cases, the fan shaft is 10x12 ft. in section and about 60 ft. deep. While the first fan has proven all that was expected and yields a volumetric efficiency of 119 per cent., the second fan gives an efficiency of only 53 per cent. The comparison of these tests proves conclusively that the mine conditions determine very largely the efficiency of the ventilating fan.

It may be stated that both fans were built under a guarantee of 250,000 cu.ft. per min., against a 6-in. water gage. The fan installed at Mine No. 43 would deliver 250,000 cu.ft. per min., under a 5.34-in. water gage, as estimated from the yield previously mentioned; but the fan installed at Mine No. 119, estimating on a similar basis, would show a water gage of 23.56 in., for a circulation of 250,000 cu.ft. per min. The conclusion is that the dimensions of this fan are not adapted to the mine it is designed to ventilate. We are now adding two airways in this mine, which will reduce the water gage and yield conditions better adapted to the fan. It is only fair to state that this result was anticipated in the plan of the mine, which was arranged to provide for the additional airways when required.

Preparing Specifications for Mine Fans

It is a common thing for the mining engineer to be called upon to prepare specifications for a mine fan, for service at a particular mine, and to invite bids for the erection of the same. The specifications are based on a stated requirement of, say 250,000 cu.ft. of air per minute, against a 6-in. water gage. A manufacturer in

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presenting his bid will often state that he can do better than what the specifications ask, often claiming that the dimensions given are too great and the fan unnecessarily large. Where the manufacturer is left to make his own estimate of the size of fan required, he will often make no inquiries in reference to the size of the mine airways or the present circulation in the mine; but will take chances in reference to these important data. In nine cases out of ten the new fan is installed at a new mine, where, owing to the short airways of ample size, it continues to do good work for a few years. In the later development of the mine, however, there is experienced a scarcity of air, and, referring to the guaranteed capacity of the fan, the superintendent orders the mine foreman to speed it up, claiming that it is not run at its full capacity. The results are still far from satisfactory, but the fault is not with the fan, which is now forced to operate under conditions for which it was not designed.

Calculation of Horsepower Required

A short familiar calculation of the pressure required to pass a given quantity of air through an airway of given dimensions, using the Fairley coefficient (k = 0.00000001), shows that a water gage of 1.9 in. is required to pass 100,000 cu.ft. of air per minute through an airway 7x10 ft. in section, for each 1000 ft. in length. Suppose the main airway in the mine is 3000 ft. long to the first point of split. The distance the main air current must traverse, including the return, is then 6000 ft., and the water gage required, for the passage of the main airways only, is 6x1.9 = 11.4 in. It is clear at once to any mining engineer or foreman that it would be impracticable to attempt to pass 100,000 cu.ft. of air through a single airway of this size for a distance of 6000 ft., including the return. By providing two airways of this size for the intake and two airways for the return, both the water gage and the power on the air would be reduced to one-fourth of the previous amount.

By this means, a main air current of 100,000 cu.ft. per min. can be conducted a distance of 3000 ft. to the first point of split and returned to the upcast, under a water gage of 2.85 in., requiring 45 hp. This is the horsepower on the air consumed in the main airway. These are the more important calculations in estimating the requirements of the mine in respect to ventilation. To these amounts, however, must be added the water gage and power consumed in the splits.

Finally, to determine the power of the engine driving the ventilating fan, it is customary to assume an efficiency of 60 per cent. For example, if the entire horsepower on the air, for the main airways and splits, is, say 60 hp., the required horsepower of the engine would be 60 ÷ 0.60 = 100 hp. A similar calculation shows that a water gage of 5.08 in. and 160 hp. on the air are required to pass 200,000 cu.ft. per min. in three airways, a distance of 6000 ft.; but, using four airways, the same air volume, circulated the same distance, will only require a water gage of 2.85 in. and 90 hp. on the air.

Saving in Fuel Consumption

Assuming a consumption of 5 lb. of coal per hp. per hr., the saving of 160 — 90 = 70 hp., by employing four instead of three main airways, would correspond to a saving in fuel of 5 × 70 = 350 lb. of coal per hour, or 1¾ tons in 10 hr., which figures are a fair approximation to fact, in actual practice. Assuming, then, a saving of 3 tons of coal per day of 24 hr. (less fuel being consumed during the night, when the mine is not working), at a cost of $1 per ton for coal at the mines, the total saving per month would be practically 3 × 30 = 90 tons or $90 per month, at the least computation.

Economy of Low-Water Gages

Experience suggests that economical ventilation requires that the water gage be kept down to at least 1 in. per 100,000 cu.ft. of air in circulation. As has often been suggested before, this can be done by properly splitting the air current in the mines. Experience leads me to suggest further, that for the circulation of from 80,000 to 100,000 cu.ft. of air per minute, two main intakes and two return airways should be provided; or three main airways for a circulation up to 150,000 cu.ft. per min.; and four main airways for a circulation up to 200,000 cu.ft. per min., the sectional area being 70 sq.ft. If this plan is followed, a great saving in coal will be found to result. It is important, in overcasting the air, to see that all air bridges on main airways are substantially built so as to prevent the leakage of air. Such overcasts and all stoppings on main airways should be built of concrete, for the same reason.

For the last ten years, it has been the policy of the Consolidation Coal Co., when opening a new mine, to make the projections on the maps of that mine, with enough intakes, returns and overcasts, to ventilate the mine under a low water gage. Where old mines were contending with a high water gage, air shafts were sunk, in order to shorten the airways and lower the water gage. At Mine No. 26, an air shaft was sunk 11,700 ft. from the mouth of the mine, and a new 6x20-ft. fan and a boiler plant installed. By installing the fan at this last location, it shortened the airway one-half, besides permitting the two return airways to be used as outlets or intakes, as required, thus providing four inlets in place of two, as before. Previous to the change, this mine had but two inlets and two returns. By moving the fan, the water gage was reduced from 3 in. for 100,000 cu.ft., to 1.36 in. for the same air volume, a splendid demonstration of the practical value of shortening airways. It will be noticed that 1.36 in. water gage is too high for a circulation of 100,000 cu.ft. of air, as, in case 200,000 cu.ft. were required, the necessary gage would be 5.44 in., which is far too high for everyday practice. It may be possible that this is the best that can be done with an old mine sometimes.

In estimating the saving of coal effected by moving this fan, the calculation is based on the difference in actual total horsepower required of each engine, which is 123 hp. for 150,000 cu.ft. of air. Five pounds of coal per hp. per hr. then means 615 lb. of coal per hr., or 14,760 lb., or, say 7.4 net tons per day of 24 hr. Coal at $1 per ton then means $7.40 per day, or $222 per month and $2664 per year. The water gage on the new fan will be 3.06 in. for 150,000 cu.ft. of air; while on the old fan, it would require a 6.75 in. water gage for the same air volume. The new mines opened by this company in the West Virginia coal field are three, namely, Nos. 63, 32 and 84.

Mine No. 63 was opened about eight years ago, and an 8x20-ft. fan was installed. The mine inspector's report states that on Oct. 17, 1912, this fan was delivering

151,510 cu.ft. of air, at 70 r.p.m., against a 1.8-in. water gage. This would equal a 0.78-in. water gage for 100,000 cu.ft. of air; or a 3.13-in. gage for 200,000 cu.ft. of air.

Mine No. 32 has been opened for three years. It has a 6x20-ft. fan, which was but recently started. The mine inspector's report of Sept. 26, 1912, states that this fan delivered 108,000 cu.ft., at 48 r.p.m., against a 0.6-in. water gage, which is equal to a 0.514-in. gage for 100,000 cu.ft. of air, or a 2.056-in. gage for 200,000 cu.ft. of air. It must be remembered that this mine is new and the airways are short.

Mine No. 84 has no large fan yet, but has four return and four inlet airways 7x10 ft.

Mine No. 43, which has been referred to before, at present shows a rising of the water gage. The mine inspector's report of Oct. 16, 1912, states that this 6x20-ft. fan is furnishing 171,424 cu.ft. of air, at 84 r.p.m., against a 3.2-in. water gage, which is equal to a 1.09-in. gage for 100,000 cu.ft. of air, or a 4.37-in. water gage for 200,000 cu.ft. of air. An air shaft is being sunk at a point 8500 ft. from the mouth of the mine to relieve this high water gage.

Installation at an Old Mine

At Mine No. 3, Frostburg, Md., the Consolidation Coal Co. had a 6x20-ft. fan installed, some three years ago. This is a very old mine, with large airways. The mine inspector's report of Oct. 13, 1912, states that the fan at this mine is delivering 120,000 cu.ft., at 68 r.p.m., against a 1.1-in. water gage, which would equal a 0.76-in. water gage for 100,000 cu.ft. of air, or a 3.04-in. water gage for 200,000 cu.ft. of air.

There are some things concerning this fan to which I wish to call attention. The blades were set in backwards, by error of the builders. The mistake was not discovered until after the fan had been completed and running for some time. When the maker of the fan came to test it, he found that they had made this error and the fan was running the wrong way. It was left to me to say whether the maker should take down the fan and rebuild it correctly or not. I had not seen the fan since its erection, and in making an examination found that a part of the housing surrounding the fanwheel would have to be taken down. This wall consisted of brick and concrete, no steel being used. I decided that, inasmuch as the fan was doing good work, I would let "well enough" alone. That was three years ago, and I believe that this is one of the best fans the company owns.

From the foregoing presentations and arguments, it will be seen that all fans will deliver air against a low water gage. Some fans have a larger volumetric efficiency than others, which is a good thing, as such fans can be run at a slower speed and make the same water gage.

Economical Policy in New Coal Fields

The Consolidation Coal Company has adopted a different method for the ventilation of its new coal field in the Elkhorn Division, Kentucky. The mines are all projected on the map of the coal field, showing the mines about as they will be, and giving the amount of coal they expect each mine to produce and the amount of air they expect to put into each mine. Then the proper number of airways are projected on the map, together with all overcasts, so as to handle this amount of air with a given water gage. The large mines from which it is intended to produce not less than 2000 tons of coal per day, are expected to require about 200,000 cu.ft. of air per minute when the mine becomes fully developed.

In these large mines, we have four return airways and four intakes, each of which will average 6½ ft. high by 10 ft. wide, making an area of 65 sq.ft. each. From the fan to the first split is generally about 1200 ft., and here two double-face headings are turned off—two to the right at about 1200 ft. and two to the left at about 1320 ft.—so the switches will not interfere, as the face headings are turned with a 112-ft. radius curve. Each of these two face headings will have about four room headings, making eight room headings for each 25,000 cu.ft. of air. The four room headings will be ventilated with one split of air, say about 12,500 cu.ft. to each four room headings, which will be about 1000 ft. long. Face headings will be turned every 2100 ft., center to center, and room headings are then to be turned both ways from the face heading.

The water gage that will be required in passing 200,000 cu.ft. of air to the first, second, third and fourth splits, there being four return airways and four intake airways, is estimated as follows: The distance to the first split of air is, say 1260 ft., an average between the two face headings where 50,000 cu.ft. of air goes to the four face headings. Using Fairley's coefficient of friction ($k = 0.00000001$), the water gage for 200,000 cu.ft. of air up to this first split will be

$$w.g. = \frac{0.00000001 \times 1260 \times 2(6.5+10) \times 200{,}000^2}{5.2\ (6.5 \times 10)^3} = 0.72\ in.$$

To the second split is a distance of 2100 ft., the air volume being 150,000 cu.ft., the water gage for this section is found in the same manner, and is 0.68 in. Likewise, to pass 100,00 cu.ft. of air to the third split, a distance of 2100 ft. again, will require a water gage of 0.30 in., and finally, to pass the remaining 50,000 cu.ft. the same distance to the last face headings will require a gage of 0.075 in. The sum of these four gages must then be doubled to provide for the return, in each case, which gives for the total water gage absorbed in the main headings $1.775 \times 2 = 3.55$ in.

It is well to estimate on a loss of at least 10 per cent. of the air, which means a loss in water gage of 19 per cent., which taken from 3.55 in. leaves only 2.87 in. water gage for 200,000 cu.ft. of air on the whole mine, to this point. The splits in the face headings show a water gage of only 0.075 in. for 2100 ft. with 12,500 cu.ft. of air.

All regulators on face headings should be placed near the main airway and must not be set beyond the first room heading, under any consideration. In reference to the percentage of water gage spoken of as being lost (19 per cent.), I have found in practice this loss reaches as high as 25 per cent., so that it is safe to call it 19 per cent., as 10 per cent. loss in air means 19 per cent. loss in gage. This is not all due to loss of air by leakage, but from air passing crosscuts and other wide places, which reduce the velocity.

At some of the mines there are three intakes and four returns, and it is about 1000 ft. to the first split. To pass 200,000 cu.ft. of air through three airways 6½x10

ft. for 1000 ft. will require 1.027 in. water gage. There are four return airways and the water gage on them will only be 0.57 in. for 1000 ft. long, making a total gage of 1.59 in., in and out.

The 2.87-in. water gage passing 200,000 cu.ft. of air will require just 90.4 hp. on the air, or a total of, say 150 hp. for the fan engine.

The mine fans in the Elkhorn field will be operated by a 150-hp. a.-c. motor, which should not have as much friction as a steam engine when working below capacity, for the reason that the motor will run at regular speed at all times; and, by having different sized pulleys for the motor, any speed needed for the mine fan can be obtained. Even should it have the same friction in fan wheel and motor, the 150-hp. motor will be large enough, until the water gage becomes higher, when a larger motor can be installed. The fan wheel will be 5x14 ft. and should give 200,000 cu.ft. of air at about 145 or 160 r.p.m. with this water gage, and the volumetric efficiency should be, at least, 180 per cent.

A boiler plant will be erected at each of the mines near the fan, for the purpose of adding steam to the air current when needed to humidify the mine air so that it will not be necessary to do any watering to dampen the coal dust in the mine.

I recall a mine at which had been installed a fan 7 ft. wide and 13½ ft. in diameter. This fan was delivering 116,000 cu.ft. of air at 112 r.p.m. and showed a water gage of 1.3 in. The fan was driven by a 125-hp. motor. It was stated that this fan was guaranteed to deliver 300,000 cu.ft. of air per minute, against a 6-in. water gage, at 300 r.p.m. At that time, the mine was new and the airways were not very long. Let us see what would have been the result if 300,000 cu.ft. of air had been desired while the airways were still short. The water gage will increase as the square of the velocity and the horsepower as the cube of the quantity of the air. For sake of illustration, I give below the water gage and horsepower for each 25,000 cu.ft. of air, increasing from 100,000 to 300,000 cu.ft. I use 100,000 cu.ft. as a base of beginning for simplicity. The fan delivers 116,000 cu.ft. of air, against a 1.3-in. water gage, which is equal to a 0.966-in. gage for 100,000 cu.ft. of air. Using the Fairley coefficient, as before ($k = 0.00000001$), we find as follows:

Cu.Ft. of Air	Total Hp.	In. of W.G.
100,000	21.5	0.966
125,000	42	1.5
150,000	72	2.17
175,000	114	2.95
200,000	171	3.86
225,000	224	4.89
250,000	336	6.04
275,000	446	7.30
300,000	575	8.69

Allowance has been made for 71 per cent. of mechanical efficiency in the calculation of horsepower.

Cross-Country Boiler Moving

By H. F. Pfening, Jr.*

In the month of April, 1914, the North East Coal Co., of Paintsville, Ky., purchased a new 150-kw., direct-current plant to be installed on Johns Creek, about 3½ miles from any railroad. Then came the problem of moving the boilers from the cars to the foundations. These boilers were 6 ft. in diameter, 18 ft. long and weighed 19,870 lb., or practically 10 tons each.



Rolling One of the Boilers into the Water and Towing It across the River



Hauling a Boiler from River to Power Plant

The first obstacle encountered was crossing and moving down the Big Sandy River for a quarter of a mile. This was accomplished by floating as may be seen in the illus-

*North East Coal Co., Paintsville, Ky.

tration. All the holes were plugged and when put into the river each boiler floated 16¼ in. out of water.

Each drum was towed to the mouth of John's Creek, by a motor boat, where it was then taken out of the water and up the bank a distance of about 100 ft. Here it was loaded onto a large wagon, which had 4-in. iron axles, 14-in. hubs and 5-in. tires.

It required 10 yoke of oxen or 20 cattle in all to convey this wagon and boiler to the power-house site, and even then blocks and lines were used in many places.

It required about 11 days to move these two boilers from the railroad cars at Auxier, Ky., to the No. 8 mine of the North East Coal Co., and cost about $500. This expense might have been reduced had there been a good road to travel over. As it was, however, a large portion of this amount was required to grade a road sufficient to carry such a load.

Extracts from a Superintendent's Diary

One of the most trying duties that falls to my lot is the constant necessity of convincing the wives of my salaried employees that they are receiving all of the consideration guaranteed by their husband's position with the company. These wives rank about as follows, taking the salaries of their husbands as the criterion: company physician, mining engineer, commissary manager, mine foreman, master mechanic, electrician, chief clerk, etc.

Between the wives of this group of salaried men and the wives of the ordinary miners there is little fellowship, and for that reason little chance for misunderstandings, but between the wives of the different salaried men there is much intimacy and a corresponding (or to be exact, a more than corresponding) amount of jealousy and envy.

If the master mechanic finds a way to improve his bathing facilities the mining engineer's wife begins to grumble. If the electrician improvises an improvement in his house-lighting arrangement, the wife of the company physician comes to see me next day. If the mine foreman selects a car of coal for his own use that happens to contain more than the average amount of lump coal, the commissary manager's wife gets in her work on the company teamster, and so it goes.

Of course, any man with half a sense of humor could enjoy these petty manifestations of sisterly love if he were privileged to observe them as a rank outsider, but I am far from enjoying such disinterestedness. I have learned through bitter experience that whenever the wife of one of my employees becomes dissatisfied with her surroundings the husband will soon be requesting his time slip.

Just now I am trying to convince Mrs. Mining Engineer that Mrs. Company Physician was granted a telephone in her house because some of our employees who live at a distance demanded it.

For once I feel confident of victory; however, if Mrs. Commissary Manager had protested first the jig would have been up because she would have been ably seconded by the wives of all of the miners living on the outskirts who read with envy of the growing possibilities of trading by telephone, as related by our near-by city dailies.

We have established a sort of voluntarily accepted "Common law," the ladies and myself, which allows me to turn down all applicants for each particular favor after one applicant has been vanquished. They seem to realize that were I compelled to give each one of them a hearing on every claim that might arise, I wouldn't have time left for looking after their husbands. Despite their willingness to quarrel with me at every opportunity, they seem to prefer a continuation of my power rather than risk a successor in my position.

Speaking frankly, my sympathies are largely with these ladies. They have no permanent homes, and the joy of fixing things about the place that they may enjoy them in future years can never be more than a longing for them. And overlooking altogether my sympathies in the matter, I realize that every improvement for their homes which they succeed in securing, in spite of my well meant opposition, becomes another anchor tending to hold their family in its place in our community, counteracting occasional tempting offers from rival camps.

Compressed-Air Locomotives at the Marihaye Coal Mines, Belgium*

At the coal mines of Marihaye it was decided to operate the subterranean haulage by means of compressed-air locomotives, and by the end of 1913 these had been installed at the Vieille-Marihaye pits.

The central air-compressing plant was erected above ground. In consists of two compressors of five stages each, belt driven by a 100-hp. electric motor. The number of revolutions is 190, and 10,500 cu.ft. of air are compressed per hour to about 3000 lb. pressure.

The air is cooled between each compressor stage, going through a separator to get rid of the oil and moisture. After leaving the compressor, it is cleaned and led into an air tank with four compartments of 16 cu.ft. each, from which pipes lead to the points where it is proposed to charge the locomotives.

The installation comprises about 13,000 ft. of 1⅛-in. (inside diameter) pipe of drawn steel, galvanized inside and out and provided with the usual high-pressure fittings. Each compressor can feed three locomotives in active service.

The locomotives carry a compressed-air tank composed of four flasks of drawn steel, about 13½ in. in diameter (inside) and 10 ft. long, arranged on the upper part of the chassis. The engine is of the triple-expansion type.

The locomotive carries two electric lights, one in front and one at the rear. Each machine can haul a train of 35 empty cars on a ½ per cent. grade at a speed of 100 ft. per minute, and return with the wagons loaded to the shaft, making the trip of 5000 ft. each way with a single charge of air. Each locomotive is about 12 ft. long, 31 in. wide, 55 in. high over all, and weighs about 10,000 lb.

One of the two compressors will take care of the haulage of 796 tons for one kilometer (3280 ft.) in eight hours with one locomotive. At present, one locomotive is at work on each of the two levels, having replaced six horses. It takes about half a minute to charge the air tanks. The use of these locomotives will soon be extended to the other pits of the company.

*Translated by Henry B. Binsse from a report by the Director in Chief of Mines at Liege, M. V. Leckat.

The Battle of Ludlow

By L. C. Paddock*

SYNOPSIS—A complete account of the action at Ludlow showing the battle was really an attack on the militia and not a defense of the tenters against military violence. The strikers killed one girl in bed; the women and children destroyed in the death pit were probably smothered before the tents were burned.

The fighting at Ludlow lasted from early Monday morning, Apr. 20, until late Friday evening, Apr. 24, at which time General Chase arrived with reinforcements and a truce was declared. On Monday morning, a few minutes after 8 o'clock, a letter was presented at headquarters at Ludlow by a woman of foreign nationality, asking that her husband be gotten out of the tent colony. Many times previous to this various people had been taken out of the tent colony by troops stationed at or near Ludlow.

The Corporal, Patten, in charge of the train detail was sent to the Ludlow tent colony to get this man and was told that there was no such captive there. Returning he informed Major Hamrock of this, who then called Louie Tikas, the Greek, by phone asking him to come over to camp, which Louie refused to do.

THE MILITIA GATHERS

As the people in the tent colony were gathered around in small groups in rather a suspicious manner, Lieutenant Lawrence, who was in command of the detachment stationed at Cedar Hill one and one-half miles southwest of Ludlow, was notified by telephone to come down a little earlier than usual for drill. Louie, the Greek, called up Major Hamrock stating that he would meet him at the depot, Major Hamrock accepting and going to that rendezvous.

Lieutenant Lawrence was again called on the phone by Hamrock who ordered him to bring the machine gun. Lieutenant Lawrence then left Cedar Hill in command of the advanced guard which consisted of ten men. Upon arriving near Ludlow he left these men on Water Tank Hill while he rode on to Ludlow depot to report to Major Hamrock.

Lieutenant Lawrence called Major Hamrock's attention to the fact that groups of the strikers were armed with rifles and carried ammunition and were running back and forth, some of them having started for the cut on the Colorado & Southeastern, which is east of Ludlow. The main body of national guardsmen arrived from Cedar Hill under the command of Lieutenants K. E. Linderfelt and M. C. Bigelow and consisted of fifteen men.

THE OPENING SHOTS FIRED BY COLONISTS

Louie Tikas left Major Hamrock, telling him that he would stop the strikers. Major Hamrock gave Lieutenant Lawrence orders to take up a position on Water Tank Hill and immediately upon returning to the hill from the depot Lieutenant Bigelow was sent with seven men to take up a position south of the Colorado & Southeastern R. R. cut, Lieutenant K. E. Linderfelt returning upon Water Tank Hill proper and Lieutenant Lawrence swinging over to the right of the Denver & Rio Grande tracks with five men.

The strikers, about three hundred in number, having gained the cover of the cut on the Colorado & Southeastern, opened fire on the detachments under Lieutenants Lawrence and Bigelow. Immediately afterwards another large group of strikers which had gone north and northwest from the tent colony toward the arroyo and the steel bridge, opened fire on the military camp at Ludlow which was southwest of the tent colony.

Before the firing started a large group of women and children, numbering about four hundred, left their homes running northwest to the arroyo. There were about thirty shots fired at the detachments of the National Guard south and southeast of the cut on the Colorado & Southeastern under Lieutenants Bigelow and Lawrence, before the order was given to commence firing. General Chase had been called on the long distance telephone by Lieutenant Benedict, Major Hamrock's adjutant, from the military headquarters at Ludlow, notifying the general that firing had started.



View of the Iron Bridge near the Ludlow Tent Colony and Three Views of Destruction Wrought by Strikers

*Editor the "Daily Camera," Boulder, Colo.

Note—This article appeared in the "Daily Camera" and we are indebted to the same paper for the photographs from which these illustrations are prepared.

Major Hamrock, after returning from the depot to the military camp at Ludlow, took up a position near cars south of this camp on the Colorado & Southeastern, from which point he could see very well the positions being taken by his own men.

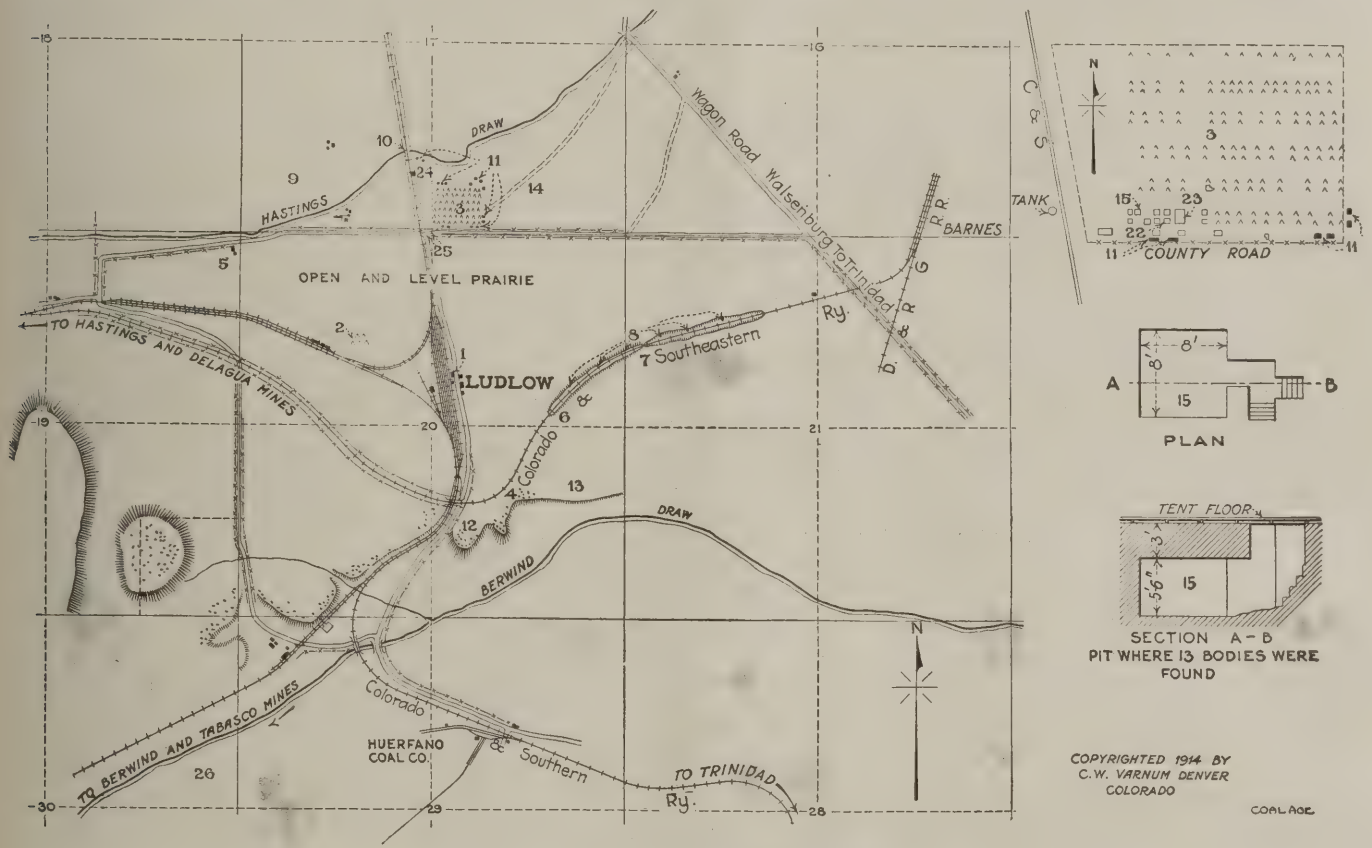
NO PROFESSIONAL MINE GUARDS

Soon after firing started, three bombs which had been provided to use in calling assistance, were set off and Lieutenant Benedict was sent by Hastings cañon to the west to take charge of the men who would come to the Guard's assistance from that point, belonging to Troop A. None of the 18 men who came out of Hastings cañon, members of Troop A, were employed as mine guards but were employes at the mine, one a doctor and several being mechanics and miners.

On the right of the line a member of Lieutenant Lawrence's command, Private Martin, received a wound in the neck. Lieutenant Lawrence was forced back from his position on the extreme right, being forced to withdraw without the body of the wounded Martin, whom he left in a small draw. As Lieutenant Lawrence had been forced back on the extreme right the strikers had been able to deliver a cross-fire on Lieutenant Bigelow, whose position was south of the Colorado & Southeastern cut, forcing Lieutenant Bigelow to retire from that point. Retiring, Lieutenant Bigelow swung around to the right, meeting Lieutenant Lawrence and received orders to take up a position upon a knoll which was less than 150 yd. west of another point occupied by the strikers and to do what he could to recover the wounded Martin, who lay in a draw between these two points. Lieutenant Lawrence retiring and taking up a position 600 yd. to the rear, covering the position held by Lieutenant Bigelow.

As Lieutenant Bigelow had but five men with him at this point and was greatly outnumbered by the strikers east of him and those along the Denver and Rio Grande tracks, he was forced to retire from his position on the small knoll after having had one of the members of his command, Private Purcell, wounded, Private Purcell being hit by a soft nosed bullet in the left arm a little over two inches below the shoulder, which coming in contact with a bone, part of it lodged in the chest, and part in his back.

After Lieutenant Lawrence had returned to Water Tank Hill, Lieutenant K. E. Linderfelt forced his way down to the Ludlow depot, taking up a position at that point, having three or four men with him and delivering a fire into the west end of the cut of the Colorado & Southeastern. Major Hamrock not being able to get General Chase on the long distance telephone from military headquarters, as the line had been cut, succeeded in getting General Chase shortly after one o'clock at the office of the Cedar Hill Coal & Coke Co. near Ramey. He was notified by General Chase that reinforcements would come out during the afternoon from Trinidad with more ammunition. Captain T. C. Linderfelt and Lieutenant R. J. Linderfelt, having arrived about noon, were left in command at the Ludlow station by Lieutenant K. E. Linderfelt who returned to Water Tank Hill, Lieutenant Bigelow being sent to work with Captain T. C. Linderfelt by orders of Major Hamrock.



PLAN OF THE BATTLEFIELD OF LUDLOW

The numbers of men given here at first seem grimly humorous as describing an "army" and as designating one party in a "battle." When we think, however, of the greater number of adversaries and realize how the size and power of the smaller force has been misrepresented, the recital of the men engaged appears pathetic rather than humorous. The figures on the map are as follows: (1) Ludlow Station. (2) Major Hamrock with the army center (four men). (3) Ludlow tent colony. (4) Water Tank Hill, Lieutenant Lawrence with 22 men and a machine gun until 3:30 p.m., when Captain Carson arrived with another machine gun and 46 men. (5) Lieutenant Benedict with left wing of eight men. (6) and (7) Machine guns after about 4 p.m. (8) About 250 or 300 Greeks, etc., 9 a.m. until about 4 p.m. (9) Private Phillips mortally wounded. (10) Steel bridge. (11) Strikers to the number of 250 to 400 in rifle pits, some of which were of the latest and best military types. (12) Captain Carson with machine gun and 46 men arrived here at 3:30 p.m. (13) Private Martin wounded about 10 a.m. Body recovered about 10 p.m. (14) John Lawson, strike leader, in automobile about 11 a.m. (15) So called "death pit," which is reproduced in plan and elevation in lower right-hand corner (22) Tent marked "Lawson's Headquarters." Over 19,000 rounds of ammunition in boxes were found here, and among them about 400 Ely's explosive elephant cartridges. (23) Union headquarters. (24) Tikas, Rubino and Tyler captured. (25) Same men killed. (26) Cedar Hill. (16) to (21) and (28) to (30) are section centers.

FIRE FROM TENT COLONY

Several times during the afternoon small details under the command of Captain T. C. Linderfelt, aided by Lieutenants R. J. Linderfelt and Bigelow, were able to push their way through to the north end of the string of box cars and freight cars standing in the yards west of the depot, but were unable to go any further because of the fire they received from the rifle pits on the south side of the tent colony, the tent colony and those northwest of the tent colony in the direction of the pump house and the steel bridge.

MUTILATION OF MARTIN

Captain Carson arrived from Trinidad with about thirty-six men with ammunition and a second machine gun, which was in use during the fight. Captain Carson detrained at Rameyville and immediately advanced to the aid of Lieutenant Lawrence on Water Tank Hill. After Captain Carson's arrival several attempts were made by Lieutenant Lawrence to recover Martin's body but with no success. Not until 9 p. m. was he able to reach it. He found Martin's body terribly mutilated. Not only had he received a wound passing through his neck but he had been shot directly from above as he lay on the ground. This shot passed through his mouth tearing out two teeth and blowing off the top of his head. Not only that but his face had been caved in by a blow with the butt end of a rifle, his nose being broken and blood oozing from both ears. He had also been shot twice through the body at the waist.

The strikers holding a position in the cut on the Colorado & Southeastern were forced out of this position in the direction of Barnes on the Denver & Rio Grande about 5 o'clock in the afternoon.

THE BATTLE SHIFTS TOWARD THE TENTED TOWN

About the same time orders were given to Captain T. C. Linderfelt and the officers with him at the Ludlow depot to aid in the taking of the steel bridge over the arroyo, northwest of the tent colony, as Lieutenant Benedict had been able to force his way from the west and occupied a position in a couple of ranch houses about 400 yd. west of the bridge.

Captain T. C. Linderfelt with Lieutenants Bigelow and R. J. Linderfelt with 10 men, taking advantage of the cover afforded by the Colorado & Rio Grande tracks, had been able to take up a position just south of the road going west to Hastings, about seventy to eighty yards southwest of the tent colony. About this time Captain Carson arrived with a support and took up a position on the right of Captain Linderfelt. During this time they received a hot fire from the strikers located in the pits in the southwest of the tent colony and those in the tent colony proper.

The two machine guns which had been placed, one on the east side of Water Tank Hill and the other at the cut on the Colorado & Southeastern which had been taken, were firing at the steel bridge and the rifle pits along the south bank of the arroyo. The troops, under Captains T. C. Linderfelt and Carson, returned the fire of the strikers located in the pits along the south bank of the tent colony.

THE TENTS CATCH FIRE

The volley fell among the tents. It was at this time that a tent in the southwest part of the colony took fire the blaze shooting up through the roof. At that time there



LUDLOW TENT COLONY AFTER CONFLAGRATION

were no troops east of the Colorado & Southern tracks. Several of the men were able to get across the Hastings road underneath the water tank. Throughout the night there were constant explosions of ammunition, giant powder and dynamite in the tent colony. The fire was also aided by a strong wind from the southwest.

After the sixth or seventh tent was afire, the cries of women and children were heard from the tent colony. This was the first intimation the troops had had during the day that there were any women and children left in the colony. A great number of women and children had been seen leaving the Village before the firing opened about 9 o'clock in the morning. The order was immediately given to cease firing and all ran into the tent colony to rescue women and children left there by the strikers.

THE AIR-TIGHT PITS

During the time that the rescue work was going on the troops engaged in this work were constantly under the fire from the strikers situated to the north of the tent colony and to the northwest toward the steel bridge. These rescuers made excellent targets in the glare of the fire. Various obstacles were encountered by the men and officers engaged in the rescue work in order to get the women and children out of the pits in which they had been placed. At one pit where Lieutenant Bigelow rescued a woman and children, two trunks and a carpet had to be removed and a trap door opened in order to get into the pit where the women and children were. Similar boards were found over the pits by others engaged in the same work. The troops about this time started running for the cover offered by the Colorado & Southern R. R. tracks, taking the women and children, because they were told that a large quantity of dynamite was in one of the tents which was at the time on fire. They had no sooner reached cover when this tent went skyward, spreading sparks all over the colony. Many of the soldiers again returned into the tent colony to go on with the work of rescuing the women and children.

THE WHITE FLAG

At this time a buggy drove out of the southeast corner of the colony, driving west on the Hastings road. The occupants of this buggy carried a white flag and upon crossing through the line one of the occupants turned around and opened fire on the troops. The fire was returned with the result that one of the occupants and the horse were shot. A Colorado & Southern freight train coming in from the north and slowing up to take water at the tank allowed the strikers in the pits north of the colony and those near the pump house to get away to the arroyo.

Lieutenant Benedict, who had held a position in the ranch houses west of the steel bridge during the afternoon, sent the men under him back to Hastings after the tent colony caught fire, as they did not have uniforms on and he did not want them to mix with the men in uniform. They took two men who had been wounded during the afternoon.

ONE MINE GUARD AND A STRIKER KILLED

One of these men, Phillips by name, died a week later in the Pueblo hospital from his wound received that afternoon. Captain Linderfelt, who returned to the water tank from the steel bridge, was sent back to hold the steel bridge by order of Major Hamrock.

Captain Linderfelt left Lieutenant Connor, who arrived with Captain Carson from Trinidad during the afternoon, with a couple of men at the pump house. At the steel bridge the body of a striker was found. This striker had been shot by a steel jacketed bullet making a clean wound through the head. The steel jacket bullet is a service ammunition used by the armed forces of the United States and the only kind authorized by modern warfare.

DEATH OF LOUIE TIKAS WHILE ATTEMPTING TO ESCAPE

Shortly after this Louie Tikas was captured by Lieutenant Connor at the pump house, and Filer and Rubino were made prisoners at the steel bridge by the detail under the command of Captain Linderfelt. The latter leaving Lieutenant Bigelow in command at the steel bridge went to the water tank himself. Lieutenant K. E. Linderfelt, after the capture of the three men, went to the Ludlow depot to notify Major Hamrock. After he left the men in charge of the prisoners they were fired on from the strikers on the east side of the tent colony, the men immediately taking to cover. The prisoners, taking advantage of this, tried to escape, with the result that they were shot.

Major Hamrock placed his outposts about midnight and later summoned the officers to a meeting at Cedar Hill to discuss the plans for the ensuing day, Lieutenants Bigelow and Connor being left in command at Ludlow during this meeting.

BOTH SIDES REINFORCED

Early in the afternoon, during the fight on the 20th, Major Hamrock received word of about 250 strikers coming from Aguilar, Rugby and Rouse to reinforce those at Ludlow. He notified the people at Delagua and Hastings to get out into the hills and to watch the trails from Aguilar.

A group of negroes working at Hastings, about twenty to twenty-five in number, led by a negro who had been a first sergeant in the 24th U. S. Infantry, had taken up a position in the hills two and one-half miles west of Ludlow. Hamrock also notified the people in Berwind cañon to get into the hills and look out for strikers who were coming from Segundo toward Tollerberg. At about midnight he received word of a large number of strikers, about 300 in number, coming from Trinidad.

The troops were reinforced early Tuesday morning by Company C, Second Infantry, from Lamar, and by a small detachment of troops from Walsenburg. These, with the reinforcements received during the afternoon of the 20th, brought the original number of 44 troops at Ludlow up to 168 and 19 officers. Major Hamrock received a call for aid

from Hastings, sending a small detachment there, the strikers retiring as soon as the detachment arrived.

STRIKERS SHOOT FOUR MEN AND ONE GIRL

The next day a similar call for help was received from Delagua and again as soon as the troops arrived the strikers retired back over the hills in the direction of Aguilar, after having killed four men and shot a 14-yr-old girl while still in bed at Delagua, and shooting all the livestock and various domestic animals at the ranches in the neighborhood. These same strikers later burned up the cañons around Aguilar.

THE DEATH PIT

Tuesday morning, the 21st, a pit was discovered under what had been one of the tents in the colony and containing the bodies of 2 women and 11 children. Lieutenant Benedict and Dr. Lamme of the medical corps immediately went to investigate, finding that none of the bodies showed any evidence whatever of bullet wounds and that the victims had been suffocated and had been dead some time prior to the time the fire started in the colony.

A number of eminent physicians, after having seen the pit where these 2 women and 11 children were found, stated that 13 people could not live more than two hours in that pit without being asphyxiated. It was 7x8x5 ft.

DUMDUM AND EXPLOSIVE BULLETS

During the time of the rescue work in the tent colony a large quantity of ammunition was taken from the tents, some 19,000 rounds being taken from one marked "HEADQUARTERS JOHN R. LAWSON." There were 11 cases containing 1,000 rounds each from which the seals had not even been broken and 500 rounds of 45.70 dumdums. There were 200 rounds of Ely Express, calibre 45.100, a soft nose bullet containing an explosive cap in the end. Upon coming in contact with a human body the head would immediately explode and spread the lead.

All the ammunition taken from the tent colony was soft-nose ammunition. Bullets of this character are not used by the forces of any civilized country at the present time. The troops at Ludlow were surrounded by about 1200 strikers when General Chase arrived on Friday afternoon, April 24.

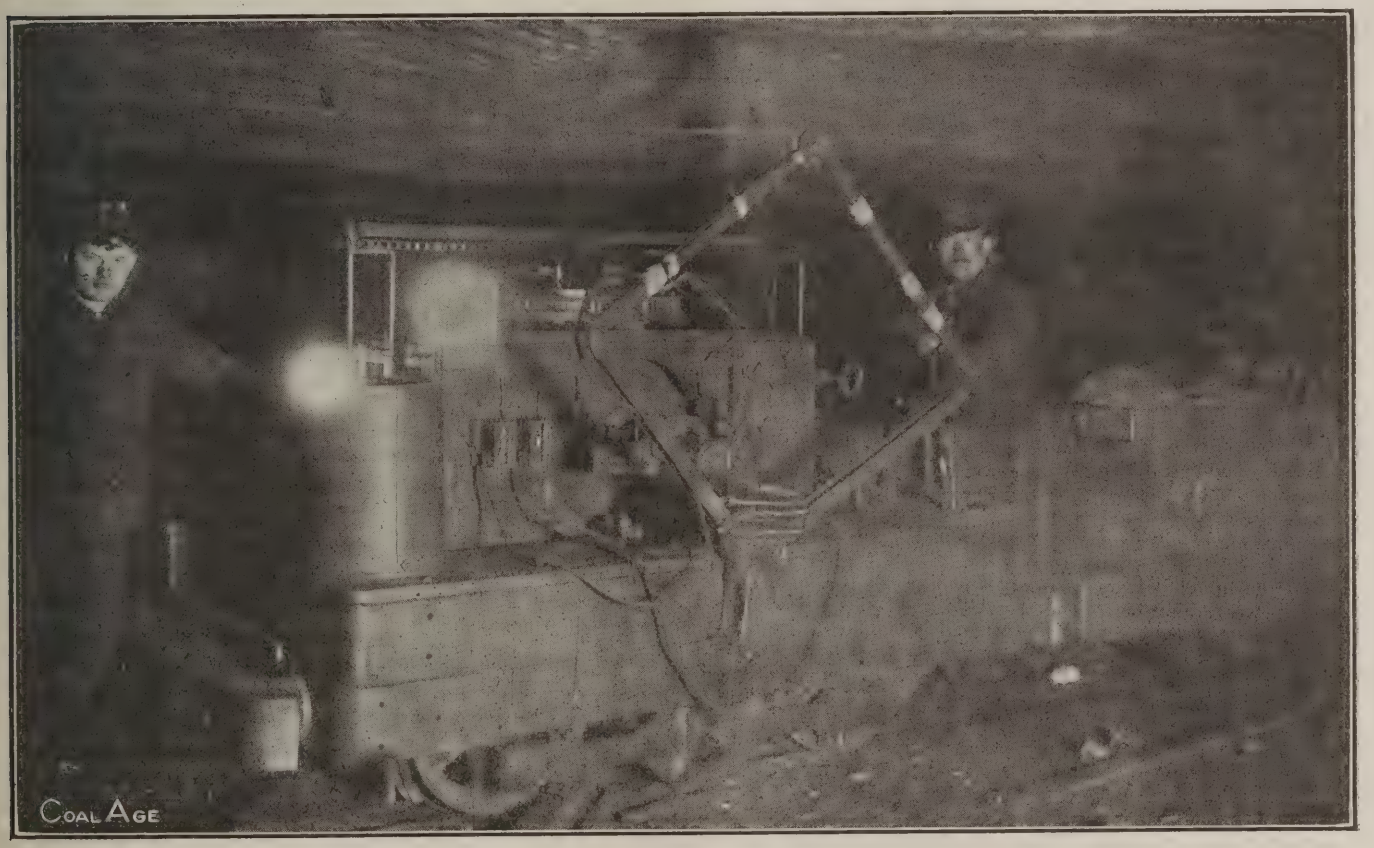
The number of substances which are used for electric conductors in commercial work is limited to three of the metals, namely, copper, iron and aluminum. Of these, the first is preëminently the best, while aluminum and iron come next in order.

An Historical Mining Locomotive

By H. C. Spaulding*

SYNOPSIS—The second electrical mining locomotive installed in the anthracite region was of Thomson-Houston manufacture, and has been in operation since 1889 and is still running.

Through the courtesy of The Society for Electrical Development, we publish herewith an illustration showing a mining locomotive which is not only interesting from an historical standpoint, but unique in its record for long and continuous service. This machine was installed at the Hillside Colliery, in 1889, and is still in satisfactory service. It was the second to be put in operation in hard-coal mining, the first having been built a year or two before for the Lykens Valley Coal Co., of Lykens Valley, Penn., by the Union Electric Co., of which W. S. Schlesinger was chief engineer.



The Second Electric Locomotive to Be Installed in the Anthracite Region

The locomotive shown in the illustration was the first to be built by the Thomson-Houston Electric Co., at Lynn, Mass., and was designed largely by C. J. Van Depoele, who was at that time actively engaged in the development of various types of mining machinery, including coal-cutting machines, reciprocating drills, pumping apparatus, etc. The adoption of electric haulage in place of mules was due to the farsightedness and enterprise of Capt. W. A. May, then superintendent of the Hillside Colliery, and now general manager of the Pennsylvania Coal Co.'s properties.

This machine was rated at 40 hp., had a 3-ft. gage, and

*Society for Electrical Development, 29 W. 39th St., New York.

was 9 ft. 7 in. long and 5 ft. 3 in. wide over all, with a height of 5 ft. 6 in. above the rails. As originally built, it weighed 10,500 lb., but 18,000 lb. of pig iron was added later as a dead-load to increase capacity for drawbar pull.

The above-ground installation consisted of a 60-hp. Armington-Sims engine belted to a 2-pole "50-hp." Thomson-Houston generator of the type made familiar by the Siemens & Halske Co. in Germany. Connection from the switchboard to trolley wires was made by No. 0 "Clark" wires inclosed in gas pipes, as a safeguard against mechanical injury. This fact is noticeable in view of the practice generally adopted later for pipe-inclosed wiring.

In the Lykens Valley installation worn out rails were used for the trolley contact, being joined end to end by copper bonds, but in the Hillside Colliery the trolley was a continuous No. 0 hard-drawn copper wire supported by insulators which later became generally known as the mining or "barn" type, fastened to the roof of the gallery by expansion bolts.

The electrified part of the track ran for about ½ mile in either direction from the foot of the shaft. It is interesting to note that previous to the electrical installation the galleries were dripping wet all the time owing to the condensed "steam" from the mules, and that after these animals were replaced by the electric locomotive this feature entirely disappeared.

In the construction of the locomotive itself, a single double-pole motor was used, the power being transmitted from pinions on the armature shaft through idlers to the driving shaft, which by the ordinary block and slot construction actuated the rods on either side connecting the two pairs of wheels. The crankpins were placed at 90 deg. from each other to avoid dead points. This construction allowed sufficient flexibility for inequalities of the track and movement of the motor with reference to the wheels.

As will be noticed from the illustration, the trolley was of the "lazy tongs" type, upward pressure against the wire being secured by the tension of spiral springs tending to "close up" the lower members.

It is interesting to note that the first electrically operated pump to be installed in the hard-coal country had been put in operation in the near vicinity only a short time before, and that this pioneer locomotive was followed not long afterward by one of 60 hp. of the "turtleback" type, since generally adopted for this class of work.

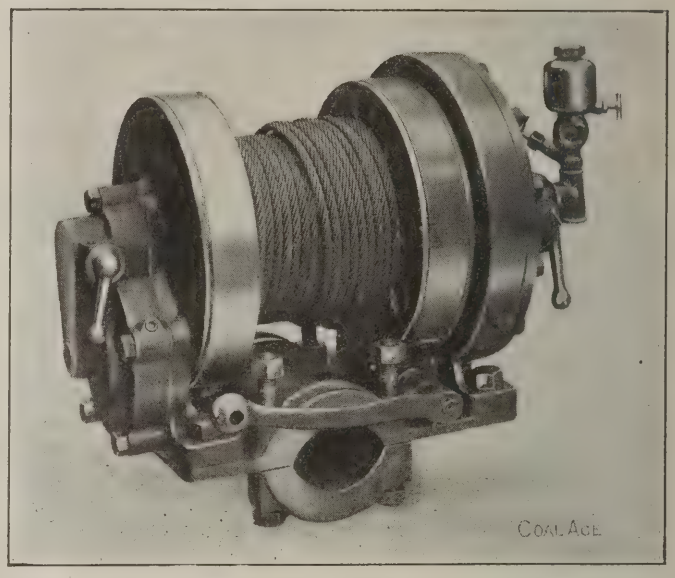
The "Little Tugger" Hoist

A new type of hoist has recently been placed upon the market by the Ingersoll-Rand Co., 11 Broadway, New York City. It is intended for light lifting, having a capacity up to one-half ton and, due to its small weight, which is under 300 lb. complete, it is particularly suitable for use as a portable hoist for mines, in contract work, for manufacturing plants, power houses and in railroad shops and ship yards.

Miners are using it in winzes, stopes and raises, for raising and lowering drilling machines, mountings, drill steel, timbers and miscellaneous material, for hauling cars in drifts and tunnels and for hoisting and lowering buckets in shallow shafts, and for other similar purposes.

The main base of the hoist is arranged so that it can be bolted to a timber or by means of a cap which comes with the hoist it can be clamped to a circular member, such as a mine column or arm, shaft bar or pipe. The dimensions of the hoist are 21¼x16½ in., and the height is 20⅛ in. The drum is 6 in. in diameter with a space of 7 in. between flanges. This will accommodate a length of 700 ft. of ¼-in. rope or 450 ft. of $\frac{5}{16}$-in. rope. The capacity is 1000 lb. with a rope speed of 85 ft. per min. at an air pressure of 80 lb. The machine operates with either compressed air or steam.

The motor or engine is of the reversible square-piston type, giving four impulses per revolution. There are no



Rear View of the Hoist, Showing the Three Control Levers

dead-centers and the machine will start in any position. The drum is mounted independent of the engine shaft and is operated through the medium of a clutch and gears. Safety is provided for by a powerful worm-operated band brake lined with "Raybestos."

The speed of hoisting is entirely at the will of the operator. When he releases the throttle, it returns automatically to central position, shutting off the power and stopping the hoist. Oftentimes the hoist will be used for haulage purposes and the release feature enables one man to handle this class of work. He can leave the control lever and carry the rope to the car.

There are no moving parts exposed, except the drum, all gears and shafts being covered. This is an especially desirable feature for underground operation where the light is none too good and where there is constant danger of workmen's clothes or bodies getting caught in the machinery.

So far as the practical electrical worker or engineer is concerned, electricity may be considered as one of the various forms of energy. Being such, it is never created, but is always produced at the expense of an equal or greater amount of energy in some other form. Electricity serves no useful purpose as such. It must be converted into some useful form of energy, such as mechanical, chemical or thermal, before it can be utilized. Electrical energy must always be used when it is produced, and produced when needed, for it cannot be stored. Because of the ease in transforming it into other useful forms of energy and transmitting it over great distances, electricity is being used more and more for commercial purposes. The ultimate nature of electricity is unknown. Recent discoveries would indicate that matter itself is composed of ultimate particles or charges of electricity.

Economy of Varying the Speed of Mine-Ventilating Fans

By a West Virginia Coal Mining Engineer

SYNOPSIS—In many mines it is found practicable to operate the ventilating equipment at one speed during working hours and at another during the night or on idle days. The two-speed induction motor is admirably adapted to such conditions.

The art of ventilating coal mines mechanically, dates back to the early days of the steam engine; the practice of economical ventilation is of comparatively recent birth.

Economy is becoming a much used word. It behooves us to know what it means according to the dictionary and to apply the principle to each of the different branches of our business if we are to keep up with the march of progress.

In mining coal, the cost of maintaining ventilation in accordance with the mine laws of the different states is one of the heaviest expenses encountered after operations have extended over a period of six or seven years. As time advances and the mine grows larger these expenses increase. If ventilating charges represent a large proportion of the total cost of work underground, any economies successfully brought to bear will have an effect in reducing the cost of production.

In considering a ventilating proposition, we have many factors to cover. Few words are required to describe this operation in an ordinary mine. The air is pulled through the galleries or tunnels of the underground workings by a centrifugal, or other fan, placed outside near the source of some certain power supply. It is very simple to describe. To do the work with a reasonable economy in power is not so simple.

It is desirable to comply with the mining regulations as far as possible, and deliver all the fresh ingoing air to the face of the actual working places. These points, from the nature of things, are furthest inside the mine and the most distant from the ventilating fan. Dozens of stoppings, overcasts, doors, etc., may be required to control the air current and carry it to where it is needed. If these stoppings could be built completely air-tight, an efficient ventilating layout would result. We are only poor weak mortals after all, and our efforts to build perfect structures in the darkness of a coal mine—or anywhere else—are not always crowned with success.

The longer a tunnel or airway is, the greater the number of stoppings there may be connected with it; and the greater may be the air lost through leakage. Again, if the pressure on one side of a stopping is decidedly greater than it is on the other, a proportionately greater amount of leakage will occur.

These losses are cumulative, and there are conditions where all the air is lost through stoppings, etc., before it reaches the face of the workings where it is needed. To repair the structure or stoppings in such a case requires time and labor and material. How much can be economically spent?

Airways of too little area require current at a high velocity in order to pass the volume required for thorough ventilation. By clearing out obstructions, and widening or multiplying the airways, the velocity is reduced and power saved. How much can be economically spent for such a purpose?

Conditions Change Rapidly

These questions are capable of solution only for short periods. Conditions change from week to week. As the workings extend underground, the amount of air required is increased, the resistance runs up, the number of stoppings multiply, the current of air may be lengthened or shortened. All of these things take place, resulting in a change in the amount of work required of the fan. If, by making repairs, extensions and changes, costing, for example, $100, the fan is relieved of 10 per cent. of its work, we have something to show on both sides of the account, and can decide whether or not the money has been well spent, if we know the amount of power saved and its cost per unit.

There are few cases where the cost of power per horsepower-hour is known in installations where a steam engine is used for driving the fan. The practice usually is to operate at a certain number of revolutions per minute, this speed being maintained by opening and closing the throttle valve. This critical speed is governed by the needs of the mine. If there is "bad air" on "Third Right," the foreman may "speed 'er up" a few revolutions. Or, again, the drivers are "not able to keep a light," in another part of the mine. In this case the fan may be "slowed down a little."

Under such conditions, and they exist more generally than one would imagine, the cost of power used cannot always be figured accurately. In many instances it is not known at all. The mine, however, may be amply ventilated at some one of the different speeds at which the fan is run. This particular speed, whatever it is, is the proper one at which the fan should be driven during the time when the underground operations are in full activity.

Where a mine is equipped with a fan of ample capacity, and has airways as well as underground structures in fair condition, a certain number of revolutions of the fan will furnish a sufficient amount of air to comply with the mining law and to fully ventilate the mine when it is producing its maximum tonnage. Such ventilation will require the maximum horsepower applied to the shaft of the fan.

During the hours when the mine is not producing coal, say at night, on Sundays and on holidays, only a fraction of this ventilation is needed. In mines where no inflammable gas is found, tests have shown that at night and on idle days, about half the full ventilating current is sufficient for all needs and all the demands for safety.

Under conditions such as we have outlined, a steam-driven fan can be slowed down to, say, half the speed used in the daytime, and the volume of air will be reduced in almost the same proportion. The steam, however, will vary in pressure, and this, too, will further vary the speed of the fan as well as the volume of air passing.

An engine running under such conditions is extremely inefficient, for the reason that the horsepower delivered to the shaft of the fan at half speed is practically one-fifth that delivered at the full speed, according to numerous recent tests. Where electric power is available, we should be safe in recommending its use for a drive, if for no other reason than to obtain a contant speed of rotation.

High Night Fan Speed Is Useless

In nongaseous mines, or others, where at night, etc., there is required only half the ventilation that is used in the daytime, it is needless expense to use more. Those officials who are responsible for the safety of life and property, after due and careful consideration of all the conditions, should be able to decide as to what amount of air may be used at night, etc.

Having properly decided that full speed and half speeds are safe for the operation of a particular mine fan, any other speed is not only unnecessary but wasteful in power. In other words, if half speed will fully meet the requirements in the way of ventilation, it is unnecessary to go to the expense of furnishing other ratios.

If a speed-regulating device were supplied as in the case of a steam engine, for example, the control of the power consumption, and therefore to a certain degree the cost of ventilation, would be in the hands of a comparatively irresponsible attendant who cannot be depended on to do one thing the same way every time. A motor capable of running at full speed, whatever that may be, and at half speed, fills the requirements of fan drive fully.

Once it is installed it assumes all responsibility as to the speed of the ventilating apparatus. It operates at either one or the other of its two possible speeds, and the fan, as a result, is either handling its full prescribed capacity or approximately half of it.

Occasions arise which demand that the maximum rotation of the fan be changed, either increased or decreased. Such changes can be well and cheaply made by substituting a different diameter of pulley on the motor shaft, when a belted installation is being considered.

The power saved by making the high-speed rotation exactly what is needed to fully ventilate the mine, and no more, when underground conditions are reasonably good, soon amounts to enough to pay for an extra or different driving pulley, or even several of them.

A Bibliography on the Export Trade

By F. R. Wadleigh*

SYNOPSIS—Although a few American companies have conducted exhaustive investigations into the export trade, the general knowledge on the subject is limited. Recent urgent requests for information along this line have made it seem advisable to publish a bibliography of the available data. As pointed out by the author, it would be difficult for one man to compile a list that would cover the subject in all its ramifications, and readers are invited to contribute additional or supplemental notes.

Interest in the exportation of coal is quite pronounced at this time, as is shown by the numerous inquiries regarding possible markets, competitive coals and prices, credits, freight rates and ship tonnage.

The subject is such a large one, comprising, as it does, every phase of coal handling from mining and geology to the actual burning of the coal, together with economic and political questions of the greatest importance, that a book of good size could readily be written on it. I have seen one private report, covering export possibilities to but one set of markets, that comprised 392 pages of typewritten matter. New conditions that have arisen as a result of the war now going on make the export question a matter of present and vital importance, and a knowledge of its ramifications and conditions absolutely necessary to those interested. To assist in obtaining such knowledge, I have made up a list of books, articles and public reports that have a bearing on the subject; in short, a bibliography of the coal export trade, incomplete probably, but none the less of some value. I would suggest that the readers of the Coal Age add to this list by advising the editors of any articles that may have been omitted.

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Foreign Journals

As England leads the world by a wide margin in the export of coal, it is natural that most of the data on the subject should be found in English publications. The two leading English coal papers, the *Colliery Guardian* and the *Iron and Coal Trades Review*, publish each week, letters from all of the English shipping ports, giving prices, foreign contracts and inquiries; they also give numerous items regarding coals and the coal trade in foreign countries.

The *Liverpool Journal of Commerce* (daily), probably the leading shipping paper of the world, devotes two whole pages of its Friday issue each week to coal and the foreign trade.

The *Cardiff Journal of Commerce*, controlled by Mr. D. A. Thomas, one of the world's greatest authorities on coal export, also devotes considerable space to the subject.

La Revue Noire, published at Lille, France, the leading French coal paper, also has regular reports from the various foreign coal markets, statistics, etc.

Neither the British nor our own government has published anything on the subject, with the exception of consular reports. The United States Government has, it is true, published two reports on the world's coal trade, but these are made up from consular reports, many of which are inaccurate and do not give the information desired and needed. I recently suggested to our government officials the advisability and value of getting together and printing a full and accurate report on the coal trade of South America, made from the standpoint of the coal sellers in this country, and giving the information they would like to have; this suggestion has not met with much favor, although it was admitted that such a publication would be useful and timely.

BIBLIOGRAPHY OF BOOKS

The Coal Question; W. S. Jevons; London; 1st Edition, 1865; 3d Edition, revised, 1906.

An inquiry concerning the progress of the nation and the probable exhaustion of the coal supplies. It is the standard book on the subject, dealing with it from an economic standpoint, entirely on the British side. Geology, costs, prices, economics, consumption, exports and imports, changes and progress of the coal industry and coal resources of various countries are among the topics dealt with. It is a most interesting book to anyone in the coal trade, with copious and valuable references.

The Coal Fields of Great Britain; Edward Hull; London; 5th Edition, 1905.

As its title implies, this work is devoted to the coal fields of Great Britain, their geology and extent. It also has valuable data on the world's coal fields, with some analyses, chapters on coal exports and duration of the coal supply.

Analyses of British Coals and Coke; Allan Greenwell; London; 3d Edition, 1909.

This is a compilation by the editor of the *Colliery Guardian,* giving analyses of British coals and coke, with map, description of the different coal beds, names of collieries and trade names of coals. It contains the only collection of analyses from all the British fields, but too much reliance must not be placed on these, as some are too old to be of value (1860), and the majority are of mine samples, probably selected. For instance, analysis of Cambrian Navigation (Admiralty) coal shows 0.62 per cent. ash, while a sample from an actual shipment of the coal from another source showed 3.46 per cent.

In comparing them with analyses and calorimeter tests of our coals, it should be remembered that in a majority of cases the results are stated in different terms from ours. Most of the tests were made with the Thompson calorimeter, which may give 300 to 500 B.t.u. lower results than would the bomb calirometer.

The introduction of this book contains valuable information on purchase, storage, calorific values and the meaning of coal analysis, the last named being especially good.

Hints to Coal Buyers; Charles E. Evans; Cardiff, 1909.

This contains maps and descriptions of the South Wales coals, coal docks, preparation, analysis, briquettes, notes on sales, including charter parties, and much other information on Welsh coals. Also, a supplement to the plotted vertical section of the Northumberland and Durham coal field. (John Kirsopp, Jr.)

New Castle, 1908.

Description and analysis of coals from this field, including names of collieries and seams, together with characteristics of the various coals. This is the only work of the kind on this field. There are several hundred analyses, collected from various sources, the authority being always given.

1905 Royal Commission on Coal Supplies; in three volumes; London, 1905.

A digest of the evidence, reprinted by the *Colliery Guardian* and revised by witnesses. This is a compendium of information on the British coal trade; it includes mining, selling, buying, use and exports. Some interesting statements are made on the competition of United States coals. It also contains quite a complete bibliography on coal mining, both foreign and English. Volume 3 consists entirely of evidence regarding the export trade. Volume 2 has a bibliography of works in coke, briquette making, spontaneous combustion, fuel economy, gas making and liquid fuel.

Coal; James Tonge; New York, 1907.

This is written entirely from the British standpoint. It describes foreign coal fields with analysis and values and gives a list of world's coaling stations.

Story of American Coals; W. J. Nicholds; New York, 1904.

This deals only with United States coals; it does not contain much information as to markets, but the export question is mentioned on pages 55 and 139, where reference is made to our competition with English coals and why we cannot compete in the world's markets.

Modern Practice in Fuel Contracts; Myles Brown; Wigan, England, 1911.

This gives a number of foreign coal-contract forms and specifications; also analysis of foreign coals.

Shipping and Freight Business Prospects; Year Book; Business Statistics Co., Ltd.; Cardiff.

This is a small annual publication reviewing the past years in the coal and shipping trades and the prospects for the coming year. Statistics on export coal, prices and freights.

South Wales Coal Annual; Business Statistics Co., Ltd.; Cardiff.

An annual publication devoted to the South Wales coal trade. It contains valuable and useful data on exports and coals generally.

North Country Coal Annual; Business Statistics Co., Ltd.; Cardiff.

An annual publication devoted to the Northumberland and Durham coal trades, with statistics and data on exports and output.

Buying and Handling of Steam Coal; Boston Chamber of Commerce, 1909.

This is compiled and written with special reference to coals for New England, but has valuable maps and data that apply to the export trade as well.

The Black Diamond Year Book.

This gives much data on our coal exports, analysis of coals and tonnages, with a complete directory of all mining companies.

Panama Canal Traffic and Tolls; Report by Prof. Emory R. Johnson to the Secretary of War, Washington, 1912.

This contains much valuable data. Chapter X, on coal facilities and costs *via* the Panama Canal and other routes, gives costs and coals used at different ports, analysis, comparative consumption of different fuels in actual use, etc.

The Coal Trade; published annually by the *Coal Trade Journal,* New York.

A compilation of data and statistics on the year's business. It has considerable data regarding exports scattered through it.

The Production of Coal; annual publications of the U. S. Geological Survey, included in "Mineral Resources of United States."

This gives data on exports, the world's coal consumption, etc.

The Coal Resources of the World; Three Volumes and Atlas; an inquiry made under the auspices of the Second International Geological Congress; Toronto, 1913.

Descriptions of the world's coal fields, with outputs, resources and analyses. The United States and British sections are short and very general. The atlas is valuable and comprehensive.

The Trade of the World; J. D. Whelpley; New York, 1913.

A general consideration of the subject that does not go into the coal export trade particularly, but is of value to anyone interested, as showing the trend of the world's commerce and commercial activities.

Annals of Coal Mining and the Coal Trade: R. S. Galloway; Two Volumes; London, 1904.

An elaborate and interesting account of coal mining in England from the earliest times. It is of great value to anyone connected with the coal trade.

Foreign Trade in Coal; H. S. Jevons; Cardiff, 1909.

A valuable monograph giving data regarding the world's export coal trade, freight rates, German exports and rates.

Transport Facilities of South Wales and Monmouthshire; Clarence S. Howells; Cardiff, 1911.

Papers on the Export Question in Coal Age

Our Future in the Export Trade. F. R. Wadleigh. Dec. 28, 1912; Feb. 8, 1913; Mar. 8, 1913.

Discussion of our export trade in general. Short description of the Welsh coals, with analysis. Also, analysis of Pocahontas and New River coals, consumption of coal in foreign countries, markets and transportation.

Our Coal and Coke Exports in 1911. Editorial discussion. Jan. 6, 1912.

Discussion of statistics and their relation to the trade.

World's Consumption of Bunker Coals. Jan. 27, 1912. Statistics and discussion.

The World's Coal Production. Jan. 6, 1912.

Our Export Trade in 1912. F. R. Wadleigh. Jan. 11, 1912.

The 1912 trade and what it shows; the future possibilities and difficulties to be overcome.

The Price War in the Markets of the Pacific. Feb. 14, 1914.

West Virginia's Foreign Rivals in the Pacific Markets. Feb. 28, 1914.

West Virginia's American Rivals in the Pacific. Mar. 21, 1914.

General discussion of the future of the West Virginia coals in the West Coast markets. Gives comparative distance, prices and analyses and data regarding the cost of shipping coal by water to the gulf.

Effect of the Panama Canal. W. A. McCorkle, ex-Governor of West Virginia. May 30; June 20; July 11, 1914.

Effect of the Panama Canal on the World's Coal Markets. F. R. Wadleigh.

A criticism of ex-Governor McCorkle's article on West Virginia coals in the Pacific markets. Analysis of coals, distances, transportation, prices, possibilities of competition of different coals and oil, smokeless coals and briquetting.

Export Trade and the Panama Canal. Colliery Guardian (London). Extract from editorial. Feb. 21, 1914.

The Welsh Coal Field. Reprinted from *The Syren and Shipping.* London, 1906.

Describes the Welsh coal fields and coals, coal docks, railways and foreign trade and United States coaling stations. Also gives historical sketches of several of the large coal companies and description of their mines and coals.

Wealth and Prospective Development of the West Coast of South America. Journal of Association of Engineering Societies, Boston, March, 1908. A. Russell.

Gives data regarding coals and coal consumption. The coal fields and collieries of Chile.

Mining Journal, London, Aug. 21, 1909.

Describes coal deposits and coals used in Chile.

United States Consular Reports

Many of these reports give more or less information regarding coal in foreign countries, but usually the data are not of much value or use. A practical list of numbers is given below:

Uruguayan Coal Situation. July 6, 1912.

Ecuador Coal Imports. Mar. 20, 1914.

Coal in Bolivia and Peru. Feb. 10, 1912.

Conditions in World's Leading Coal Shipping Port. Apr. 10, 1914.

American Coal for Argentina. June 2, 1914.

Chilean Commercial Progress. June 16, 1914. Gives products and importation figures.

Increases of Fuel Consumption in Chile. June 3, 1914.

Iron and Coal Trades Review (London)

French Imports of Coal. 1912. Feb. 21, 1914.

Coal Exports Prices. (Editorial.) Sept. 5, 1913.

Prices of Exported Coal. (Editorial.) Sept. 19, 1913.

The World's Coal Production and Consumption. Apr. 3, 1914.

German Coal Industry in 1913. Feb. 13, 1914.

Coal Trade of the United States. (Editorial.) May 2, 1913. Discusses competition of Welsh and United States coals in foreign markets.

The Progress of German Coal Exports. July 4, 1914.

Italian Coal Imports and Bunker Coal. (Editorial.) July 19, 1912.

The British Coal Shipping in 1913. (Editorial.) Jan. 9, 1914.

A Statistical Review of German Coal Industry. Apr. 24, 1913. Complete data for 1913.

Journal of Commerce (Liverpool)

D. A. Thomas and His Future Connection with England and the United States. Interview and Biography. Feb. 21, 1913. Interesting comparisons between English and United States coals and coal mining.

American Coal Competition in the Mediterranean. July 19, 1912.

American Coal Export Trade. July 3, 1914. Statistics of Exports from Baltimore and Hampton Roads.

America's Foreign Coal Trade. With especial reference to Hampton Roads coals.

Colliery Guardian (London)

The American Coal Trade. (Editorial.) Dec. 12, 1913.

American and British Coal. May 9, 1913. Discusses the influence of the Panama Canal on coaling stations and bunker coal markets at Panama on the Pacific.

Black Diamond (Chicago)

Export number, Oct. 5, 1912.

American Coals Suitable for Export. J. S. Burrows.

Use of Fine (Small) Coal.

Export Statistics for Eight Months of 1912.

Advertisements of Three Large Coal Companies.

Some Data on Exports.

Beginning with 1913, a page in each week's issue is devoted to the United States coal export trade, giving statistics, prices and freights, extracts from foreign trade papers and consular reports, etc.

Shipping (New York)

In each issue under the heading "Coal Notes," are given various items on the export trade, including ocean freights.

Coal Trade Journal (New York)

Gives, in each issue, a list of prices of Welsh coals and ocean freight rates.

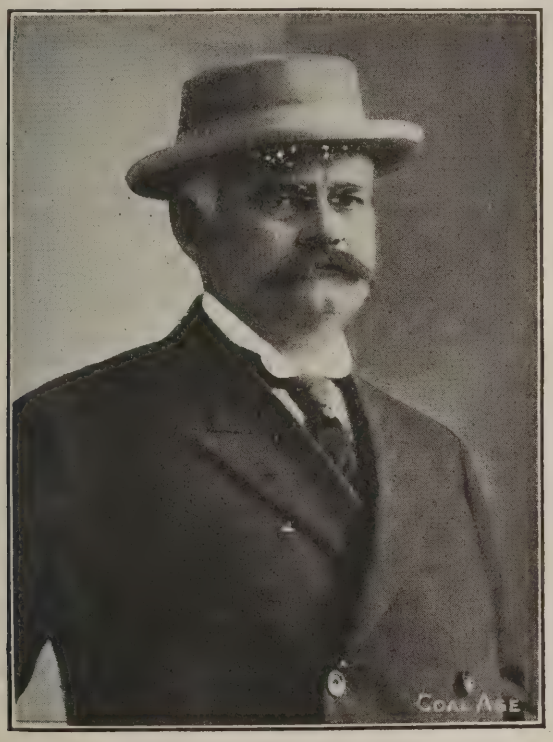
It must be understood that this list of books and articles on the export trade is by no means complete.

Who's Who in Coal Mining

John Markle

When we speak of America's independent anthracite coal interests, we must necessarily refer to the famous Markle family in Pennsylvania, for the two are practically synonymous. In fact, the history of the Markles is largely a history of hard-coal mining.

The creator of the firm of G. B. Markle & Co. was George Bushar Markle, who was born at Milton, Penn., July 1, 1817. This elder Markle started in Hazleton, Penn., as a clerk, advancing to bookkeeper, store manager and finally colliery superintendent. In 1857, after nine years of such training, G. B. Markle formed the firm which was later succeeded by the corporation now



JOHN MARKLE

bearing his name and operating four collieries in the Lehigh-Anthracite Region, with headquarters at Jeddo, Penn. No other anthracite property has such a record of 56 years of continuous operation under the same ownership and management by the same family interests. Most of the other independents have been absorbed by the railroad coal companies

Mr. Markle is known as the "father of the breaker," having designed the first one embodying real mechanical principles. His inventive mind also added many improvements to mine pumps, jigs, crushers and other machinery used in early anthracite mining. He gave up business in 1879, due to failing health, and died Aug. 18, of the same year, at the residence of his son John Markle, in Hazleton, Penn.

John Markle, the subject of this sketch, was born in Hazleton, on Sept. 15, 1858. He graduated from Lafayette College with the degree of mining engineer in 1880. Immediately following his graduation, Mr. Markle entered the coal business of his father as general superintendent of all the company's extensive coal properties in the anthracite region.

On the death of his father eight years later, John Markle purchased the entire interest of the Asa Packer Estate in the firm of G. B. Markle & Company, this interest ranking next to that of the senior Markle himself. This purchase gave Mr. Markle control of the property and caused him to assume complete management of the company's affairs.

In due time, Mr. Markle rebuilt the entire properties under his control, and today there is no evidence of any of the original buildings other than the miners' houses, even these having been greatly improved. He has increased the production at the Jeddo and Highland collieries from 360,000 tons in 1879, to 1,337,000 tons in 1913, and has guided the "Markle organization" to a high degree of efficiency. The G. B. Markle and Co. mines have worked steadily throughout recent years, affording a sharp contrast to the broken time worked by most of the other operators.

Mr. Markle's engineering ability was also shown by his work in connection with the Jeddo Tunnel, which is generally credited with being the largest drainage tunnel in the world. The construction of this huge underground waterway made possible the working of mines then thought to be hopelessly flooded, and makes the Markle mines at Jeddo and several adjoining collieries entirely self-draining. Short connecting tunnels could drain the Hazleton and other coal basins.

The tunnel is 7 ft. by 9 ft. and extends through five miles of solid rock. The cost of the work was in the neighborhood of $1,000,000.

In 1907, Mr. Markle suffered a serious impairment of his vision, but through the efforts of celebrated German oculists, the sight of one eye was saved. About this time the partnership of G. B. Markle and Co., of which he was managing partner, was incorporated into the present operating corporation of G. B. Markle and Co., of which concern, John Markle is president.

John Markle has inherited his father's fearless determination to stand for what is just and right, irrespective of any and all consequences. His success in the commercial and industrial world has netted him great wealth, but the possession of this he regards as a stewardship. It is his conviction that every man, if not incapacitated, should create more than he spends or destroys, irrespective of his position or inherited wealth.

Mr. Markle is known for his genuine desire to elevate his employees. No man could be more kindly in a practical way to those dependent on him. His charities are not heralded by the blare of trumpets, but they no less succeed in relieving those who are most in need. The beautiful marble library given to Hazleton is a memorial to his parents, and the recently completed casino, built at Jeddo is another tangible indication of his broad-minded generosity.

In 1884, four years after his graduation from college, Mr. Markle married Mary Robinson, daughter of Mrs. J. Hood Wright, of New York. He is a member of a long list of societies and organizations located in New York, Philadelphia and throughout eastern Pennsylvania. His home is at 723 Fifth Ave., New York City, although he still maintains his summer home at Jeddo.

Editorials

The Rights of Labor

The rights of labor are human and not superhuman. They should be rights, not privileges. Let the working man always remember that he is only a man and entitled only to a square deal, that even the successful, yet unfair, restrictions of capital by labor may prove veritable Pyrrhic victories in the end by putting one class of workingmen in the hands of another.

The Western Federation of Labor is about to become a branch or ally of the United Mine Workers of America. Already committees from both organizations are favorably discussing organic union. Our readers will pardon us, therefore, if we discuss the Western Federation, which is being fiercely attacked by the Industrial Workers of the World, or rather, perhaps, by a union more or less in sympathy with that organization. In fact, so severe is the disturbance that the Socialist officials in the town of Butte, Mont., have telegraphed for the state militia and word is received that Governor Stewart has ordered the Second Regiment of the Montana National Guard to mobilize at Helena, Mont.

The offices of the Anaconda Copper Mining Co. have been dynamited. Apparently that corporation committed the heinous crime of hiring Western Federation men against the wishes of the Industrial Workers of the World, who are requiring that every man must wear a button and enter their union and no other. The organization, not content with dynamiting Western Federation headquarters, disturbing their parades, driving out and killing their men, desire to arm themselves for an attack on the Anaconda Copper Mining Co. should the mines be closed down. They also threaten to burn down the city of Butte should federal troops or militia be sent to preserve peace.

We suppose that the United States will ultimately send troops and restore the *status quo* and will forbid any one to come to the mines to work, thus keeping Western Federation men from employment unless, being citizens or at least residents of Montana, one by one they are willing to face the violence of their enemies and in self-immolation enter the hostile camp. They may well be forbidden by the Department of War to engage themselves in numbers and at points outside the state, and the operators may be forbidden to purchase arms to protect them. For labor is no longer free. The stronger and more violent element has claimed the right to command the national forces and to control the situation. Even the majority of the miners does not rule as has been shown recently in Colorado and Nanaimo. Thus the miners who have set themselves against liberty have surrendered themselves by that act to violence.

It is to be hoped that recent events will convince the sober workingman, whose ascendancy is in doubt, but whose majority is unquestionable, that there are workingmen as also there are operators who need to be kept firmly in the narrow path of right behavior. No body of men can be left free of law and restraint.

For example, as the Grand Jury in Las Animas County, Colorado, has declared, the United Mine Workers of America have been in that county men of violence who should be curbed. National officers and leaders of the union, they say, have purchased and supplied arms to mobs and as a result there has been wholesale destruction of property and the killing and wounding of men, women and children by armed mobs made up of members of the United Mine Workers of America. They say that many persons connected with these outrages have been shielded and secreted by the miners' organization.

Clearly the union has in places proved that power can be abused by those who have it, regardless of the source from which that power is derived and from Butte the workingman may learn and he cannot know it too soon that the hand of the law must not be paralyzed or the heel of the mob will bear heavily upon the workingman.

Miner's Certificates in Arkansas

In January of this year, the Federation of Labor and the United Mine Workers of America in Arkansas, initiated an act creating a state mining board. This by the "Initiation and Referendum Act" required 14,000 signers. There were 18,000 on the petition.

On July 15, the Operators Association of Arkansas sought to have a decree entered against the petition, alleging fraud in obtaining signatures to the instrument, and on Aug. 13, Chancellor J. E. Martineau, of the Pulaski Chancery Court, entered a decree enjoining Secretary of State, Earl U. Hodges, from certifying the proposed act to the election judges. The Federation of Labor appealed the case to the Supreme Court, which is now on vacation and will not convene till Oct. 1, 1914. The state election will be over by that time, being held on Sept. 14. So the act cannot be passed by vote for two years.

This law requires certificates for mine managers, superintendents, mine foremen, "gas men," hoisting engineers, mine inspectors, fire bosses, pit bosses and coal miners. The latter must be able to pass an examination as "to their practical knowledge of mining coal." The law also states "that it shall be unlawful for any person to engage in mining coal without first having obtained a certificate of competency."

It is clear that under this law no one can mine coal but those who *have* mined it; thus all men who are not miners and even miners' sons are excluded. It is evident that the law would either be deliberately misinterpreted or it would, if also passed in other states, cause coal mining to become a lost art in a few years for the ranks of the coal miners could not be recruited. Not a word is said about laboring under a coal miner, as in the Pennsylvania law.

Either the law is made with the idea of evasion or else inadvertently the miner has made the walls so tight that his own children cannot follow the same profession as he

follows himself. It may be possible that evasion of the law is purposed for the miners are to have a majority on the board, one of the members is to be a practical mining engineer, one a mine operator and three are to be practical miners "actually engaged in digging coal" at the time of appointment.

Believing that every man should have the right to aspire to be a miner or a butcher or whatever you please, without being required to violate any law or asking any board to violate the law for him, we unhesitatingly condemn any such enactment as a gross interference with the rights of workingmen. Certificates for coal mining, such as the anthracite region of Pennsylvania has, are bad enough, but that is largely because of the racial differences of the people, which make it necessary for an English-speaking man to work for a Pole or a Slav and because it compels able miners from another state or nation to work for less competent men to get certificates. Also because these certificates have often been obtained fraudulently. But this law is objectionable in different ways. It would, if made nation-wide, close the trade of coal miner to all but those who are now so engaged.

Mine foremen or gas men under the provisions must have "five years' practical experience in mining coal," mine inspectors must have "five years' practical experience as an actual coal miner," and fire bosses and pit bosses, "five years' practical experience as a coal miner." The bars are let down to hoisting engineers, but they must have "practical knowledge of mining coal." It seems entirely needless that hoisting engineers should have such knowledge, but we must admit that we are assured that no attempt is being made to corner all positions for the advantage of the coal miner, for the requirement as to mine managers and superintendents is not any too severe. They must have "five years of practical mining experience."

We would suggest that the signers having two years before them make the proposed act more in accord with reason and also go over it carefully and see if they have not repeated themselves several times in Section 6 without any necessity. The act as drawn is quite vague. It has no definitions and it might be quite easy to evade some of its provisions because its application is to men of a given title and not to men performing specific duties.

Our Last Thought Is Too Often of Ourself

In our daily struggle for success we endeavor to be alert, yet cautious. We try to marshal our forces to the best advantage and waste as few shots and as little energy as possible.

Safety, Efficiency, Conservation are the ruling thoughts of our very existence. To reduce costs and eliminate risk are the chief aims of our life.

Too often, however, the last person we consider is ourself. We forget that we cannot discharge our duty to others unless we first fulfill our duty to ourselves.

The person who is negligent of his health and careless of habits that destroy body and character is not only useless as a member of society, but is a pernicious influence generally.

The prime essential of right living is a knowledge of the laws of our being. It is because the origin, development and decay of life are beyond our comprehension that we recognize the necessary existence of a great unknown power. The danger is that in giving reverence, we neglect obedience, and violate mandates written in nature's laws.

When a friend gives us a present merely through kindness, and not to enrich us, it is the giving we appreciate more than the gift; but when we are presented with a gift of great value, it becomes a trust, and we attempt to develop its possibilities.

Life is the greatest of all trusts; yet the great masses of humanity are ever ready to break the plainest and simplest of nature's laws. This is absolute evidence that we have not been properly taught.

Our violations are generally committed in youth, however; it is in middle life and old age that the punishment is imposed. If our carelessness brought immediate penalties, we would act differently.

An infant puts its finger in the candle, and the punishment is so immediate that one experience is sufficient for a lifetime. The anguish that so often fills many lives is usually the slow punishment of sins that comes after the lapse of years.

Arkansas Ventilating Methods

The double-entry system of mining is such a common method of operation in all the leading coal-producing states of the Union that it is remarkable to find that in the State of Arkansas where there is often gas, the operators are opposing its further introduction. We imagine that if in the States of Pennsylvania and West Virginia the laws were all wiped off the statute books and every operator were allowed to do as he pleased, only those people who mined coal for local domestic use in a small way would seek to return to the old inefficient single-entry system by which slow progress is made.

However, we feel that Arkansas is partly to blame for this condition because it has passed a law requiring crosscuts in headings to be spaced at 40-ft. centers, where there is no gas present and at 30 ft. or even a less distance where there is gas. Such a provision tends to support the operator in his preference for the single-entry system. The chain pillar is cut up until it has no strength and the method is needlessly expensive. In the States of Pennsylvania, the mine inspector is expressly forbidden to require that crosscuts be driven closer than 48 ft. apart even in rooms and the distance may be at his discretion 105 feet.

In fact, it usually is nearer the latter figure. Even in Colorado, which has an unusually stringent law, the inspectors are allowed to let working faces travel 60 ft. beyond the air current, which does not mean that crosscuts be placed 60 ft. apart, as canvasses can be used to direct the current.

But unreasonable as we consider this requirement of frequent crosscutting to be, we cannot see why any company should refuse to drive a double-entry and we believe that in time the irreconcilables in that state will learn that a more liberal policy pays. There is hardly a state in the Union where such mining as we illustrate in the article on the "Double-Entry System in Arkansas" could be perpetrated, for the waste of coal and mining developments have proved it everywhere to be a folly.

Sociological Department

The Lehigh Valley Meet

The first-aid movement at the collieries of the Lehigh Valley Coal Co., received added impetus at the third general contest, which was held on Saturday, Aug. 29, at Hazle Park, Hazleton. Vice-President and General Manager Fred M. Chase and other officials of the company were in charge.

Five teams, each representing the best in their respective divisions, participated in three full-team events. First place was awarded to the Westmoreland team of Wyoming, Lackawanna Division, of which W. D. Owen is superintendent. Derringer team, of Hazleton, Lehigh-Coxe Division, scored a tie with Westmoreland, both percentages being 99. The event was decided on the time taken by the contesting teams. Westmoreland completed the problems assigned in 27 min. and 45 sec., while Derringer consumed 29 min. and 16 sec. The Franklin team of Wilkes-Barre, Wyoming Division, also averaged 99, but took 34 min. and 5 sec. The Primrose team, of Mahanoy City, Delano Division, took fourth place with a percentage of 98⅔, while fifth place went to the Centralia team, of the Centralia Division, the average of that team being 97. Only the three leading teams were rated on the time consumed in performing their work, the other corps being placed solely on the merits of their performance regardless of their rapidity in action.

The high averages attained by every entry speak well for the training which the members have received. The men in direct charge as captains were given an opportunity to display their proficiency in an individual contest, and Simon Fellin, of the Derringer team, emerged the winner with an average of 99½, while Anthony Gludding, of the Primrose team, was a close second, his percentage reaching 99¼. John O'Neil, of the Franklin team, was only ¼ of a point behind Gludding, and O'Neil was tied with James R. Morris, of the Westmoreland team. The standing between O'Neil and Morris was therefore decided on the time allowance, which gave O'Neil the advantage. O'Neil finished in 3 min. and 45 sec., while Morris' time was 9 min. and 9 sec. John Wilson, of the Centralia team, performed his task in excellent time and made an average of 97½. It had been announced before this contest that the winner would be taken as a representative of the Lehigh Valley Co. at the meeting of the American Mine Safety Asosciation, to be held in New York City on Sept. 7. The captains acquitted themselves so creditably, however, that General Manager Chase made an announcement that every man who participated in the individual contest will also be taken along. This move on the part of the officials indicated the admirable attitude which they have assumed toward their first-aid men. When the announcement was made known to the big assemblage that packed the park theatre, prolonged applause arose.

The Westmoreland team was presented with the valuable silver loving cup, which the Derringer team, one of the best organized in the anthracite region, held last year and had high hopes of holding again. It will be put up for contest at the next general meet in 1915. The cup, in order to be retained permanently, must be won three times. Westmoreland has won it only once. As a further award, every member of the winning aggregation will be taken to the American Mine Safety Association meeting.



TEAM MEMBERS, OFFICIALS OF LEHIGH VALLEY COAL CO. AND JUDGES

The judges were Miss A. M. Anderson, a graduate of a New York hospital training school and who at present is superintendent of the Social Service Department of the Wilkes-Barre City Hospital; Dr. W. A. Lathrop, superintendent of the State Hospital, Hazleton, Penn., and Dr. Lawrence Thompson, of Wilkes-Barre, Penn.

After the awards had been made, General Manager Chase gave a brief address, in which he congratulated the men and commended them for the noble work which they are rendering in the service of suffering humanity. Thomas Thomas, general inside superintendent of the Lehigh Valley Coal Co., gave a splendid talk on first-aid work.

Before the contests started, John M. Lloyd, efficiency en-



THE TEAM OF THE WESTMORELAND COLLIERY, LACKAWANNA DIVISION; THE WINNING TEAM

From left to right .John F. Reynolds, mine foreman; Jas. R. Morris, captain; Edward Reap, Thomas Ridgeley, Walter Jacoby, Joseph Johnson, Fred Halpin. Rear row: George P. Gallagher, assistant division superintendent; G. F. Hileman, outside foreman.

gineer, delivered an address of welcome, in which he declared the purpose of the meeting. Charles F. Johnson, superintendent of Kis Lyn, also spoke and complimented the Lehigh Valley Coal Co. and its employees for what they are doing to conserve human life. At noon, a substantial lunch was served in the park dining room, and between courses brief talks were given impromptu by the officials. Among the guests were Alvin Markle, coal operator, of Hazleton; General C. Bow Dougherty, superintendent of the Susquehanna Coal Co., Wilkes-Barre, Penn.; H. Heffler, of Centralia; W. H. Davies, of Lehigh-Coxe, and J. H. Haerter, of Wilkes-Barre, Penn.

Efficiency Engineer John M. Lloyd was in general charge, M. W. Price in direct charge, and the scorekeepers were Herbert I. Quinn and M. E. Terwilliger. For the first time in the history of the Lehigh Valley first-aid contests, a time limit allowance was placed in the events. The affair was without doubt the most successful ever held by the company.

Five teams were entered in the first three events, each of the five divisions of the Lehigh Valley Coal Co. being represented.



OFFICIALS IN CHARGE OF MEET

From left to right: Atherton Bowen, scorekeeper; John Lloyd, efficiency engineer, in general supervision; Thomas Thomas, general inside superintendent of L. V. Coal Co., and M. W. Price, scorekeeper.

Event No. 1, for Full Teams—The problem was as follows: "Simple fracture of right kneecap. Compound fracture of middle third of left leg. Severe bleeding in spurts. Simple fracture of the jaw. Deep wound in palm of right hand." Time allowance, 15 min.

The judges and timers rendered decisions as follows in this event:

Franklin colliery team, representing the Wyoming division, 100 per cent.; time, 9 min. 55 sec. Primrose colliery, representing the Delano division, percentage 99; time, 11 min. 35 sec. Westmoreland colliery team, representing Lackawanna division, percentage 100; time, 9 min. 10 sec. Centralia colliery team, representing Centralia division, percentage 97; time, 9 min. 8 sec. Derringer colliery team, representing Lehigh-Coxe division, percentage 100; time, 9 min. 9 sec.

Event No. 2, for Full Teams—The same men who won the first event also won in this contest. "Compound fracture of the left forearm with severe bleeding in spurts. A simple fracture of right collar-bone. Crushed left foot. An open wound entire length of right shin bone and feet." Time allowance, 10 min.

The result of this event follows: Franklin colliery team, Wyoming division, percentage 98; time, 11 min. 40 sec. Primrose colliery, Delano division, percentage 97; time, 7 min. 35 sec. Westmoreland colliery, Lackawanna division, percentage 98; time, 8 min. 13 sec. Centralia colliery, Centralia



THREE OF THE CAPTAINS

From left to right: Simon Fellin, captain of Derringer colliery team, first prize; Anthony Gludding, captain of Primrose colliery team, second prize; James R. Morris, captain, Westmoreland colliery, third prize.

division, percentage 97; time, 8 min. 20 sec. Derringer colliery, Lehigh-Coxe division, percentage 92; time, 10 min. 2 sec.

Event No. 3, for Full Teams—"Fracture of pelvis on right side. Compound fracture of middle third of left thigh with severe bleeding in spurts." Time, 15 min.

The judges made the following announcement on this event: Franklin colliery, Wyoming division, percentage 99; time, 12 min. 30 sec. Primrose colliery, Delano division, percentage 100; time, 9 min. Westmoreland colliery, Lackawanna division, percentage 99; time, 10 min. 22 sec. Centralia colliery, Centralia division, percentage 97; time, 15 min. 54 sec. Derringer colliery, Delano-Coxe district, percentage 99; time, 10 min. 2 sec.

Event No. 4, for Individuals—The captains of each of the five teams which took part in the first three events were the competitors in the individual contest event. The problem was as follows: "A man in falling to the ground grasps an electric wire with his right hand. Rescue and give artificial respiration for 1 min. Treat for burns of the right hand. Time allowance, 9 min."

The results of this event follow: John O'Neill, captain of Franklin colliery, of Wyoming division, percentage 99; time, 3 min. 45 sec. Anthony Gludding, captain of Primrose colliery of Delano division, percentage 99¼; exceeded the time limit. James Morris, captain of Westmoreland team, Lackawanna division, percentage 99; time, 9 min. 9 sec. John Wilson, captain Centralia team, Centralia division, percentage 97½; exceeded time limit. Simon Fellin, captain Derringer team, Lehigh-Coxe division, percentage 99½; time, 5 min. Fellin was declared the winner of this event, having the highest percentage and having worked the problem well within the time limit.

The teams which represented the different districts were comprised of the following:



JUDGES OF CONTESTS
From left to right: Dr. W. A. Lathrop, Miss A. M. Anderson and Dr. Lawrence Thompson

Westmoreland colliery (winning team), representing the Lackawanna division—James Morris, captain, electrician; Edward Reap, assistant foreman; Thomas Ridgley, mason; Walter Jacoby, siltman; Joseph Johnson, fireman; Fred Halpin, subject.

Franklin colliery, representing the Wyoming division—James O'Neil, captain, assistant foreman; William Morgan, trackman; Edgar Boston, bratticeman; Hugh Owens, bratticeman; Henry Hennerty, bratticeman; Harry Thomas, subject.

Primrose colliery, Delano division—Anthony Gludding, captain, pumpman; Joe Maher, pumpman; Daniel Lewis, footman; Daniel Jenkins, driver.

Derringer colliery, Lehigh-Coxe division—Simon Fellin, captain, pumpman; Andrew Bretz, miner; Arthur Michael, helper; Roy Schell, trackman; Clarence Curtier, pumpman.

Centralia colliery, Centralia district—John Wilson, captain, pumpman; Edward Britt, pumpman; Thomas Lamb, footman; Nicholas Willis, bratticeman; Jesse Heist, footman.

Developments in the Export Trade

At the present moment the fate of the export coal trade appears to be hinging on the ability to get vessels at reasonable rates. Further complications are also developing, as, for instance, it is stated that the French government has commandeered all coal carried in French vessels. It is obvious, therefore, that shipments in such boats are not being attempted, except where there is a thorough understanding with the government.

In a press interview, D. J. Wittenberg, President of the Pocohontas and New River Coal Co., predicted last week that American exports to Europe would aggregate one million tons by the first of the year, providing no serious obstacles in transportation or credits arises.

One of the largest deals reported is that said to have been closed by Spanish interests, involving 2,800,000 tons of steam coal. The contract is said to run over a two-year period, and is for delivery at Buenos Aires, Montevideo and Rosario. Loading will be at Philadelphia, Newport News and New York, and the reported price is $2.75 per ton, f.o.b.

At San Francisco, the German steamer "Mazatlan" was held up by the Collector of the Port just as she was about to sail with 500 tons of coal. The coal was contained in sacks, and it was believed that it was destined for the German cruisers "Leipzig" or "Nurnburg."

At Philadelphia, the North German Lloyd steamship "Brandenburg," said to be loaded with 10,000 tons of coal, took out clearance papers for Bergen, Norway, on Aug. 21.

The Hamburg-American steamer "Græcia" cleared from New York on the night of Aug. 27 with 3000 tons of coal for Cadiz, Spain. It is rumored that the coal is destined for the "Kronprinz Wilhelm," which left New York Harbor on the night of Aug. 3 and was last reported in West Indian waters. On the afternoon of Aug. 29, the steamer "Macedonia" of the same line sailed from New Orleans with 5000 tons of coal, in addition to other large supplies. This is the first German vessel to sail from this port since the war was declared. Although ostensibly destined for Cadiz, Spain, it is believed that these supplies are intended for the German cruiser "Dresden."

As regards the foreign situation, the British Government has receded from its demand for a "triple bond" on all export shipments, as was generally expected. This has considerably relieved the tension in foreign markets, particularly in Italy where the situation showed indications of becoming acute. The problem now facing the British exporters, and also those in this country, has resolved itself into one of financing. It would seem that the different governments might advantageously arrange to guarantee payments by responsible purchasers.

Reports from England are of a rather conflicting nature, it being noted on one hand that the government has requested the collieries to work on Sunday, while on the other hand, it is stated that there are enormous supplies at all the shipping points because of the almost complete suspension of industrial demand. The only serious difficulty the British operators now seem to be facing is in transportation lines. The heavy burden thrown upon the railroads of the country in moving the troops and muntions of war has so congested the service, that trouble is being experienced in this line.

Recent issues of the *Daily Consular and Trade Reports* contain the following notes relative to the export trade and foreign mining conditions.

South America—A telegram from an American consular officer in a South American country stated that the Government railways want 300,000 tons of coal annually for three years. Particulars are being forwarded by the first mail from the consulate.—No. 13583.

Europe—An American consul reports that two coal merchants in a European country desire to receive offers from American coal exporters and also some publications on the trade. Correspondence should be in French, and copies should be sent to the consulate submitting the report.—No. 13572.

Discussion By Readers

The Flame of a Mine Explosion

In connection with the many experiments made to determine the correct explanation of the phenomena observed at the mouth of a mine, at the moment of explosion, COAL AGE, Aug. 22, p. 295, the following incident illustrating the wonderful expansive force of the flame of an explosion, on reaching the open air, will prove of interest:

The Palos mine explosion occurred May 5, 1910, at Palos, Ala. In this mine, the main-slope heading was quite contracted. The narrowest place in the heading had an area of less than 27 sq.ft. The gases and dust projected from this small opening at the moment of the explosion, took fire in the air and the flames spread on each side of the mouth of the mine, to a distance of over 80 ft., burning and scorching the leaves on the trees and bushes in that area. Wood was charred at a distance of 105 ft. from the mouth of the mine, in the direction of the axis of the slope, and a mail carrier was killed some 70 or 80 ft. away from the mine entrance. He was burned worse than any other man killed in that explosion. Had it not been for a heavy railroad trestle, in its path, the flame would have reached a still greater distance.

The sight was witnessed by a number of men, who stated that the flames leaped upward to a distance claimed to be anywhere from 200 to 500 ft. in height. I mention this incident as showing how the flames of an explosion would spread in a mine where the air conditions are in its favor.

GEORGE T. MAIN,
Fireboss.

Republic, Ala.

A "Mine-Run" Failure

The fact that the mine-run law, recently enacted in Ohio, is a failure, at least in the No. 8 seam, is proven quite conclusively by the statement of eastern Ohio operators, to the effect that the shutdown of the Block House mine of the Dexter Coal Co., a branch of the Pittsburgh-Buffalo Coal Co., was necessary owing to the high cost of production.

An investigation of the cost of operating this mine showed that the coal mined on a run-of-mine basis was being produced at an increase of 16c. above the price prevailing the preceding year. The giving out of this information has caused much comment in mining circles, since the fact was well known that the court was desirous that this mine should continue in operation. Since they began operating on the run-of-mine basis, the company have had constant complaints in regard to the preparation of the coal, which is another feature requiring careful consideration. When it was finally found impossible to reduce the cost of production so that it would more nearly approximate that of the previous year, it was decided to close down the mine, since, to continue in operation, was merely piling up debts for the already embarrassed company.

The suspension of the Block House mine has set everyone interested in the success of the coal-mining industry in the state, to thinking seriously over the various developments and conditions following in the wake of the strike. The utter uselessness of the operators in the No. 8 seam, attempting to operate on a mine-run basis is apparent to everyone.

This feeling is growing stronger every day; and it would not be surprising if, as is indeed already rumored, a large class of miners will soon be endeavoring to arrange conferences with the operators, for the purpose of negotiating a contract under a wage scale that will permit the operators to run their mines on the same basis as last year. This would seem to be the only practical solution of the problem. The instance to which I have referred, namely, the shutting down of the Block House mine, is only an example where the new system has been given a thorough trial and been found wanting.

O. P. RATER.

————, Ohio.

Keeping Rooms on Sights

I was pleased to see the inquiry in regard to driving rooms on sights, COAL AGE, Aug. 22, p. 317. About a year or so ago, we were having much trouble, in the mine, with the rooms "holing" into each other, due to the carelessness of the "cutters" or machine runners.

Our rooms are turned off at right angles to the butts and driven on the face of the coal. The rooms are driven on 50-ft. centers and are 28 ft. wide, leaving a "rib" (room pillar) 22 ft. wide. The rooms are driven up anywhere from 200 to 300 ft. and a chain pillar 40 ft. wide is left along the entry. It was a common everyday occurrence to find an unexpected breakthrough at the face of a room.

Having a compass at the mine, and both the mine foreman and myself being able to set sights, we decided to try out the method of driving all rooms on sights. This was not a difficult matter, after we had once caught up with the men; but, as our friend from Kentucky states, the sights were often disregarded, and we found it a difficult matter to get the men to pay proper attention to them.

However, after a few of the careless ones had a week or so off, and the loaders were forced to take a "skip," which was always pickwork, at loading price, they began to sit up and take notice of the "sights." I am pleased to say that, at the present time, we are having no trouble of this kind, and the "holing" of rooms into each other is a thing of the past. The ribs in the rooms will scarcely vary 2 ft. their entire length. There is, of course, an occasional error in setting the sights; but this is generally soon detected before it causes any trouble.

The process is as follows: When a room has been "necked" and as soon as the first three cuts are taken

out, before the switch is laid, we set up the compass and put in a pair of sights on the course the room is to be driven. All sights are placed on the same side of the room, about 4 ft. from the ribs. The neck is driven narrow for about 60 ft. Then, the cutter drops back about 20 ft. from the face and widens the place on the opposite side from the sights.

It is sometimes claimed that carrying rooms on sights is a hard matter, but this is not my experience. A good entryman will drive his entry from one station to another and will scarcely vary a foot, in going 300 or 400 ft. by the sights set by the engineer. If this can be done in the entries, why not in driving rooms.

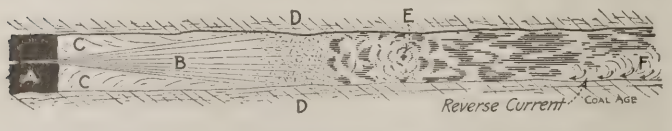
Before a machine is taken to the face of the room, the cutter will generally send his helper up to the face to see that it is in proper condition. If all is ready, the helper is instructed to hold his lamp at the face, and the cutter lines him in by the sights in the neck of the room. This being done, an arrow is marked on the roof with a piece of chalk. This shows the cutter, at a glance, whether the rib is to be gripped or set back.

JAMES P. REYNOLDS, Fireboss,
Pine Run Co.
Vandergrift, Penn.

The Verner Theory

Referring to the editorial on this subject, COAL AGE, Aug. 15, p. 273, I notice the statement that the "theory about the counter air current in a mine explosion has gradually gained strength." In a previous letter, I asked Mr. Verner to explain his theory of the counter-current by means of diagrams. He did not do this, however, but Mr. Parfitt came to the rescue with an explanation of the phenomenon, illustrating it by means of a sketch, COAL AGE, Vol. 5, p. 1059.

Referring to this sketch, Fig. 1, Mr. Parfitt assumed that the so called "reverse current" started at a point marked *F* in the figure. It is clear, however, that no such reverse current could be produced until the force exerted by the powder or other explosive had expended its

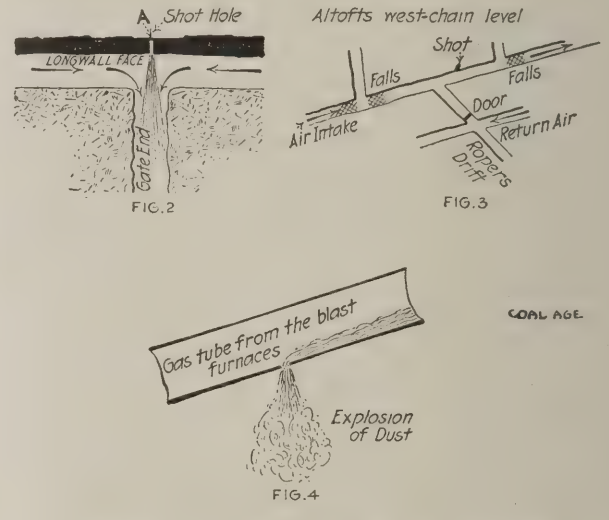


IDEAL SKETCH, ILLUSTRATING THE INITIATION OF A MINE EXPLOSION

energy. It would also seem that, at the point marked *C* in the figure, the air would be in a state of compression instead of a "depression or vacuous condition" existing, as he stated, assuming the shot was fired in the face of a heading. There might be a suction effect or depression if such a shot were to be fired at a gate-end, on a longwall face. I have tried to illustrate this suction effect, in Fig. 2. Here the firing of the shot *A*, at the gate-end would naturally draw air from the face on each side of the shot, as shown by the small arrows in the figure after the principle of an injector.

From Mr. Parfitt's illustration, Fig. 1, it might be assumed that the reverse current *F* resulted from the cooling of the heated gases from the blownout shot; but, here, the explanation is dropped. Mr. Verner would have done well to have taken up the explanation at this point and showed what followed the starting of the reverse current at the point *F*.

In my opinion the presentation of any theory should be accompanied by sketches or diagrams to make the intended meaning clear; and should be further supported by references to actual occurrences, as far as possible. In differing with Mr. Verner, in reference to his theory of the reverse current being a factor in the initiation of a mine explosion, I shall endeavor to explain my ideas by reference to observed occurrences, and to illustrate these by brief sketches that will assist the understanding.



ILLUSTRATING MINE-EXPLOSION THEORIES

In practically every mine disaster with which I have had an intimate acquaintance and which was caused by the firing of a shot, I have observed that there was invariably a large cavity or air space in the immediate neighborhood of the blast. Again, I have observed another important feature of such disasters, namely, there is always a considerable area, in the immediate neighborhood of the blast, in which there is little or no evidence of damage having been done such as is plainly observable at a distance more removed from the initial point where the shot was exploded.

Referring now to a case in point, namely, the Altofts explosion, Fig. 3 shows approximately the position of the shot that was the primary cause of this disaster. The shot was drilled in such a direction, in the rib of the west-chain-haulage road, that when it blew out, the heated gases and solid matter were projected *against the air current,* which is shown in the figure by the small arrows. In this case, the nearest large air space was the heading known as "Roper's drift." It was observed, in this explosion, that the men who were killed had taken warning that all was not right and had moved from the manholes where they had gone for shelter. The distance these men moved from their position when the shot exploded, indicates a certain lapse or interval of time between the blowing out of the shot and the second blast or explosion, which killed them instantly. A similar interval of time has been observed on other like occasions, where men have been warned of the danger and sought to escape, but were killed instantly by a second blast. In the Altofts mine, there was little or no damage done, for a distance of about 75 yd. on either side of the shot.

My opinion, based on these facts, is that when a shot blows out, the heated gases and particles of solid matter are projected into the mine roadway where the blast stirs up the dust. At this initial moment, the immediate atmosphere in the vicinity of the shot is quickly rendered devoid of oxygen, which makes an explosion of the dust and gases at this point impossible. I believe the interval of time that intervenes until the expanding and projected gases meet with a sufficient volume of air for their explosive combustion, is the brief period in which the later victims of the explosion attempt to escape and move from their places for that purpose. The real explosion that wrecks the mine, I consider, is that which occurs when these heated gases and dust encounter sufficient air for their combustion.

In support of this conclusion, I want to refer to an incident observed when passing through a blast-furnace ironworks, on an idle day when the men were cleaning out the gas mains connecting the tops of the furnaces with the battery of boilers. In doing this work, the dust and soot accumulated in the mains were scraped to the handholes in the bottom of the tubes (Fig. 4). The men had taken the precaution to dampen the dust inside the tube and never to open a handhole in advance of the portion of the tube that was being scraped. The reason for this was quickly evident after observing what took place when the heated dust fell through the handhole into the air below. A dense black cloud of dust would fall for a considerable distance and then burst into a violent flame or explosion. This, to my mind, is a simple illustration of what happens in a mine when a blownout or windy shot is the cause of an explosion such as that at Altofts.

Unless I wholly misunderstand Mr. Verner, he is at a complete loss to show where his reverse air current would assist in explaining the Altofts disaster, or the explosion of the dust as observed at the ironworks, just mentioned. Neither Mr. Verner nor Mr. Parfitt has shown any reverse current other than that due to the cooling of the heated gases, which occurs in what is properly called the "condensation stage" common to every mine explosion and which is nothing new in respect to such occurrences.

In closing, permit me to say that, whatever new points may be raised in connection with this theory, it has not yet been shown what influence the reverse current can exert at the initial point of an explosion. What follows this is not pertinent to the question. Therefore, what Mr. Verner has called the "counter air current" is still without any clearly defined explanation.

JAMES ASHWORTH,
Mining Engineer.

Vancouver, B. C., Canada.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

PLAN OF MINE

General Requirements—In the planning of a coal mine the most careful consideration must be given to the questions of **ventilation, drainage** and **haulage,** as these arrangements, to a great degree, determine the successful operation of the mine.

In order to insure the safe and economic extraction of the coal, the same careful consideration must be given to ascertaining the extent and character of the seam, its depth below the surface, inclination and thickness, the character of the roof and floor and the hardness of the coal, its cleavages and faults, impurities, etc.

The information thus gained will be of the first importance in deciding on the most suitable method of mining to adopt, in order to secure the largest returns on the investment, the most complete extraction of the coal and the greatest safety in mining the same.

Economy and Efficiency—The **economic ventilation** of a mine premises the circulation of the required air volume, with the least expenditure of power. **Efficient ventilation** requires the circulation and proportionate distribution in the mine workings, of such a volume of air as will not only meet the requirements of the law; but, likewise, produce the necessary velocity in all roads and passageways and at the working faces of all headings and chambers, so as to sweep away the smoke and gases that would otherwise accumulate therein; and to so ventilate all waste, void and abandoned places as to prevent them from becoming a menace to the safety of the mine as reservoirs for the accumulation of gas.

The Main Airways—While two airways, an intake and a return airway of sufficient size, furnish the necessary means for conducting the air current to and from the working faces of the mine, there are other considerations of economy and safety of operation that demand a larger number of main airways.

The **number** of main airways required, in any case, is determined by their size and the necessary volume of air that must pass through them. The limiting factor in this calculation is the safe and economic **velocity** of the air current traveling the main airways.

While too low a velocity of the air is dangerous because of its failure to remove the accumulating gases, too high a velocity, on the other hand, is dangerous by reason of its increasing explosive conditions in the mine air, by raising and carrying in suspension fine dust, and by furnishing an excessive supply of oxygen that invites active and explosive combustion.

The velocity of main air currents in mines can safely vary between 250 and 1200 ft. per min.; and for short distances a velocity of 2000 ft. per min. may be permitted, although high velocities rapidly increase the power producing the circulation. Where the main intake airways are used for haulage roads, it will not be possible or advisable to employ a velocity much exceeding 400 or 500 ft. per min., owing to the annoyance and danger of drivers losing their lights.

The Coal Age Pocket Book

Illustration—In the planning of a mine for an output of, say 2000 tons of coal per working day, in a 6-ft. seam of more or less inflammable bituminous coal (shaft, slope or drift openings), the following data may be assumed as approximating possible conditions, but modified to suit known facts that have been determined, in special cases:

Output per man per day (average)	2½ tons
Number of miners employed (2000 ÷ 2.5)	800
Number of loaders or helpers	400
Number of drivers, trackmen, timbermen, etc.	60
Foreman, assistant foremen and firebosses	20
Total number of men and boys	1280
Number of mules	25

Assuming a gaseous mine requiring, by law, say 150 cu.ft. of air per man, and 600 cu.ft. per mule, per minute, the necessary circulation based on these data would be (1280 × 150) + (25 × 600) = 207,000 cu.ft. per min.; or, to allow for certain leakage, say the necessary air volume is, in this case, 225,000 cu.ft. per min.

Driving 10-ft. openings in a 6-ft. seam and allowing for necessary timbering would leave an unobstructed effective area of, say 50 sq.ft. In this case adopting a 4-entry system for the intake and the same for the return, would give for the total effective intake and return areas, each 4 × 50 = 200 sq.ft., which would make the velocity of the intake air current 225,000 ÷ 200 = 1125 ft. per min., which is a safe and economical velocity, provided these airways are not used as haulage roads.

To provide for the expansion of the return air, owing to rise of temperature and addition of mine gases, which may altogether amount to 6 or 8 per cent., the return airways should be driven, say 8 or 10 in. wider than the intake airways.

Economy of Multiple Main Airways—The economy of driving a multiple system of main airways will not be questioned in the planning of large operations. The same plan should be applied to the opening of mines on a smaller scale, the objective point being to keep the velocity of the main air current so that it will not exceed 1200 ft. per min., for any considerable distance.

The saving in power (fuel consumption, equipment and attendance) will pay for the increased expense of upkeep of entries; and the system affords a large increase in safety by reducing explosive conditions and providing additional avenues of escape in case of accident. There is afforded, besides, room for a double-track haulage system, which will prove a great advantage in the operation of the mine.

Assuming that one-half the power on the air is consumed in the main airways, which more or less closely approximates the fact, and taking the general efficiency of the fan and engine as 60 per cent., a double-entry system, for the main intake and return airways, would effect a saving in fuel of 11.25 per cent.; a triple-entry system, 13.32 per cent., and a 4-entry system, 14.10 per cent.

Inquiries of General Interest

Ventilation Question

The following question, which was asked at a mine inspector's examination held at Pittsburgh, May, 1909, has recently aroused considerable discussion as to its correct answer. We would very much appreciate seeing this question answered in the columns of COAL AGE. It is as follows:

A total of 8000 cu.ft. of air passes through three airways, *A*, *B* and *C*, under a water gage of 1.7 in. All the airways have the same sectional area and their lengths are as follows: *A*, 6000 ft.; *B*, 10,000 ft.; and *C*, 21,000 ft. It is desired to increase the quantities of air passing in the airways *B* and *C*, so that all three airways shall pass the same quantity of air (in other words, the main air current is to be equally divided between the three airways).

(a) What effect will this change have on the water gage? (b) How much will the resistance be increased in *A* and *B* when the change is made? (c) If the airways *B* and *C* were to receive as much air as the airway *A* gets now, what would be the total quantity of air in circulation?

A correct answer to this question will be greatly appreciated by a number of COAL AGE readers.

CHARTER SUBSCRIBER.

Pittsburgh, Penn.

The question is, to a certain extent, incomplete, inasmuch as it does not state that the power on the air remains constant, which is the natural assumption to make, although the conditions in (c) clearly demand an increase of power.

Evidently, the first step in the solution is to determine which of the three airways will be the free or open split, requiring no regulator in the proposed redistribution of the air. This can be found by calculating the relative pressure potentials for the three airways, respectively. Thus,

Split *A*, $X_a = \frac{1}{\sqrt{l}} = \frac{1}{\sqrt{6}} = 0.4082$

Split *B*, $X_b = \frac{1}{\sqrt{10}} = 0.3172$

Split *C*, $X_c = \frac{1}{\sqrt{21}} = 0.2182$

$\Sigma X_p \ldots\ldots\ldots 0.9426$

The airway having the smallest potential value is the one that naturally takes the smallest quantity of air, and is therefore the one having the greatest resisting power; which fact makes it the free or open split, in the redistribution of the air. In the present case, split *C* is the open split, while regulators must be placed in the other airways, *A* and *B*.

In splitting, the pressure is the same for all the splits; and in this case, the pressure and quantity of air being the same for each split, the power on the air will be equally divided between them because the power is equal to the product of these two factors. The next step, therefore, is to find the original power on the air, which is assumed to remain constant after the change. Thus,

$U = Q\,p = 8000\ (5.2 \times 1.7) = 70{,}720$ *ft.-lb. per min.*

The simplest method of solution, now, is to find the quantity of air and the power, for split *C*, before the change was made; and, then, since each split absorbs one-third of the original power on the air, find the quantity of air that will pass in the open split *C*, according to the rule that the quantity of air circulating in an open airway varies as the cube root of the power. The water gage is then found, according to the rule that the water gage varies as the square of the quantity of air in circulation.

The quantity of air in circulation in an open airway being proportional to the pressure potential for that airway, the quantity for split *C* (natural division) before the change, is

$$q_{c_1} = \frac{0.2182}{0.9426} \times 8000 = 1852\ \textit{cu.ft. per min.}$$

But, the pressure being the same for all the splits, the power on the air for split *C* is proportional to the quantity of air passing in that split; thus,

$$u_{c_1} = \frac{1852}{8000} \times 70{,}720 = 16{,}371\ \textit{ft.-lb. per min.}$$

Since, after the change is made, split *C* absorbs one-third of the original power, it then consumes $70{,}720 \div 3 = 23{,}573$ ft.-lb. per min. Then the quantity of air passing in this split, which is open, having no regulator, is

$$q_{c_2} = 1852 \sqrt[3]{\frac{23{,}573}{70{,}720}} = 2091\ \textit{cu.ft. per min.}$$

(a) Since the pressure or water gage is proportional to the square of the quantity of air passing, the water gage, after placing the regulators for an equal distribution of the air, is

$$w.g._2 = 1.7 \left(\frac{2091}{1852}\right)^2 = 2.167\ \textit{in.}$$

(b) For the same sectional area of an airway, the resistance is proportional to the pressure or water gage; and is, in this case,

$$\frac{R_2}{R_1} = \frac{2.167}{1.7} = 1.274\ \textit{times}$$

(c) The quantity of air that was passing in split *A* before the change was made, is

$$q_{a_1} = \frac{0.4082}{0.9426} \times 8000 = 3464\ \textit{cu.ft. per min.}$$

If airways *B* and *C* each get this amount of air, the total circulation will be $3 \times 3464 = 10{,}392$ cu.ft. per min. This, however, would require a large increase of power. Assuming a constant power, as previously, the total circulation after the change is $3 \times 2091 = 6273$ cu.ft. per min.

Examination Questions

British Columbia Examination, May 20, 1914

(*Selected Questions*)

VENTILATION

Ques.—How many cubic feet of air is traveling in an air course which is 8½ ft. wide at the bottom, 7½ ft. wide at the top and 5½ ft. high, when the anemometer shows a reading of 85 revolutions?

Ans.—The average width of the airway is ½ (7½ + 8½) = 8 ft. and the sectional area is, therefore, 8 × 5½ = 44 sq.ft. Then, assuming the anemometer reading is 85 r.p.m., the quantity of air in circulation in this airway is 85 × 44 = 3740 cu.ft. per min. In this answer, no allowance is made for correction of the reading of the instrument, for the reason that the measurement of the velocity of an air current in this manner is only approximate at the best; and, in ordinary practice, this correction is neglected.

Ques.—If, by applying 42,000 units of work, you obtain 31,500 cu.ft. of air per min., what units of work will be required to produce 70,000 cu.ft. per min.?

Ans.—For the same airway, the power or units of work applied to the air varies as the cube of the quantity of air in circulation. In other words, the power ratio is equal to the cube of the quantity ratio, which gives, in this case,

$$\frac{x}{42{,}000} = \left(\frac{70{,}000}{31{,}500}\right)^3 = 460{,}900 \textit{ ft.-lb. per min.}$$

Ques.—Explain the principle of natural ventilation.

Ans.—The principle of natural ventilation depends upon the difference in the density of two air columns that would otherwise be in equilibrium; or, upon any dynamic force, such as wind pressure or the pressure of escaping steam that would give motion to the air in an airway or air conduit. The difference in the density of air columns may arise from a difference in temperature, the warmer air being lighter than air of a lower temperature, volume for volume; or the difference in density may be due to the presence of a considerable quantity of gases that are either lighter or heavier than atmospheric air.

A difference in density causes the heavier of the two columns to sink, by reason of its greater weight, the lighter air column being thereby forced upward. These air columns may exist in a mine shaft or slope or in dip or rise workings in the mine. The result is always a more or less rapid movement of the air from the point of higher pressure toward the point of lower pressure, the movement being due to the natural causes just mentioned.

Ques.—Explain the difference in the methods of producing an air current by a forced fan and by an exhaust fan.

Ans.—As far as the fan itself is concerned, the action is the same in both cases. The revolution of the air within the fan gives to it a centrifugal force that causes it to move from the center toward the circumference of the fan. It is this movement of the air within the fan that results in a depression at the central opening and a compression at the circumference or the discharge opening of the fan.

In the case of a forced fan, the fan drift is connected directly with the circumference and receives the air discharged by the fan, which air is conducted into the mine. Owing to the resulting depression at the central opening of the fan, the atmospheric air enters the fan at this point. In the case of an exhaust fan, the fan drift is placed in connection with the central opening of the fan, which therefore draws the air from the mine and discharges it into the atmosphere at the circumference through the fan chimney.

Ques.—When the barometer reads 23.2 in., what is the pressure of the atmosphere (a) per sq.in.; (b) per sq.ft.?

Ans.—(a) Since 1 cu.in. of mercury weighs 0.491 lb., the atmospheric pressure corresponding to a barometer reading of 23.2 in. is 23.2 × 0.491 = 11.39 lb. per sq.in. (b) This corresponds to a pressure of 11.39 × 144 = 1640+ lb. per sq.ft.

Ques.—In order to secure thorough ventilation in a mine, about what velocity should the current have at the face of the workings, both in gaseous and nongaseous mines?

Ans.—The thorough ventilation of a mine at the working face requires a velocity sufficient for the removal of the gases that would otherwise accumulate. In a nongaseous mine, for the convenience of the men, the velocity of the air current should not exceed 3 or 4 ft. a second, say 200 ft. a minute. At times, a less velocity than this is desirable. In a gaseous mine, assuming the air current is properly deflected by means of brattices, so as to sweep the face of the coal, a velocity varying from 240 to 360 ft. per min. should be sufficient for the removal of the gases, except in special cases in rise or dip workings that often render the efficient ventilation of the working face difficult.

The removal of marsh gas from the face of rise workings or carbon dioxide from the face of dip workings may frequently require a higher velocity of the air current. Under these conditions, proper precaution must be taken not to expose the safety lamps of the miners to the full force of the current, which may have a velocity of 600 ft. per min.

Ques.—How can you tell whether or not any obstruction is in an air course that you have not passed through?

Ans.—Any obstruction in an air course would be indicated by the decreased velocity and quantity of air in circulation and by an increase of water gage for that airway. A decrease in the quantity of air passing, together with a like decrease in the water gage would point to trouble outside of the airways in question, by reason of which the quantity of air supplied to that section has fallen below the normal quantity. Under a normal condition of the general ventilating system in the mine, an obstruction in any section or district of the mine will cause a decrease in the quantity of air passing and an increase of the water gage for that section.

Coal and Coke News

Pennsylvania

Anthracite

Wilkes-Barre—With a view of insuring protection to surface property from mine caves, the Lehigh & Wilkes-Barre Coal Co. has requested the city of Wilkes-Barre to permit the driving of bore holes in the Heights section, the object being to ascertain how near the coal is to the surface, so that proper steps can be taken to safeguard property. Believing that the action of the company will enable the city to protect the section in question from the danger of mine caves, a resolution has been introduced in the City Council authorizing the company to drive the bore holes, but requires it to furnish the city with a copy of the results of the tests.

Harrisburg—Fifty anthracite coal companies have filed appeals from the amount of the anthracite coal tax assessed against them under the act of 1913, in the Dauphin County Court, and probably 100 companies have taken the matter to court. The auditor-general's department went ahead with its making out of bills for the amount of the tax based on the reports of the anthracite producers made on their output last year, some weeks ago. The test of the constitutionality of the tax brought in the Dauphin County Court by the People's Coal Co., of Scranton, in which a dozen or more companies joined, has not been decided, and the companies have determined to take the settlements into court, pending the decision on the case. Thus far but two coal companies have paid, and one of them under protest, so that it may be months before the coal tax is settled. No matter which way the case is decided in the Dauphin County Courts, it will be appealed to the Supreme Court.

Pottsville—Mining men have called attention to a possible shortage in the supply of dynamite, caused by the failure of manufacturers to secure raw glycerine, dynamite's chief ingredient, which is produced in Europe. Since the opening of the war, the price of glycerine has increased 100 per cent., and it is not improbable that traffic in the product may stop until the war has ended.

Peckville—Residents of Blakely Borough are somewhat incensed over the fact that culm is allowed to run in pipes from the breakers of the Mt. Jessup Coal Co. to the Lackawanna River, thus polluting the waters of this stream.

Pittston—After several days of waiting, the expected mine cave at the intersection of William and Ford Sts. occurred at noon, on Aug. 24. This settlement took down 40 sq.ft. of brick pavement, together with the track of the Scranton Traction Co. The sewer and water pipes were also damaged.

Reading—The anthracite market is becoming more active and inquiries are plentiful. The mines of the Philadelphia & Reading Coal & Iron Co., which have been working for three days per week for some time past, are now working five days per week. There is an improvement in the demand for all sizes, and the indications point to a busy fall and winter.

Bituminous

Greensburg—Coal operators in this vicinity are making plans for one of the biggest booms ever experienced in the coal business in this part of the state. According to some of the leading operators, the closing down of the Welsh, German and Belgian mines has created a fuel shortage in Europe that threatens to tie up the industry in neutral countries all over the world. Steamships are seriously affected. The coal operators say they are only waiting for the Federal Government to provide the means of shipping coal to start one of the greatest periods of prosperity in the coal industry in this section.

Johnstown—The much discussed Boswell cut-off of the Baltimore & Ohio R.R. to Johnstown is said to have been suddenly projected into the region of probability. Several representatives have been sent to the vicinity of the proposed right-of-way to investigate conditions, it is said. The proposed line would give the Baltimore & Ohio access to a rich virgin coal field, besides creating an additional rail line out of the city to the south. The developments of coal lands in that vicinity is only a matter of a few years, according to coal experts, as borings have established the presence of rich beds of coal.

Pittsburgh—Because the breadwinners of the family have in many instances returned to Europe, the poor directors of western Pennsylvania counties are being besieged with applications for aid from destitute foreign families. Throughout the coke regions, the task of providing these people with food is becoming acute. The foreign populaaion is here large, and many of the men returned to their home countries before hostilities began.

WEST VIRGINIA

Charleston—Miners who have been on strike at Boomer, Winifrede and Black Betsy have returned to work, under an agreement by which operations will be kept up pending the negotiations now on between the union and the Kanawha Coal Operators' Association. The trouble at these points rests principally on the discharge of miners by the superintendents, for various reasons, and the negotiations are now being conducted with reference to a clause in the three-year agreement specified reserving to employers full right to hire and discharge men. The point is to be settled, it is understood, by an umpire selected by the two boards.

Fayetteville—Several hundred men employed by the Paint Creek Co. in its operations in seven mines on Paint and Brier Creeks have been idle for several days, following the failure of the company to pay them at the usual time. This is said to have occurred before at the company's mines, and the men refuse to go back to work until they are paid. The mines affected are those at Mucklow, Wacoma, Banner, Tomsburg, Hickory Camp and Brier Creek.

Dorothy—The two mines of the Four States Coal Co., located on Coal Creek, near this place, have been closed down for an indefinite period, on account of the inability of the company to arrive at a satisfactory agreement with the miners. About 600 men are affected. There has been trouble at the mine for several weeks, conferences failing to evolve a settlement.

ALABAMA

Gadsden—The Van Zandt Mine No. 2 of the Racoon Mining Co., near Gadsden, Ala., after having been closed down for the past year, has resumed operations. G. T. Schoolar, of Gadsden, is president.

Cullman—The Soutts Mountain Coal & Coke Co., which has been operating on an extensive scale near Cullman, Ala., for the past 15 years, having worked out its territory, has sold its stock and closed down. Robert Stephens, of Birmingham, is president.

Cordova—Sale of the properties of the Oakleaf Coal Co. will be transacted privately, as the auction sale was unsuccessful. This is the order of E. H. Dryer, referee in bankruptcy.

TENNESSEE

Knoxville—A miners' field day will be held in Knoxville, on or about Oct. 15, according to officials in charge of the local mine-rescue station. First-aid, explosion demonstrations and athletic contests will feature the occasion. Elaborate preparations are being made, and it is expected that miners from all over the South will attend.

Jellico—After a day's conference at Jellico, the three Knoxville officers of the United Mine Workers of America and operators in the Jellico district agreed to postpone discussion of the wage scale until Sept. 18. It was stated that the miners officers are preparing a petition for presentation to the Tennessee Legislature at the next session requesting the removal of convicts from the mines of the state.

KENTUCKY

Barbourville—Continued improvement in the coal industry is leading to a full resumption of operations in the southeastern Kentucky fields. In the event of a prolonged European war, local operators believe that they can supply a great part of the Eastern trade, which draws its present supply from the Eastern States.

London—The office and store building of the New Laurel Coal Co., at Pittsburg, Ky., two miles south of here; the office of Captain W. A. Pugh, coal operator, and other structures were destroyed recently by fire. The total loss is estimated at $10,000, only partly covered by insurance.

Jenkins—It is said the Consolidation Coal Co., in its Jenkins-McRoberts coal field, is making increases in its plants and will double its capacity within the next 30 days. Railroads—both the Louisville & Nashville and the Baltimore & Ohio—are taxed to their limit to handle the large tonnage. Additional trains will be added.

Mater—The Elkhorn Coal Co. will make increases in its plant here soon. One hundred extra miners will be put to work; 200 houses are under construction.

OHIO

Coshocton—After a session covering two weeks, with frequent interludes for private conference, the joint meeting of Ohio miners and operators interested in the strike in this part of the field adjourned on the afternoon of Aug. 29 without having come to any settlement. A thousand miners will continue on strike in consequence, unless some means of ending the trouble is quickly arrived at.

Congo—Mine No. 301, at this place, which was badly damaged by fire on Oct. 31 of last year, has been inspected by representatives of the State Mining Department and found to be in shape for the resumption of work, as the fire has been completely smothered. It is expected that it will again be in operation by the middle of September.

INDIANA

Terre Haute—Officials of the United States Bureau of Mines have been here arranging for the contests, Sept. 12, when teams and individuals will do first-aid and rescue work and the bureau will give demonstrations of explosions with its steel room. Teams are being entered from the Eastern fields, and following the contests a training school will be established in this city.

ILLINOIS

Peoria—The Ubben Coal Co. is making arrangements for considerable improvements at its mine on the East Bluff. The installation of electric mining machinery will be one of the changes made, and the interior of the mine is to be lighted electrically.

Danville—Local coal operators recently received announcements of the National First-Aid and Rescue Meet to be held in Terre Haute, Ind., Sept. 12. The Bunsen Coal Co. will have teams entered from both the Westville and Universal (Indiana) districts, and it is believed that these contestants will make a creditable showing.

Herrin—The Roberts & Schaefer Co., of Chicago, which has the contract to rebuild the top works, recently destroyed by fire at Mine B of the Chicago & Carterville Coal Co., is breaking records in getting the property in shape for operation. It is expected that within 30 days from the time the contract was awarded, the property will be in shape to hoist coal.

Marion—The drouth in the southern Illinois mining fields was broken during the past week by several days of heavy rain. In many sections, this is the first rain since last May, and since as early as June, water has had to be hauled to several mines to keep them in operation. The supply is now abundant.

MISSOURI

Kansas City—The district conferences that have been in session for several months have been concluded. Satisfactory settlements have been made in all districts where there have been dissensions between operators and miners, and all the mines are running full crews.

Webb City—For the first time, the mine-rescue car of the National Bureau of Mines, which heretofore has confined its demonstration and lecture work to coal-mining districts, has been sent to a metal-mining section. It is now stationed here, and will remain in this vicinity a month. Its presence is due to the activities of the Jasper County Anti-Tuberculosis Society, which was organized after attention had been called to the high death rate from tuberculosis in the mines. The car is later to be taken to Fort Smith, Ark.

COLORADO

Denver—Thirty-five independent Colorado coal operators on Aug. 29 signed working agreements for the coming year with the district organization of the United Mine Workers of America. All these operators who have conducted their properties during the last few months under agreements with the Union renewed these agreements, the old contracts expiring Sept. 1. Two thousand men are employed in the independent coal mines.

Hayden—The Colorado-Utah Fuel Co. is sinking a large coal mine on what is known as the Wedge seam, in the middle series, and building a large camp, at Harris, near Hayden, Routt County, Colo., on the Denver & Salt Lake R.R. The vein at this point is slightly pitching and shows from 7 to 9 ft. of high-grade bituminous coal, and will be worked by a rock slope about 150 ft. long, which has recently reached the coal. Shipping is expected to begin in about 30 days, and in about a year to reach an output of 2000 tons per day.

WYOMING

Kemmerer—Mine No. 6 of the Kemmerer Coal Co., which was shut down last Spring, has been reopened and will employ 150 men.

MONTANA

Lombard—The Western Coal & Coke Co., owning a valuable coking coal property near Lombard, Mont., on the Northern Pacific Ry., is selling an issue of $150,000 of preferred stock for the purpose of opening a small mine and erecting a coal washer, small battery or byproduct coke ovens, probably of the Mueller type, a few dwelling houses and other equipment necesary for such a plant. Construction work is expected to begin in the early coming spring.

FOREIGN NEWS

Paris, France—Refugees from Frameries, Belgium, declare that when the Germans occupied that town, they stopped all mine shafts and destroyed the machinery. Some go so far as to say that many miners were at work in the mines when the pit mouths were closed. This is, however, hardly probable.

RECENT COAL AND COKE PATENTS

Steam Boiler. P. Jones, Wigan, Scotland. 1,089,476. Mar. 10, 1914. Filed Jan. 6, 1912. Serial No. 669,840.

Miner's Lamp. J. Van Liew, Chicago, Ill. 1,090,250. Mar. 17, 1914. Filed Apr. 29, 1913. Serial No. 764,310.

Boiler. L. D. Freeman, Pittsburg, Kan. 1,089,758. Mar. 10, 1914. Filed Feb. 17, 1913. Serial No. 748,930.

Miner's Lamp. J. Van Liew, Chicago, Ill. 1,090,250. Mar. 17, 1914. Filed Apr. 23, 1912. Serial No. 692,627.

Coaling Device. O. Bauerle, Sacramento, Calif. 1,090,012. Mar. 10, 1914. Filed July 9, 1913. Serial No. 778,141.

Miner's Lamp. P. Guilman, E. St. Louis, Ill. 1,090,051. Mar. 10, 1914. Filed Oct. 28, 1913. Serial No. 797,817.

Furnace Grate. J. Beck, Two Harbors, Minn. 1,090,014 Mar. 10, 1914. Filed Feb. 21, 1911. Serial No. 609,795.

Smoke Conveyor. C. F. Kellems, Holder, Ill. 1,090,071. Mar. 10, 1914. Filed May 23, 1913. Serial No. 769,505.

Smoke Consumer. L. Kidd, Bloomfield, Ind. 1,090,072. Mar. 10, 1914. Filed Jan. 31, 1913 Serial No. 745,511.

Forced Draft Grate. R. G. Long, Lawrence, Kan. 1,089,-237. Mar. 3, 1914. Filed July 2, 1912. Serial No. 707,342.

Mine Door. J. K. Orr and L. F. Jones, Zeigler, Ill. 1,090,-562. Mar. 17, 1914. Filed Apr. 7, 1910. Serial No. 554,008

Water-tube Boiler. A. F. Yarrow, Blanefield, Scotland, 1,101,606. June 30, 1914. Filed Jan. 20, 1912. Serial No. 672,494.

Stoking Grate for Furnaces. D. F. Nisbet, Grafton, Va. 1,088,445. Feb. 24, 1914. Filed Sept. 6, 1910. Serial No. 580,610.

Mechanical Stoker. F. M. Underwood, Hastings, Neb. 1,091,406. Mar. 24, 1914. Filed May 3, 1913. Serial No. 765,354.

Smoke-Stack Protector E. C. French and T. E. Craig, McKinney, Texas. 1,090,389. Mar. 17, 1914. Filed June 16, 1913. Serial No. 774,504.

Apparatus for the Manufacture of Coal Gas. R. C. Congdon, Atlanta, Ga. 1,090,813. Mar. 17, 1914. Filed Apr. 29, 1913. Serial No. 764,310.

Steam Boiler Setting. M. W. Sewall, assignor to Babcock & Wilcox Co., Bayonne, N. J. 1,090,947. Mar. 24, 1914. Filed May 27, 1912. Serial No. 699,861.

Positive Cleaning and Self-Dumping Stoker. R. S. Riley, Providence, R. I. 1,090,651. Mar. 17, 1914. Filed Aug. 31, 1912. Serial No. 718,606.

Grate. A. B. Coates, assignor to Economy Forced Draft Slack Burner Co., Elsworth, Kan., 1,102,139. June 30, 1914. Filed Apr. 15, 1913. Serial No. 761,378.

Stack Cooler for Blast Furnaces. L. L. Knox assignor to Keystone Bronze Co., Pittsburgh, Penn., 1,101,701. June 30, 1914. Filed Aug. 4, 1911. Serial No. 642,338.

Apparatus for Regulating the Air Supply for Gas Producers. H. L. Doherty, New York, N. Y., 1,101,787. June 30, 1914. Filed Feb. 15, 1910. Serial No. 544,097.

Chain Grate Stoker. J. H. Rosenthal and C. S. Davy, assignors to Babcock & Wilcox Co., Bayonne, N. J. 1,091,666. Mar. 24, 1914. Filed June 24, 1912. Serial No. 705,424.

Apparatus for Discharging Ashes and Clinkers. W. S. Parsons, assignor to J. Stone & Co., Deptford, England, 1,102,351. July 7, 1914. Filed Feb. 3, 1913. Serial No. 746,021.

Firing Door Controlled Forced Draft Blower for Steam Boiler Furnaces. E. R. Mulcahey, assignor to Draft Regulator Co., Providence, R. I. 1,090,820. Mar. 17, 1914. Filed Mar. 26, 1912. Serial No. 686,340.

PUBLICATIONS RECEIVED

The Canadian Mining Institute Bulletin No. 24. One hundred and fifty-eight pages 6x9 in., illustrated.

The Canadian Mining Institute Bulletin No. 23. One hundred and three pages 6x9 in. illustrated.

Department of the Interior, U. S. Geological Survey. "The Production of Anthracite in 1913," by E. W. Parker. Sixteen pages, 6x9 in.; illustrated.

Department of the Interior—U. S. Geological Survey. "The Production of Peat in 1913," by Charles A. Davis. Nine pages, 6x9 in., unillustrated.

Department of the Interior, Bureau of Mines, Miners' Circular 12. "The Use and Care of Miners' Safety Lamps," by James W. Paul. Sixteen pages 6x9 in. illustrated.

Department of the Interior, Bureau of Mines. Technical Paper 60 "Mud-Laden Fluid Applied to Well Drilling," by J. A. Pollard and A. G. Heggem. Twenty one pages 6x9 in. illustrated.

Department of the Interior, Bureau of Mines, Technical Paper 58. "The Action of Acid Mine Water on the Insulation of Electric Conductors," by H. H. Clark and L. C. Ilsley. Twenty six pages 6x9 in.

Department of the Interior, Bureau of Mines, Technical Paper 56. "Notes on the Prevention of Dust and Gas Explosions in Coal Mines," by George S. Rice. Twenty-three pages 6x9 in., unillustrated.

Department of the Interior—Bureau of Mines, "Monthly Statement of Coal Mine Fatalities in the United States, May, 1914, with Revised Figures for Preceding Months." Compiled by Albert H. Fay. Sixteen pages, 6x9 in., unillustrated.

Department of the Interior, U. S. Geological Survey. "The Production of Gas, Coke, Tar and Ammonia at Gas Works and in Retort Coke Ovens and of Gas and Tar at Water-Gas Works in 1912," by Edward W. Parker. Thirty-two pages 6x9 in. with numerous tables.

PERSONALS

Edward H. Coxe, of La Folette, Tenn., has just returned from a three weeks' trip to Denver and the Routt County coal fields.

Samuel D. Weakley has been retained by the Alabama Coal Operators' Association to conduct the resistance to the plan of the railroads to make an increase in local coal rates.

W. T. Brown, of Ragland, Ala., has reopened his mines at Taits Gap, the same having been closed down for more than a year. Extensive improvements have just been completed.

Sam Davis, the well known Toledo coal dealer, has a force of men at work on what it is said will be when completed the largest coal yards in Ohio. The initial outlay on the new coal yards will be $30,000.

Kenneth U. Meguire, of Louisville, Ky., president of the Harlan Coal Co. and of the Snead-Meguire Coal Co., recently went to Fairmount, W. Va., to play golf with George T. and James O. Watson in the tournament in which the three coal men are all entered.

George G. Yeomans, formerly assistant to President Delano, of the Wabash R.R. Co., has been elected president of the Monon Coal Co., of Indiana, with headquarters in the Old Colony Building, Chicago. This position was recently vacated by Harry N. Taylor, of Chicago.

William McLaughlin, of Huntington, Ark., was recently elected president, succeeding Peter R. Steward, of McAllister, Okla., resigned, of the United Mine Workers of America of Oklahoma, Arkansas and Texas. Thomas L. King, of Fort Smith, Ark., was elected vice-president.

Thomas E. Byrnes, of St. Louis, Mo., for several years with the Franklin Coal & Coke Co., and the Bickett Coal & Coke Co., and formerly superintendent of transportation of the Missouri Pacific-Iron Mountain Lines, entered the coal business for himself on Sept. 1, with offices in the Wright Building.

John Britt, chief of the mine clerks of the Pittsburgh Coal Co., of Pittsburgh, Penn., has retired from that organization to become identified with the Berwind-White Coal Mining Co., at Windber, Penn., as auditor of the latter company. Mr. Britt has been succeeded by W. C. Fife, of the operating department of the Pittsburgh Coal Co.

Colonel Harvey M. La Follette, formerly president of the La Follette Coal, Iron & Ry. Co., returned last week to La Follette, Tenn., after a protracted absence in New York, where he has been working on a plan to reorganize the above mentioned company, now in the hands of a receiver. After remaining in La Follette a few days, he returned to New York to again take up his reorganization work.

OBITUARY

Thomas B. Heims, formerly a bituminous coal operator at Osceola Mills, Penn., died recently at his home in Philadelphia. He was 64 years of age and retired from business three years ago.

W. C. Lovejoy, aged 36 years, a well known coal man of Birmingham, secretary of the Canal-Export Coal Co., committed suicide at St. Vincent's Hospital, Birmingham, on Aug. 25. Ill health is said to have been the cause.

John Ralston, 84 years old, a pioneer operator of the Middlesboro, Ky., district, and the first inspector sent into this section by the English syndicate, died recently at his home here. Mr. Ralston came from the Pennsylvania coal district 30 years ago, and since then he and his sons have been important factors in the development of the industry in this part of Kentucky.

William Thomas Lewis, first Baron Merthyr of Seughenydd County, Glamorgan, died in London, Aug. 26, at the age of 77 years. He was one of the largest coal mine owners and operators in Wales. He served many years on royal commissions on matters connected with coal mining, trade disputes and various labor questions. He was president of the University College of South Wales and Monmouthshire, formerly president of the South Wales Institute of Engineers, the Mining Association of Great Britain and the Institute of Mining Engineers; vice-president of the Iron and Steel Institute and the Institute of Mechanical Engineers, and chairman of the Monmouth and South Wales Board of Examinations for mining certificates.

CONSTRUCTION NEWS

Philadelphia, Penn.—The Lehigh Valley Coal Co. is making extensive repairs to its big breaker at Beaver Meadow.

Yolande, Ala.—The Yolande Coal & Coke Co. will spend about $30,000 on improvements at Yolande and Abernant mines.

Kittanning, Penn.—The Allegheny River Mining Co. is opening a new mine on the Allegheny River, at Kittanning. This will be known as the Nicholson Run mine.

Euclid, Penn.—The Euclid Coal Co. is opening a coal mine on a 100-acre tract at Euclid station, near New Castle, Penn.. A coal tipple, sidings and a large number of houses for the miners' families will be erected before the winter sets in.

Cincinnati, Ohio—Contracts for the construction of two bridges across the Tug River and two miles of railroad up

Blackberry Creek have been awarded to Boxley, Haley & Co., of Roanoke, Va., by the Norfolk & Western Railway Co., at a cost of $125,000. The construction of this road will add greatly to the coal traffic of the Norfolk & Western, and opens one of the greatest coal territories in eastern Kentucky.

Johnstown, Penn.—The Savan Coal Co., owner of what is known as the Lawry coal tract, near Deckers Point, Indiana County, is pushing work on the railroad from the B. R. & P. Ry. at Savan to the opening, a distance of about two miles, and hopes to be ready to ship coal in the near future. Work on this road was commenced last summer, but was not completed.

Nashville, Tenn.—The Nashville, Chattanooga & St. Louis Ry. has just authorized the erection of a modern steel coaling plant at Hollow Rock Junction, on the Paducah & Memphis Division, and is prepared to expend between $15,000 and $20,000 in this work. The purpose of this coaling station is to take care of the locomotives in this territory as far as Paducah, Ky., also portions of the Nashville Division.

Windber, Penn.—M. E. McNeal is pushing his mining project near Cairnbrook. The tipple and scales are up, the mine is turning out coal, and the railroad line from the mine over the turn of the mountain into Bedford County is being pushed. It will probably be two months before this line is completed over the crest of the hill.

NEW INCORPORATIONS

St. Louis, Mo.—Davis Creek Coal Co., of St. Louis, has been incorporated with a capital of $75,000 by L. L. Brande, J. L. Rowland and J. J. Wells.

Woodsfield, Ohio—The Cambria-Stafford Coal Co. has been incorporated at Woodsfield, Ohio, with a capital stock of $10,000. It will deal in coal lands.

Harrisburg, Ill.—The Oliphant-Wasson Coal Co. has been incorporated here with a capital of $250,000, by C. M. Wasson, G. T. Gaskins and J. T. Gaskins.

Kansas City, Mo.—The Bruce-Cherokee Coal Co. has been organized, with a capital of $2000. The incorporators are J. B. Bruce, M. W. Coulson and V. W. Bruce.

Richmond, Va.—The Himyar Coal Corporation, of Richmond, Va., is increasing its capital stock from $50,000 to $75,000, and changing the common stock from $25,000 to $50,000.

Pittsburgh, Penn.—Announcement has been made of the increase in the capital stock of the Pittsburgh Coal Washer Co. from $12,000 to $50,000. O. J. Tope is treasurer of the company, with offices in the Fulton Building, Pittsburgh, Penn.

Roanoke, Va.—The Carrs Fork Coal Land Co. has been incorporated, with a maximum capital stock of $100,000 and a minimum of $10,000. J. B. Fishburn is vice-president; B. B. Hull, Jr., treasurer, and Leon Neal is secretary, all of Roanoke.

Jackson, Ohio—The Ohio & Indiana Collieries Co has been organized, with a capital stock of $150,000, to deal in real estate, coal, iron and other minerals. The incorporators are E. E. Morgan, Walter McCloud, David Armstrong, M. J. Jones and E. E. Eubanks.

Fairmont, W. Va.—The Liberty Coal Co. has been incorporated with an authorized capital of $2,000,000. The incorporators are Josiah V. Thompson, Robert Howell and H. A. Hibbs, of Uniontown, Penn.; Herman M. Kephart, of Connellsville, Penn., and William H. Burns, of Fayette City, Penn.

St. Louis, Mo.—The Davis Creek Coal Co. has been organized with a capital stock, fully paid, of $75,000. The purpose of the company will be to operate coal mines, buy and sell coal, also to generate and sell electric light and power. The incorporators are J. J. Wells, J. L. Rowland, L. L. Brande, Edwin H. Conrades and R. E. Rombauer.

INDUSTRIAL NEWS

Philadelphia, Penn.—The bituminous tonnage of the Reading Ry. for June, 1914, was 1,230,022 tons ,as compared with 1,293,971 tons for June of 1913.

Connellsville, Penn.—Through a petition recently filed, the Peabody Coal & Coke Co. asked the court to grant it a decree of dissolution. The petition merely set forth that the company has at present neither assets nor liabilities, and that it has been deemed expedient to take this procedure.

Fayette, W. Va.—The heavy coal loadings thus far in the West Virginia and Kentucky fields have led officials of the Chesapeake & Ohio R.R. to feel assured that the coal-loading record of the road will be broken.

New York City—G. A. Kreutzburg, president of the Wolf Safety Lamp Co., is making arrangements to have the Wolf lamps manufactured in this country, in case European hostilities cut off the supply from Germany for any considerable period of time.

Duluth, Minn.—While Duluth coal men are not hesitating to urge customers to buy fuel early, they place no faith in the report of a probable coal shortage. There are more than 8,000,000 tons of coal stored at the Duluth-Superior docks, according to accurate estimates.

Olympia, Wash.—The Public Service Commission recently announced its decision to order into effect the reduced rates on coal shipments from Roslyn to all points named in the recent tentative order. The final order in the case will probably become effective in a few days.

Manchester, Ky.—One of the biggest timber and coal land deals that have been made in this region for some time is being consummated in Clay County. Scranton, Penn., parties have purchased some 40,000 acres of the finest coal and forest land to be found in the Kentucky mountains.

Mobile, Ark.—A voluntary petition in bankruptcy was recently filed in the United States District Court by the Markley Coal Co., a corporation of Mobile, declaring its assets to be nothing and its liabilities $46,777. This company was connected with the well known Markley-Miller operations.

Ketchikan, Alaska—Coal en route to this port on board the Canadian Pacific freight steamer 'Princess Ena," and consigned to the Northland Dock Co., of Ketchikan, was seized by the British Government at Prince Rupert recently, and loaded there on board the Canadian cruiser "Rainbow."

Chicago, Ill.—A substantial increase in the coal tonnage of the Central Freight Association territory accounts for the decerase of 24,738 cars in the surplus freight cars on railroads reporting to this association. On Aug. 15, there were 174,260 cars, of which 75,272 were box, 7189 flat, 56,560 coal and gondola and 35,259 of other kinds.

Halifax, N. S.—The Nova Scotia Government recently sent a message to His Royal Highness, the Duke of Connaught, that Nova Scotia would be glad to deliver 100,000 tons of coal for such purpose as would best serve the interest of the Empire at the present time. Landed at Halifax, this coal tonnage would be worth approximately a half million dollars.

Thurmond, W. Va.—The west end of the Chesapeake & Ohio R.R. bridge over the New River, at this place, was badly damaged a few days ago, when a yard engine derailed two 70-ton steel coal cars on the bridge The structure was temporarily repaired so that empties can be handled over it, but until other repairs are made, loaded cars will be handled by way of Sewell, over the Southside branch.

Pittsburgh, Penn.—Pittsburg coal operators are preparing to resume more activity in mining in the immediate future than at any time this year. During the summer, not more than 35 per cent. of the mining capacity has been employed, owing to the congestion of coal on Northwestern storage docks. Recently, reports have come that the railroads are commencing to move the stock coal in the Northwest in empty grain cars brought to the Lake ports from the West.

Birmingham, Ala.—Alabama coal operators are greatly interested in the announcement from South America that unless the railroads there receive a supply of coal before long, they will have to cease operations. Chile has an inquiry in for 300,000 tons of Alabama coal. As soon as banking arrangements have been perfected, the business will be handled by operators in this district. Ships to handle the coal are already promised through the port at Pensacola. This order will be followed by others, and shipments when once started are to be steady and of large tonnage.

Johnstown, Penn.—The Graff interests recently purchased several thousand acres of coal and coal land in Loyalhanna and Salem Townships, Westmoreland County. These tracts lie about a mile south of Salisburg and five miles north of Andrico. It is confidently believed that the Crabtree Branch of the Pennsylvania R.R. will be extended from Andrico to Saltsburg, where it will connect with the West Penn. The building of this railroad will not only open up a big section of coal land for development, but would give residents of the Kiski Valley direct railroad communication with Greensburg.

Coal Trade Reviews

General Review

Anthracite slows down to a more conservative basis. Much of the West Virginia high-grade bituminous fuels now out of the market. Large contract closed with the Italian Government. Internal business adversely affected by slow industrial conditions.

The heavy anthracite demand of the past few weeks has slowed up to a certain extent, although the market is still active. The Western trade, which anticipated a shortage when the European war developed to such large proportions, started an active buying movement that culminated last week in a situation resembling mid-winter activity. Although still strong, there is a possibility of a relapse before the actual fall business opens up in full blast. All the prepared grades are in good demand at the full circular, with the possible exception of egg.

A large contract business is noted in the Atlantic coastwise trade, particularly as regards the Pocahontas and New River fuels; a big volume of these is either under option or already disposed of, and there are persistent rumors of an impending shortage. As regards the Pennsylvania coals, in the export trade, there seems to be little possibility of these becoming a feature in that business until the West Virginias advance to at least $3.25, or 50c. above the prevailing level. One of the most important developments of the week was the closing of a contract for 350,000 tons for the Italian Government.

The ordinary consumption seems to be reduced to a minimum, and there is scarcely any spot demand at all. On the other hand, shipments to tidewater are heavily restricted and reports indicate that supplies are even lower than usual, while there is a firmness to quotations that is strongly indicative of higher prices later.

In Canada, there are many reports of large transactions at profitable figures, when, as a matter of fact, the regular circular is being maintained with great difficulty; buying is erratic and fluctuating to both extremes. The Ohio market is suffering from the general business depression, steam consumption being light and little money in circulation. The domestic situation is improving, however, and prices are steady at the full circular.

The Southern market reports export inquiries from South America aggregating half a million tons; the business is competitive with West Virginia operators, and the local companies are making a strong effort to secure it. At present, it seems to hinge largely on the question of charters.

Contradictory conditions prevail in the Middle Western trade, substantial advances on the one hand being offset by like recessions on the other. As a rule, the demand seems to be improving as the fall season approaches, and the situation is expected to be materially improved by the close of the current month. The steam market continues the weak department, the restriction in industrial operations having curtailed the demand for these grades.

ATLANTIC SEABOARD

BOSTON

Large volume of Pocahontas and New River sold for export; a shortage expected for coastwise shipment. Pennsylvania grades in strong position and a comprehensive business expected. Georges Creek also in demand off-shore. Anthracite trade good and plenty of orders on hand for September.

Bituminous—Things in Pocahontas and New River have developed sufficiently the past week to cause some uneasiness among New England buyers. Most of the agencies have little coal available at Hampton Roads for September and October, so a large volume is either under option or actually sold for loading off-shore. There is a considerable demand from Mediterranean points and from other directions there is already inquiry for coal that will be mined 60 and 90 days hence.

Coastwise, the movement is still confined to contract business, and while prices have not advanced either f.o.b. or on cars there is a notable firmness that seems to forecast higher prices later. There are practically no cargoes offering on the market, but on the other hand no spot demand of any account has yet developed here.

The Pennsylvania grades continue in a strong position and conditions improve almost daily. Both all-rail and at tide, coal is in better request even than last week and several of the larger shippers are laying plans to handle a comprehensive business this fall. The mines are on better time and no doubt something will be heard on prices before long. Shippers are watching the export market closely and it is more than likely that there will be something of a tonnage to be loaded at Philadelphia for foreign points.

Georges Creek receivers here are beginning to worry over the outlook for sufficient supplies of that grade. Already foreign steamers are being given preference in loading, coal being held for them while coastwise boats wait, and it will not be surprising if New England again runs short of this popular grade. Unquestionably, the shippers are much interested in the off-shore market, with an eye to business in the future, "after the war."

In Water Freights there has been no special development since last reports. Rates are firm but a further advance has not materialized so far.

Anthracite—An unexpectedly heavy demand came on the last of August and practically all the companies are carrying orders over into September. The retailers are beginning to be swamped with orders and they are, in turn, ordering coal freely of the shippers. Stove is expected to be in even shorter supply in a few weeks.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.25@1.70	$1.67@1.77	
Philadelphia*	2.15@2.75	2.70@2.95	2.92@3.02	
New York*	2.45@3.05	2.80@3.25	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.85@2.95
Boston†	.....	.....	.....	3.68@3.83
Providence†	.....	.....	.....	3.60@3.68

* F.o.b. †On cars.

NEW YORK

Uncertainties still predominate the bituminous market, though the outlook is favorable. Italian contract for 350,000 tons closed. Anthracite slows down to a more conservative basis. Operations in the mining regions still heavy.

Bituminous—Aside from the active inquiry in export business, which is culminating in an occasional order, the local bituminous situation continues slow. The abnormal conditions prevailing as a result of the European wars, has caused many uncertainties in the business situation here. Some branches of manufacturing are benefited while others have been compelled to curtail or close down completely with the result that the coal consumption is fluctuating widely.

One of the most important developments of the week in export circles was the closing of a contract by the Davis Collieries Co. for 350,000 tons of coal for the Italian Government, shipment to be made in Italian bottoms. While no details are available this is probably for West Virginia coal. It is not generally believed that the Pennsylvania fuels will be able to break into the export business until Hampton Roads prices touch $3.25 to $3.50 or 50 to 75c. above the ruling level.

The situation at Tidewater is considered quite favorable at the moment. Business is slow and orders rather light, but there is no coal of any description reported on demurrage; on the contrary supplies are reported rather short. The movement on the Pennsylvania R.R. is delayed and considerable coal is reported blocked around Altoona. Mines as a rule are working good and prices are steady though at the relatively low level prevailing for the past few weeks as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—There has been a conservative slowing down in the hard coal business though the situation is still active. With the gradual development of the war situation, the early

part of last month, anthracite consumers, particularly in the West, began to anticipate a shortage, with the result that by the middle of the month a heavy buying movement developed attaining almost mid-winter proportions. It was purely a psychological condition, but it was instrumental in moving a great deal of coal.

All of the prepared grades are still firm with the possible exception of egg coal which is still occasionally offered at cut prices. The heavy demand for stove coal in all directions has helped materially to move the surplus accumulations of egg and nut coal at the full circular. Pea is growing in demand. In the steam fuels there is little of the individual high-grade varieties offered at cut prices; concessions are still heard on the lower grades though the market is not by any means flooded.

The line trade continues the leader, the Western demand for nut coal being unusually heavy, and the Canadian call for stove and nut being accentuated by the European wars. This may be taken as an indication that there will not be any surplus coal at Tidewater this fall.

Practically all the mines are working on full schedule, and a very active situation is anticipated when the winter demand opens up. The local market is now quotable on the following basis with the new September circular in effect:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.10
Egg	5.35	5.10@5.35	5.30	4.95@5.30
Stove	5.35	5.35	5.30	5.30
Chestnut	5.60	5.50@5.60	5.55	5.35@5.55
Pea	3.55	3.45@3.55	3.50	3.20@3.50
Buckwheat	2.80	2.75@2.80	2.50@2.75	2.10@2.75
Rice	2.30	2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.75@1.80	1.75	1.30@1.75

PHILADELPHIA

Better tone to anthracite market. Local conditions improving, and increased operations at mines. Little change in the bituminous situation, but trade looks for gradual improvement.

Anthracite—There is no doubt but what the situation shows a marked improvement. Line and local operators state that they are receiving many inquiries, and the retail dealers report that coal of all sizes is commencing to move. The return of house holders and the almost universal idea that coal is likely to be short the coming winter, is having its effect, and more coal wagons are seen on the streets than has been the case for a couple of months. Most of the dealers are well stocked, however, many of them carrying over considerable coal from the spring months, and it will possibly be a couple of weeks before they begin taking on additional supplies in appreciable quantities. In the meantime, the individual operators still stand ready to fill any gaps at less than circular.

It seems the concensus of opinion in the trade, that the demand will not only come early, but continue particularly strong throughout the winter months, and the dealers are laying their plans accordingly. Outside of chestnut and pea coal, which need the stimulus of a low price to move, the trade is absorbing practically all sizes. Operations at the mines were continued last week at five days, and it is understood that this program is likely to be followed until the market can absorb the full weekly output.

Prices at Tidewater rule about as follows:

	Circular	Individual
Broken	$4.75	$4.75
Egg	5.00	5.00
Stove	5.00	5.00
Chestnut	5.25	4.90 @ 5.00

Bituminous—There seems to be better feeling in the bituminous trade. While mining still continues under a curtailed basis, many operators seem to have optimistic opinions regarding the near future. This is indicated by the almost general attitude of the trade on future business; spot coal is anywhere from 25 to 30c. less than a quotation for future delivery, which certainly spells better conditions to come.

BALTIMORE

Interest centered on export possibilities. Local conditions remain flat, but big change is looked for in the near future. Surplus at tide disappearing.

With home conditions slow it is natural that the eyes of the coal trade should be turned toward the new possibilities in the export business. From every quarter of the globe come inquiries for fuels to take the place of Welsh coals that have been withdrawn as a result of the European war. A number of contracts have been closed on these advances already, and a great field is opening up. This call is for the better grade coals.

Industrial conditions are so poor for the present that there is little doing here for domestic consumption. Cheap fuel is offering freely at the mines. West Virginia gas three-quarter was selling to the trade as low as $5 in places; steam coals are around 95c. In the Pennsylvania regions the medium to poor grades are selling at from $1 to 1.10. First grade coals are showing a little inclination to stiffen, and are selling from $1.25 to $1.35.

Under the growing export movement of both coal and grain, which requires cargo and bunker coal, the big surplus at tide is fast disappearing. Some unexpected coal loadings for Norway and Greece the past week took care of part of the free coal at tide. Charter rates to foreign ports are abnormally high but more bottoms are offering now that Britain and France are in control of the sea. Coastwise bottoms are offering easily and there is little or no change of rate to be noted.

Anthracite men report a little better inquiry. No general awakening is predicted for less than three weeks or a month, however.

HAMPTON ROADS

Export shipments continue heavy. Rumors of sales negotiated at prices above circular. Government transports taking considerable bunker fuel at Newport News.

Shipments from tidewater during the week have been heavy. This is especially true as regards export movement, although coastwise shipments have also shown up well. The demand for all grades shipped from Hampton Roads still continues good, although it is reported that some large lots have been sold at prices above circular it is difficult to get this confirmed.

The market is full of inquiries from various foreign countries. It is understood that about 100,000 tons has been sold to parties in Greece and that this coal will begin to move during the next few days. Export shipments have been made to Havana, Cardenas, St. Lucia, Callao, Para, Bahia Blanca, Rio, Buenos Aires, Manaos, Kingston, Genoa, Naples and Lisbon. There has also been a small movement via schooner to San Juan, Porto Rico.

The United States Government has taken considerable coal at Newport News for transports which are due shortly to sail for European ports.

Both Sewalls Point and Newport News at this writing are within a few thousand tons of the August, 1913, dumpings and unless tonnage due fails to arrive during the next two days the total of these two roads for August, 1914, will be in excess of last year. Lamberts Point figures are not obtainable at this moment.

COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Standish Hall[2]	British	Virginia	Rio Janeiro	2544	
Haxby[2]	British	Baltimore	Genoa	2252	
Warren Adams[1]		Philadelphia	Charleston	587	
Kate B. Ogden[1]		Philadelphia	Charlottetown, P.E.I.	541	$1.60
Georgina Roop[1]	British	Philadelphia	St. John, N.B.	423	1.50
Ramazan[2]	British	Norfolk	Rio Janeiro	2211	5.40
Edison Light[2]	American	Philadelphia	Rio Janeiro	1699	
Bratlingsborg[2]	Danish	Virginia	River Plate	1963	4.80
Edith[1]		Baltimore	San Juan, Porto Rico	1051	

[1] Schooner [2] Steamer

LAKE MARKETS

BUFFALO

Conditions mixed in both anthracite and bituminous. Situation not greatly affected by war except in Canada. Home consumption less than normal. Better demand anticipated.

Bituminous—As a rule it is held that the war is going to help this country, but a period of depression is expected before the benefit is felt and it is a question how long that will last. There is a report from Pittsburgh that the war has not improved the export trade at all and there is no prospect of orders on that score. Home business has been injured by it so that the coal business so far has only sustained a loss. Canada has lately bought considerably more coal than it has used but this is no real advantage, as the time will come when that coal must be used and buying will cease. There is evidence that Canadians are much more puzzled over the outlook than is the case with us. Buying is erratic, fluctuating to both extremes. On this account the jobber and shippers hardly know what to do. A Buffalo salesman is just back from a visit to Montreal with the report that there is an over-supply on hand now.

There are many false reports of transactions. Some members of the trade appear to think that every unusual order placed is for use in the war somewhere. There is no change in the semi-official circular. Much of the poorer coal

sells for less but prices continue nominally as follows: $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, the different sizes being fairly on a level as to strength. Allegheny Valley slack is about on a par with Pittsburgh, but sizes are 15 to 25c. lower.

Anthracite—The demand is improving, though neither shippers nor local dealers are sure that the stir is the beginning of the fall rush. Practically all sizes are asked for. Canada has bought so much of late that it will probably drop out when other sections start buying. The big apple crop has created a demand for grate, which is used in the apple evaporators. The independent dealers get a large part of this trade.

There is a good amount of anthracite moving out by Lake, but the rush of June and July cannot be kept up. There is getting to be a very large amount on the Upper-Lake docks and till it begins to sell there will be light shipments. The amount loaded during the week, as recorded by the custom house was 78,000 tons.

TORONTO

Usual fall increases begin earlier than customary. Still considerable stocking.

The usual fall increase in the price of anthracite occurred this season a little earlier than usual. There is a heavy demand for domestic purposes and dealers are very busy making deliveries, many consumers laying in stocks in anticipation of a possible embargo on coal by the United States. The call for steam coal is steady and prices somewhat higher, quotations being as follows: Retail—anthracite, egg, stove and nut $7.75, grate, $7.50, pea $6.50; bituminous, steam, $5.25; screenings $4.35, domestic lump, $6, cannel, $7.50, wholesale f.o.b. cars three-quarter lump, $3.83, screenings $2.89.

TOLEDO

Lake shipping much stronger and considerable coal going to Canada. Some predict stronger prices shortly. The domestic market a little better.

The domestic market is showing considerable strength in these quarters. The steam trade continues light due to the fact that Toledo factories are for the most part only running at about two-thirds capacity. Money is tight and this has a depressing effect on business generally.

Lake shipping is more active than it has been for months and a great deal of coal is going into Canada although dealers do not have much to say about this feature of the business. Some of the railroads are ordering new equipment but it is generally conceded that should there be a very heavy grain movement there will be a severe car shortage. However, farmers are strongly inclined to hold their products in the hope of securing war prices and this may save the day so far as the traffic situation is concerned. There is no change in quotations as yet although higher prices are predicted for domestic grades.

CINCINNATI

Domestic grades slowly improving, strengthened by the foreign demand and the customary increase in local orders. Steam business remains slow, industiral concerns operating on short time.

The situation is more nearly normal, save for the general slackness which has marked the whole year. Returning domestic consumers are making arrangements for their winter fuel, bringing the retail trade better business than it has had for some time, although nothing like the usual volume is yet in evidence; this is being reflected to a certain extent in the demand at the mines. Many dealers are so fully stocked that they appear determined to wait still longer before ordering new supplies in any quantities, but in spite of this fact, the domestic market is in better shape than for some time. Prices are steady at circular, with the possibility of premiums by no means remote.

In the steam market there has been more of a decrease than an increase in the demand. The sluggishness is due to dullness in the numerous industries whose operations normally call for a large consumption of fuel, somewhat emphasized by cancellation of orders from Europe. The expected stimulation, due to increased demand from other markets, has not materialized as yet and many lines of business are running on much slower time than before. The general feeling, however, is optimistic.

On the whole the situation is much improved. Transportation facilities are excellent, and the Lake movement continues steady, although relatively light in volume. There is very reason to believe that production and consumption will be about normal from now on, with prices at a profitable level.

DETROIT

Domestic grades fairly strong and some stocking is noted. Favorable outlook in anthracite.

Bituminous—The steam trade is slow, as is naturally to be expected with industrial conditions generally at such a low ebb. There is a noticeable leaning toward the open market among consumers, and contracts are still slow in being closed up. The domestic grades are the strongest at the moment. The stocking-up season is opening up briskly, particularly on the West Virginia grades, with Hocking Valley also in good demand. The West Virginia splint lump-coal is quoted at $1.60, three-quarter lump at $1.25, Pocahontas lump at $2.50, with mine-run at $1.50, and Hocking lump at $1.60. A general increase on nearly all the grades is scheduled for the near future.

Anthracite—Should the European war result in diverting much of the smokeless coal into the export market, the local anthracite situation will be much benefited. The West Virginia smokeless fuels have made heavy inroads in the local hard-coal market in recent years, and in the event of a shortage of these, the anthracite jobbers will regain much of their lost ground.

COKE

BUFFALO

Coke shippers are unable to see any improvement in the demand. The movement of iron ore is fairly brisk, some local furnaces not having much of a supply, though the receipts are good. This apparent contradiction may mean that someone is storing up ore for future activity, but at the same time they do not try to take advantage of the coke market. Quotations remain on the basis of $4.25 for best 72-hr. Connellsville foundry, with stock coke $3.25.

DETROIT

The demand is increasing, while shipments are coming in rather slowly, with the result that the high-grade cokes are commanding a slight premium. Connellsville 72-hr. foundry is quoted at $3.75, and Solvay at $4, with gas house at $3.50, all f.o.b. ovens. Connellsville retails at $6.50 per ton and Solvay at $6, although it will probably advance to $6.50 by the middle of the current month.

ST. LOUIS

A small amount of byproduct domestic coke is moving in, and in the past week a fairly good tonnage of foundry coke passed through St. Louis. The local demand is light. Local gas house coke for domestic use is in good demand.

SOUTHERN

LOUISVILLE

Increased demand for domestic coals and mines are working stronger. New September circular in effect.

The quickened demand for domestic coal continues the significant thing in the Kentucky market at the moment; steam coals are in no worse condition than they have been for a considerable time. Generally the mines are rather active, working nearly to capacity. September prices, an increase of from 5 to 10c. all along the line, are now in effect.

The market has hardly become adjusted yet to the new conditions occasioned by the war in Europe though that influence is expected ultimately to prove beneficial.

BIRMINGHAM

European war promises renewed activity in South American trade. Lump coal in slightly better condition and blacksmith grade satisfactory.

The local demand for steam coal is just about the same though slightly heavier for immediate shipment. However, the European war is causing a shortage of coal in South America and Alabama operators have been asked to make prices on several large tonnages, one of 200,000 tons for the Argentine Republic and another of 300,000 tons for the Chilean navy. While it is not an assured fact that this district will get these orders it seems reasonable to believe it will. The United States is now the only country which can supply it, and the operators in this district are making a very strong effort to land it. The main obstacle so far seems to be in obtaining charters to convey the coal. The matter is now being vigorously pushed and results are expected shortly. Birmingham capitalists are also talking of organizing a steamship line for this business, but the matter is being held up until definite information is obtained as to whether necessary ships can be chartered. In addition to these two inquiries, Uruguay and Sweden have also asked for prices.

MIDDLE WESTERN

INDIANAPOLIS

Demand for domestic grades improves slightly and will increase as the month advances, operators predict. Prices are also expected to improve, with the fall demand and the running schedule to increase. Industrial demand slackening, due to war. Retail trade handicapped by closeness of money.

The demand for domestic coal keeps improving a little and will grow as September advances; it takes cool weather to put the householder in buying mood. Mines already have a fair number of contracts for September delivery and operations will likely be increased. That there was a little spurt in August is indicated by the fact that the last semi-monthly pay in the Clinton field was the largest of the summer season.

Trade has since fallen off, however, and in some districts is said to be the lightest for five months. The demand for steam coal is apparently below normal, affected by the slackening up of industrial operations on account of the war. Even factories that have no export trade are affected. Prices remain unchanged but operators seem to be of opinion that they will be higher shortly. Retailers say the financial stringency and industrial situation has prevented considerable stocking of winter coal. With money tight, consumers hang on to every dollar until they have to part with it. Mines are operating on about half-time.

ST. LOUIS

An increasing demand for the larger sizes of domestic coal from the high grade fields. Steam market demoralized.

Franklin and Williamson County lump and egg coal have advanced as much as 25 to 40c. a ton. This is caused largely by the fact that there has been little early buying, and business that has usually been placed in June and July is now coming in. To off-set this, several of the large manufacturing plants are running on half time. and some of them have shut down entirely, so that the future is not the brightest. Car shortage is causing the railroads to refuse to give the mines any cars for the larger sizes as long as they have unbilled steam sizes on track. In the Franklin County field during the past week as many as 90 cars of steam coal have been unbilled by one company.

In the Standard market, while the demand for domestic sizes still continues, yet there is an apparent fear on the part of the operators that if they ask more money the demand will cease: 2-in. screenings are selling at from 30 to 40c., but the price of 2-in. lump is still hovering around 90c. to $1, the last being considered a good price.

There has been an unusual demand and exceptionally good movement of Pennsylvania anthracite in the past ten days. Smokeless is absolutely a drug on the market, with no demand. Arkansas anthracite is picking up some.

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.25	$0.90@1.00	$1.10
3-in. lump	.....	....	1.30	.....	.....
6-in. lump	$1.50@1.75	....	1.40	1.10@1.20	1.25
Lump and egg	1.85@2.15	$2.25	.....	....	1.15
No. 1 nut	1.25@1.50	....	.....	.....	.....
Screenings	0.70@0.75	....	0.80@0.85	0.30@0.35	0.35
Mine-run	1.00@1.15	....	.....	0.75@0.80	.....
No. 1 washed nut	1.50@1.60	2.25	1.50	....	.....
No. 2 washed nut	1.25@1.35	....	1.35	....	.....
No. 3 washed nut	1.15@1.20	....	.....	....	.....
No. 4 washed nut	1.00@1.10	....	.....	....	.....
No. 5 washed nut	0.55@0.65	....	.....	....	.....

September prices on Pennsylvania anthracite are: Chestnut, $7.50; egg and stove, $7.30; grate, $7.05. Arkansas grate, egg and chestnut is $6.10 and lump $5.85.

KANSAS CITY

Trade continues to improve, though householders are slow in placing orders. Light wholesale trade is offset by bright prospects later.

A cool spell last week helped somewhat to stimulate interest in coal orders, suggesting the nearness of winter. The approach of September and possible higher retail prices did not create the usual rush orders on the last days. Wholesale dealers and mining companies complain that business is not up to the standard for the season, but they are all hoping for a large increase soon.

Kansas City sentiment in reference to the effects of the war is growing more sanguine, and there is a tendency to reach out for the big trade that America may get from the diminution of activity abroad. Most of the mines in the Kansas district are in operation, and an optimistic tone prevails as to the immediate future. Local stocks are said to be small.

PRODUCTION AND TRANSPORTATION STATISTICS

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for June and the twelve months ending June 30, 1913 and 14, in short tons:

	June				Twelve Months			
Destination	1914	%	1913	%	1914	%	1913	%
Tidewater	322,008	18	253,448	16	3,560,350	19	3,531,202	22
East	172,686	10	192,316	12	2,561,809	14	2,549,552	16
West	1,192,911	65	1,067,682	66	11,554,335	61	9,221,463	57
Total	1,687,605		1,513,446		17,676,494		15,302,217	
From Connections								
Bituminous	135,357	7	91,617	6	1,169,979	6	729,741	5
Anthracite	1,669		1,794		16,263		15,746	
Total	1,824,631	100	1,606,857	100	18,862,736	100	16,047,704	100
Coke	29,392		30,015		388,752		315,474	

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during July and the past four months of the current year in short tons:

	April	May	June	July
Pocahontas Field	1,156,670	1,239,653	1,245,440	1,314,478
Tug River District	221,344	263,155	244,342	263,240
Thacker District	232,181	280,148	261,248	288,643
Kenova District	96,116	101,768	97,352	100,600
Clinch Valley District	156,502	150,916	156,028	140,751
OTher N. & W., Territory	2,827	2,596	2,337	2,735
Total N. & W. Fields	1,865,640	2,038,236	2,006,747	2,110,447
Williamson & Pond Creek R.R.	79,828	74,875	76,822	90,819
All other railroads	171,818	225,561	232,387	301,796
Grand total	2,117,286	2,338,672	2,315,956	2,503,062

Destination of shipments over this road for July and the first seven months of this year and last year were as follows in short tons:

	July		Seven Months	
Coal	1913	1914	1913	1914
Tidewater, foreign	155,762	140,848	1,032,082	1,062,893
Tidewater, coastwise	321,340	279,708	2,224,658	2,241,934
Domestic	1,805,368	1,082,506	10,457,182	11,714,556
Coke				
Tidewater, foreign	4,358	182	27,199	197
Domestic	122,716	88,325	940,517	668,978
Total	2,409,544	2,591,569	14,681,638	15,688,558

Distribution of shipments for June and July compare as follows:

	June			July		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas	1,136,568	14,804	1,151,372	1,212,483	16,138	1,228,621
Tug River	242,208	2,134	244,342	260,141	3,099	263,240
Thacker	214,595	9,968	224,563	235,410	7,633	243,043
Kenova	88,455	8,897	97,352	89,953	10,647	100,600
Total	1,681,826	35,803	1,717,629	1,797,987	37,517	1,835,504

Shipments of coke, entirely from the Pocahontas field, amounted to 59,370 tons in June, as compared with 62,097 tons

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during May, June and July of this year and last year:

	May		June		July	
	1914	1913	1914	1913	1914	1913
Coal	2,995,812	2,357,119	2,380,795	3,061,929	2,594,407	2,938,723
Coke	301,163	434,898	298,237	396,920	255,650	391,485
Total	3,296,975	2,792,975	2,769,032	3,458,849	2,850,057	3,330,208

I. C. C. Nos. 5558 and 5558 Sub. No. 1—Hughes' Creek Coal Co. and Kelly's Creek Colliery Co. vs. Kanawha & Michigan Ry. C.

In the sub-numbered case, Kelly's Creek Colliery Co. vs. Kanawha & Michigan Ry. Co., the Commission originally held that the defendants should establish through routes and joint rates between stations on the Kanawha & Michigan Railway and its branches and the points specified in the complaint in eastern and southeastern territory on the lines of the Chesapeake & Ohio and its connections, and that as reasonable rates for these routes defendants should apply rates not in excess of those applying to these destinations for shipments from the mines on the Chesapeake & Ohio. Upon reconsideration of the case; **Held**, That there may properly be a slight difference between the rates applicable to the through routes ordered and those applicable to the single movement on the Chesapeake & Ohio.This difference should not exceed 5c. per ton.

Suspension Docket No. 321—Coal rates from Virginia mines.

1. The rates on coal from the mines in the St. Charles, Va., group to points north of the Ohio River within 400 miles from St. Charles should not exceed the rates from the Middlesboro-Jellico group to said destinations by more than 10c. per ton; beyond that the differential should decrease not less than 1c. for each additional 100 miles.

2. The rates on coal from the mines in the Appalachia group and the mines at Benham, Ky., should not exceed the rates from the Middlesboro-Jellico group to points north of the Ohio River by greater amounts than the present differentials, provided that the differentials of Appalachia over Middlesboro-Jellico, should in no case be less than the differentials of St. Charles over Middlesboro-Jellico.

3. The prescribed differentials being maxima, the carriers are at liberty to establish smaller ones whenever commercial conditions may so require.

4. Respondents required to cancel rates exceeding those prescribed in the report, but suspension order vacated as to all other rates named in the tariff under suspension.

FOREIGN MARKETS

ITALY

The Italian imports of coal and coke for the past three years were, in English tons: In 1911, 692,577 tons; in 1912, 770,592 tons; in 1913, 825,293 tons.

Imports of coal by countries for the past three years were as follows:

Country	1911.	1912.	1913.
Austria-Hungary	85,363	177,307	133,838
Belgium	23,160	24,363	4,358
France	100,110	170,565	164,674
Germany	442,935	889,501	949,113
United Kingdom	8,767,352	8,637,219	9,386,159
Netherlands	157,676	75,494	72,564
United States	14,068	68,032	93,529
Other Countries	5,218	14,747	6,625
Total	9,595,882	10,057,228	10,810,860

ENGLAND

Movement very irregular due to the heavy burden on the railroads. Prices fluctuating though a runaway market has been avoided. Considerable stocking for emergencies.

The London coal trade has suffered a good deal from the effect of the war. Business generally has been seriously interfered with, and consignments have been very irregular. The railways have undoubtedly risen in a marvellous way in their endeavors to cope with the enormous military traffic, but it has meant in many cases a sad delay in getting coal traffic forward. The southern lines have had great quantities of empty coal trucks waiting at various points, and in the meantime, very few collieries have had their full complement of empties to work with, besides which loaded wagons have waited sometimes a day or more before they can be removed from the colliery sidings.

Prices continue very irregular, but as a general rule the trend of market quotations is lower this week than last. Many of the Yorkshire collieries are offering both house coal and hard steam coal freely on the London market, and as a rule the natural outlet for these qualities is coastwise, or for export. The tendency last week was undoubtedly towards an advance in pit prices, but the extra quantity offering during the current week has distinctly checked all movements in that direction, and more than balanced the demand and the supply.

The depots still report an enormous quantity of unexecuted orders from the general public, the result of the first rush for coal when the war first broke out, but in many cases merchants are now delivering only the coal that is actually paid for, and making that a condition for entering the larger orders received at the time of the scare. The main object of the offer recently made by Messrs. Rickett, Smith and Messrs. G. J. Cockerell and Co. to place 350,000 tons of coal at the disposal of the Government at $5.76 and $6 per ton for the north and south respectively, of the Thames is to prevent or relieve distress for want of fuel during the coming winter.

One of the most serious aspects of the war as it affects the London trade is the closing of so many of the North London stations to the general public for so many days, whilst the troops and ammunition, together with the horses, baggage, field guns and accoutrements, are being moved from one place to another.

RUSSIA

Imports of coal and coke into Finland for the last two years were reported as follows in metric tons:

From	Coal 1912	Coal 1913	Coke 1912	Coke 1913
United Kingdom	457,385	497,636	10,012	24,342
Russia	278	.....	62	.....
Sweden	918	909	176	.....
Germany	5,190	13,874	13,930	20,150
Netherlands	23,727	22,611	5,055	3,755
Belgium	412	.....	1,565	.....
Total	487,911	536,975	30,801	48,638

FINANCIAL

Delaware & Hudson Co.

This company reports in part for the calendar year of 1913, as follows:

During 1913 this company mined 7,170,553 gross tons of anthracite, out of 69,069,628, including product of washeries, produced in the region, or 731,998 more than in 1912, when production was reduced by suspension of mining from Apr. 1 to May 21. During 1913 there were ten strikes which caused temporary idleness of one or more collieries, loss of time being equivalent to closing of one colliery 491 hr., or 54 5-9 working days.

This company has endeavored to conduct mining operations with adequate regard to protection against caving. Recent discussion, particularly in Scranton, has been accompanied by extreme demands which, if admitted would greatly enhance cost per ton recovered and materially reduce ultimate proportion of total in ground that could be made available.

Causes, some of them legislative, and all beyond control of railway managers, which during recent years have enhanced difficulties attending effort to maintain reasonable margin between revenues and expenses, were not less effective during the year. Increases in wags, consequent on arbitrations which, although nominally requiring voluntary acquiescence of railways, really operate, under ordinary circumstances, with compulsory force, supplemented by reductions in hours of labor and relaxations in conditions necessary to secure from each unit of labor its maximum of reasonable efficiency, and increases in prices of materials and supplies, themselves mainly attributable to higher wages and lower efficiency of labor, have greatly augmented expenses. At the same time the taxing authorities have continued to impose a heavier proportion of steadily rising expenditures of government. Concurrently, the process of attacking rate schedules in detail, reducing here a rate and there a group of rates, has operated to reduce gross.

BALANCE SHEET DECEMBER 31.

Assets	1913	1912	Liabilities—	1913	1912
Unmined coal owned and controlled	$15,943,915	$16,397,24	Capital stock.	$42,503,000	$42,503,000
Advances on unmined coal	354,279	354,033	Bonds(sec"Ry & ind."Sec.	57,920,000	58,171,000
Real estate	805,713	805,850	Loans payable	4,500,000	3,500,000
Road & equip. D. & H. Co.	67,175,113	65,814,079	Int., divs., etc. accrued	1,407,986	1,405,209
Canad'n lines	6,464,030	6,331,868	Int., divs. and bonds due, not yet collected	227,143	195,087
Marine equipt	5,931	6,726	Accrued taxes.	277,798	157,042
Coal dept. equip.	1,338,400	1,303,362	Spec. res've fd. accounts.	10,073	9,738
Coal-handling stor'ge plants	63,968	61,134	Audited vouch and pay-rolls	2,940,797	3,052,054
Stocks & bds.	*28,100,594	27,088,094	Other accts. payable	638,977	552,480
Cash	1,646,654	1,182,560	Add'ns t oprop erty prior to June 30, 1907 through inc...	6,839,487	6,751,837
Fire insurance fund	417,615	373,905	Profit and loss	18,153,210	15,199,924
Spec. res. fund	10,073	9,739			
Equip.trust fd	1,705,235	1,441,303			
Sup. on hand	3,330,997	2,781,673			
Bills & Accts. rec	3,810,661	4,118,197			
Ad., new lines.	4,275,293	3,427,608			
Total	135,418,471	131,497,371	Total	135,418,471	131,497,371

*The total par value of stocks owned in 1913 was $27,365,874, against $26,178,283 in 1912 (value as per balance sheet in 1913, $23,375,797; par value of bonds, $4,950,716 in 1913 and 1912 (value as per balance sheet in 1913, $4,724,796). The list of securities owned remains substantially the same as that given in V. 88, p. 939, the main change being in Hudson Coal Co. stock, $3,500,000 (increased from $100,000), and the additional Wilkes-Barre Connecting R.R. Co., $50,000; and bonds, the new items of Champlain Transportation first income debentures ($250,000), Fort William Henry Hotel Co., income debentures ($272,000), Bluff Point Land Improvement Co. income debentures ($250,000) and Chateaugay Ore & Iron Co. first mortgage ($281,000).

Note—For last previous annual report of this company see "Coal Age," Vol. 3, p. 980.

COAL AGE

Vol. 6 NEW YORK, SEPTEMBER 12, 1914 No. 11

As It Might Be

By Berton Braley

Written expressly for Coal Age

"'Twas a wonderful dream," said Dugan,
"The dream that I dreamed last night,
For I thought I wint to a fancy mine
Where the breaker was painted white
An' the coal on the belt conveyor
Was polished until it shone,
An' wrapped up in tissue paper
An' scented wid sweet cologne.

"An' instead av the breaker huskies,
Was beautiful girls—'tis so—
Wid gloves on their lily fingers
An' uniforms white as snow,
They handled the coal wid tweasers,
An' a boy wid an inlaid tray
He tuck the slate as they picked it out
An' carried it all away.

"They'd gilded the hoisting engine
An' the cables was gilded, too,
An' the cages was finished in blue an' gold
A wonderful sight to view,
An' all of the lady miners
Was natty an' spick an' span,
Wid their handcarved picks an' their jeweled lamps
An' each wid her ivory fan.

"They'd kalsomined all the entries
An' papered most every room,
An' Japanese lanterns was all about
Dispellin' the heavy gloom,
They'd muffled each drill an' cutter
An' carpeted every floor,
An' bouillon was served 'em at half past one
An' tea was at half past four.

"So I says to the lady foreman
(A regular handsome queen),
'Say, who is the boss of this spotless mine
An' what does the whole thing mean?'
An' she says, "Tis an object lesson,
An' its glory shud travel far,
For this mine is run by the Woman's Club
Wid the aid of the D. A. R.!'

"'Twas a wonderful dream," said Dugan,
"I'm sorry 'twas done so quick,
For I hadn't quite—there's the pit boss now,
Say, gimme that bloomin' pick!"

The Ramsay Revolving Car Dump at the Woodward Ore Mines

By H. S. Geismer*

SYNOPSIS—A revolving dump which handles four loaded cars weighing 40,000 lb. gross. The actual dumping requires only about two seconds, while the entire process of weighing the loaded cars, dumping and reweighing the empties requires about one minute.

The announcement that the H. C. Frick Coke Co. has contracted for a revolving car dump (of the type patented by Erskine Ramsay, of Birmingham, Ala.) for its Lemont No. 2 mine, which will be 176 ft. long and will be capable of dumping a trip of 18 mine cars without detaching from the haulage rope, led to the belief that a description of one of these dumps now in operation would be of interest to coal-mine officials.



Fig. 1. A General Side View of the Dumping Plant

The dump shown in the accompanying illustrations was installed by the Woodward Iron Co. at its iron ore mine, Slope No. 3, near Woodward, Ala., about five years ago, and has been in continuous successful operation ever since. It is designed to handle four loaded cars containing a maximum of 30,000 lb. of ore in addition to a tare weight of 10,000 lb., or a total weight of 40,000 lb.

The average time consumed in stopping the trip on the scale, weighing, pulling the cars into the dump, dumping and passing the scale on the return trip is one minute. The actual time required to revolve the dump is only about two seconds.

The loading of the ore at this particular mine is done by contractors and the contents of all of the four cars on any one trip belongs to one man. This simplifies the work of weighing considerably, as the four cars can be weighed and credited by a single entry on the tally sheets and only one check is required to be placed on each trip.

The average length of haul to the various entries off the main slope from the mouth of the mine is ⅜ of a mile, and the average time consumed in making the round trip into the mine, including the time required to do the dumping, is six minutes.

The average output of the mine is 900 long tons, and this is generally handled between the hours of 10 a.m. and 5.30 p.m. Between 7 and 10 a.m., most of the men are timbering and loading, and the hoist is kept busy handling material.

The dump is revolved by means of an air-operated piston in a vertical cylinder, which may be plainly seen in the illustrations. The up-and-down movement of the piston is transmitted to the dump cylinder by means of a wire rope. On the up-stroke of the piston, the dump

*Keiser-Geismer Engineering Co., Birmingham, Ala.



Fig. 2. Another View, Showing Weigh House, Dump, Cable and Operating Cylinder

is revolved about 200°, and then, on the down stroke, it is brought back to normal position.

In some of the dumps now built, the cylinder is designed to receive a complete revolution in one direction on the up stroke, and a similar movement but in the opposite direction on the down stroke. In this way, the coal or ore is dumped into the two sides of the bin underneath, alternately.

The power used in the cylinder of the Woodward dump is compressed air, at about 75 lb. pressure. This is piped from a receiver which furnishes air to the rock drills on the inside of the mine, to a small horizontal receiver shown in Fig. 1, just to the left of the vertical cylinder. The operating power generally used is steam, but at this plant no steam was available near the tipple location.

Only One Man Required for Dumping

One man only is required to operate this dump to its capacity. He weighs the cars first; then, after they have entered the dump, he discharges their contents by ma-

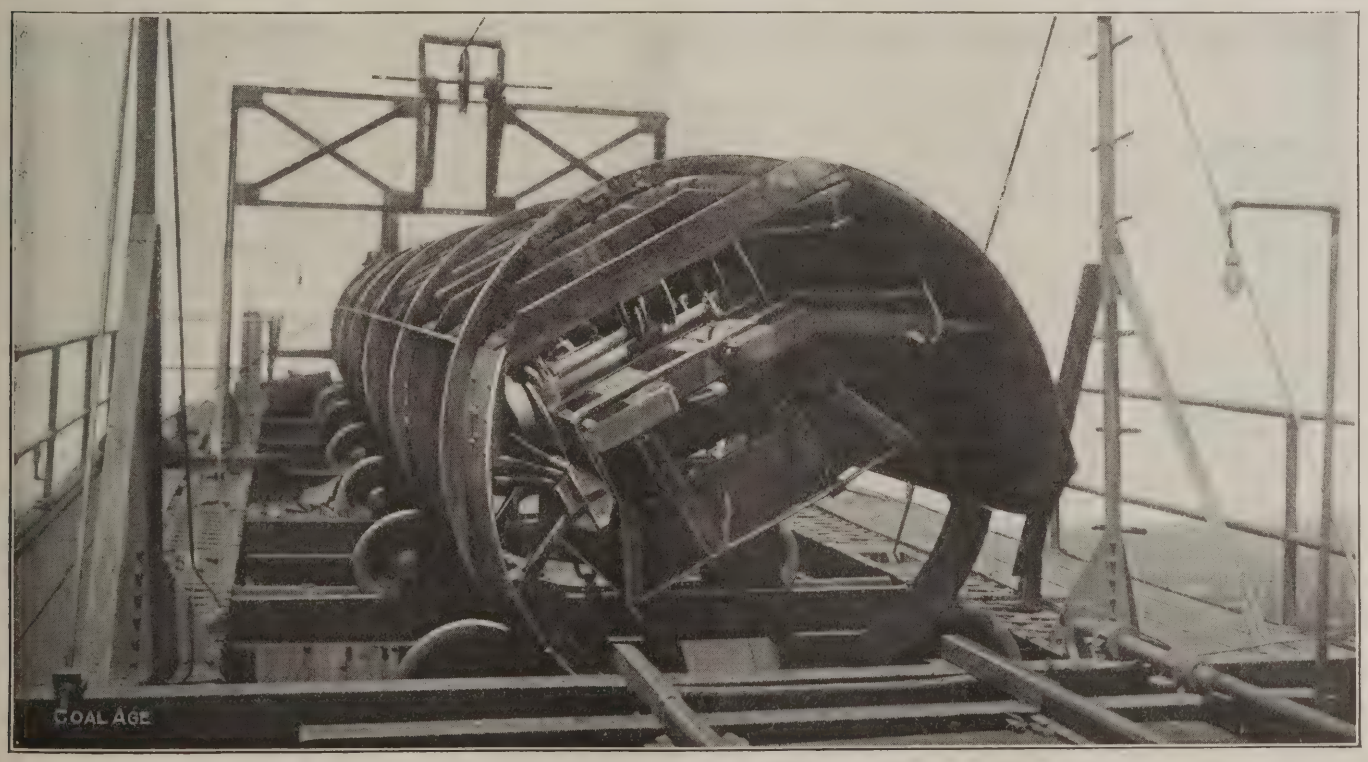


Fig. 3. The Revolving Dump in Operation

nipulating a valve in the weigh house. The dump is built on an inclination of approximately 12 per cent., which is sufficient to start the cars back by gravity, as soon as the hoisting engineer gives slack rope. The hoist is a geared electric machine and is located a few hundred feet from the dump, and exactly over the center line of the slope. As one man operates the hoist, only two men are required to do the hoisting and dumping.

In Fig. 0 the trip of loaded cars is shown standing on the scales; the small building just beyond is the weighman's house, and the scale beams are clearly seen extending horizontally about midway between the ground and tipple floor. The scale is also plainly shown in Fig. 1.

In Fig. 2 the trip of empty cars is seen just ready to start back into the mine. Fig. 3 shows the dumping cylinder revolved 90° and the cars beginning to empty.

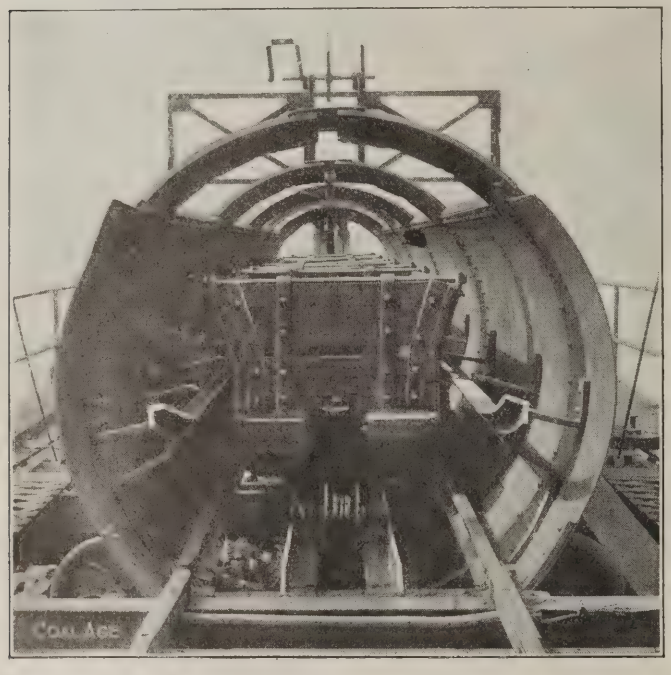


FIG. 4. THE TRIP AFTER DUMPING; READY TO RETURN TO THE MINE

In Fig. 4, the inside of the revolving cylinder can be seen distinctly, also the car wheels on the outside upon which the cylinder is supported and revolves.

By referring to Fig. 1, it will be seen that the ore, after being dumped into bins, is fed by gravity into a gyratory crusher underneath, from whence it drops into railroad cars and is hauled to the company's furnace located only a few miles distant. The entire tipple, with the exception of the siding of the bin, is constructed of steel.

Dumps similar to that employed at Woodward have been installed and are now in operation at coal mines as follows: One in Pennsylvania, two in Tennessee, one in Utah, one in Alabama. Those now in operation were designed for capacities varying from two to six cars.

THE ADVANTAGES OF THIS TYPE OF DUMP AT COAL MINES

In considering this type of dump for coal-mine service, several distinct advantages are apparent. A car without drop bottom or end grates can be used, which eliminates largely the scattering of coal along the haulage ways, due to fine particles sifting through cracks, and also the accidental opening of doors, while the trip is in motion, often at high speed. This reduces, to a marked degree, the liability of dust explosions, and also cuts down the cost of maintenance on haulage ways.

It further eliminates, to a noticeable extent, the number of wrecks on haulage roads and the troublesome delays that follow, especially where mechanical haulage is employed. The solid-end car is also lighter and consequently easier to handle than any other type, and costs less for repairs, as it is much more rigid and will stand more abuse.

Only during the past few years has the importance of keeping haulage ways free from coal dust been fully understood, and, as a result, the demand for tight, well constructed cars is becoming more and more noticeable.

This type of dump is not as hard on cars as the ordinary horn dump, since the cars are not stopped and started suddenly; even while they are being revolved they are held firmly in place, by means of the angles just over the wheels, as illustrated in Figs. 3 and 4.

To reduce the breakage to a minimum, where lump coal is desirable, a bin can be constructed the entire length of the dump, with sides coming up close to the edge of the cars when they are in dumping position.

The Bonding of British Exports

SPECIAL CORRESPONDENCE

The British government is urging the merchants and traders of the United Kingdom to go on with business as usual. They desire especially that the export coal trade should continue to neutral countries, as otherwise thousands of sailors, dock workers, railway employees, and miners will become idle, increasing the number of those for whom relief work must be found. The coal exporters have replied that they are willing to keep their trade going in the face of the serious war risks and the chance of nonpayment, but they cannot undertake the serious handicap imposed by the government in the form of a bond for treble the value of a cargo. The coal exporters feel that the government is putting the responsibility on the wrong party.

If the bond cannot be entirely removed, the coal men feel there ought to be an exemption in the case of British ships with cargos for a neutral port. An affidavit or declaration of destination should be sufficient, with proof of arrival. In the case of neutral ships a bond for a reasonable amount should be required of the owners or masters, with British sureties, and proof of arrival but not of delivery.

The matter is of such vital interest to the coal exporters of the United Kingdom that the shippers of the Bristol Channel, Humber, Tyne and Scotland have made joint representations to the government and have asked them to receive a deputation of representatives of all these districts, so that their case may be placed before the proper authorities.

The electric conducting power of a substance is usually expressed in terms of its resistance, rather than conductivity. A wire that is high in conductivity is low in resistance, and vice versa. Resistance is that property of a conductor, by virtue of its form and molecular structure, which modifies the strength of current flowing through it. It is an inherent property of all electrical conductors. Even the best conductors possess appreciable resistance.

Shaft Sinking in the Central Field of Alberta

By E. I. Roberts*

SYNOPSIS—The machinery and other equipment necessary to sinking operations in this field are enumerated, the organization and method of procedure detailed and an estimate given of the total cost of a shaft per lineal foot.

It is my desire to show some of the difficulties experienced in shaft sinking in the Central Field of Alberta and to explain how they may be overcome.

The methods and expense of sinking operations are controlled by three factors: First, the mine location relative to the base of supplies; second, the condition of the country; third, the class and expense of labor.

In the first place, machinery and supplies are obtained from eastern Canada, Great Britain or the United States, meaning a considerable delay before material reaches the field, therefore with all machinery orders there should be sent a complete order for repair parts.

A good plan for a person considering shaft sinking is to order material and supplies in October, so that operations in the field can be commenced in March or April of the following year, enabling a whole summer's work to be done before winter holds up the work. The spur from the railway to the mine site will also delay operations, and six months has to be allowed therefor.

The second factor is the nature of the country. It may be prairie, or rolling and timbered. On the former, every supply has to be shipped in, and test holes for water bored, while in rolling and timbered localities, sufficient creeks are found, as well as material for temporary structures.

In the estimates, allowance should be made for clearing the mine site and for extra engineering costs, when country is timbered. Camp and boarding supplies may be obtained from neighboring farmers, or if the surrounding homesteads are not settled, all these have to be shipped in.

The last factor is that of labor. This in the Central Field has been unsatisfactory from a mining or sinking standpoint. Competent shaft sinkers and mechanics are at a premium. The class of labor used has to be trained in every particular, and good wages paid. Men may be shipped in, however, giving the advantage of greater sinking speed and the disadvantages of the company paying transportation and being subject to the dissatisfaction of this labor. The other solution of this problem is to reduce the manual question to one of machinery.

These three factors having been met, preparatory work is commenced, consisting of clearing and the boring of a test hole within 100 ft. of the shafts. Hard shales and sandstone formations are usually found, and as pockets of quicksand are liable to be met, this bore hole will make known the actual conditions.

Equipment is the next consideration. This is subject to: First, the intended size of the shaft or shafts, which in turn will determine the size and quantity of sinking material. Second, a time-limit factor, which means an added expenditure for time- and labor-saving appliances; there is also the question as to whether the two shafts are to be sunk simultaneously. Third, the depth of the shaft, upon which depends the nature, quantity and size of shaft lining and hoisting appliances. The size and number of temporary buildings and living accommodations are also controlled by this factor. Fourth, the nature of the strata encountered which will determine the method of drilling shot-holes, size of shaft lining and quantity of water to be pumped.

*Pembina Coal Co., Entwistle, Alta

A Typical Case Considered

Considering a typical example of the equipment for the sinking of two 14x18-ft. shafts, 500 ft. deep, the arrangement of the buildings as shown in Fig. 1, with their respective fixtures, will be taken in order.

The boiler room, engine room, two hoist rooms, supply house, wash house and office are all under one roof, thus making the most economical type of building.

It is suggested that the boiler house be equipped with a 100-hp. vertical boiler. This type is chosen because of the ease of transportation and erection, as well as the little space occupied. The company furnishing the boiler should also supply flanges, piping and connections to the generator, compressor, etc.; also an additional length of smoke-stack or some other blower arrangement. The air receiver can be placed in the boiler house, and the boiler tubes cleaned with a hose attachment.

Adequate preparations are to be made for coal storage and a two weeks' supply kept on hand.

In the engine room is placed a vertical air compressor, a generator and a switchboard. The compressor may be of the type supplied by the Peter Brotherhood, Ltd., of Peterborough, England, or its equal, with a capacity of 300 cu.ft. of free air per minute. This occupies a floor space of 3 ft. 9 in. by 6 ft.

The electrical unit is direct current, compound wound, having an output of 20 to 30 kw. at 220 volts, this voltage being chosen because of the ease of obtaining 110-volt lamps in western towns. The power from the generator is divided as follows: 20 hp. for pumps, 10 hp. for saw and 5 hp. for lights. A 40-hp. turbine (Kerr or its equal) is the most economical driving unit and occupies a little more space than the generator.

The switchboard is equipped with one 100-ampere switch, one 50-ampere switch, one 25-ampere switch (all of the double-pole type), one shunt rheostat, one 150-ampere circuit-breaker, and the necessary fuses, etc.

Installed in the hoist houses are two 8x10-in. reversible hoists, with loose drums 4 ft. in diameter, each bolted to a 7x7-ft. concrete foundation. The indicator on these machines should move 1 in. for each 10 ft. of rope travel, and a balanced type of throttle should be employed in place of the one usually supplied by the manufacturers. Signal code and hoist engineer's instructions should be conspicuously posted. A hammer and plate type of gong is a convenient signal appliance to use. A separate bell for the topmen as well as switches for sending return signals through a lamp cluster to

the sinkers are necessary. No other equipment should be placed in the hoist house.

A little thought proves profitable in equipping the wash room; at all events, it should be fitted with three shower baths, about 50 hooks and chains for the men's clothing, and steam heating coils.

The supply house and its fixtures are often a big question. Having no supplies in the field, it is hard to decide what material and repair parts will be needed for the sinking and construction operations. The following list is therefore given as a basis:

Tools—Round-nosed shovels, clay and miners' picks, steel wedges, 4- to 6-lb. hammers, 8-lb. sledges, axes, crow bars, hand saws, crosscut saws, wheelbarrows, monkey and pipe wrenches, steel levels, plumb bobs and line, files, chisels and small mechanics' tools, spare blasting equipment, cant-hooks and a few carpenters' tools, such as augers, wood chisels, etc.

Repair parts—Spare pump fittings and hose, drill fittings, engine fittings, dies for pipe machine and other spare machine parts.

General supplies—Steam and water packings, oils, two or three safety lamps, coal-oil torches, stable lanterns, carbide lamps and carbide, graphite and white lead, gage-glasses, pipe fittings, sheet tin and brass,

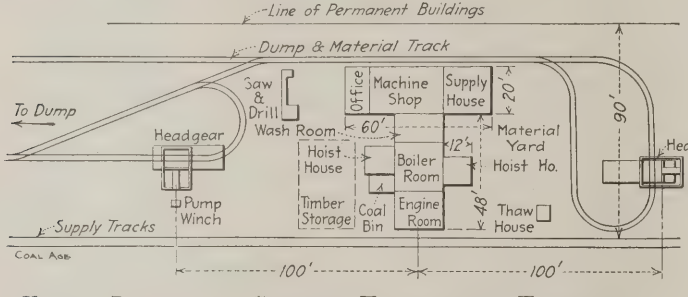


FIG. 1. LAYOUT OF SHAFTS, TRACKS AND TEMPORARY BUILDINGS

babbitt metal, lampwick, waste, iron wire, building paper, 2-in. to 6-in. nails, ½-in. to 1-in. manila rope and blocks for same, one 3-ton triplex block.

Stable supplies must also be stocked.

Iron and steel—Various sizes of bar iron, round, flat and square and drill steel.

A line of piping from ½ in. to 3 in. and a complete assortment of washers, nuts and bolts are required.

Sufficient oil-skins and gum boots should be stocked. Each man wears two suits which will shed water for about two weeks, if large quantities are encountered.

For the economical handling of the foregoing supplies, bins, shelves and boxes must be fitted in the supply house and convenient racks for piping and bar iron placed alongside this building. A desk and card index system for the use of the warehouse keeper facilitate the handling of the supplies.

Adjacent to the supply house is the blacksmith and machine shop. This is to be equipped with forge, anvil, grindstone, pipe and bolt machine, vise and a hand punch and shear. These tools can afterwards be used in the permanent shop. A 3-hp. gasoline engine or an electric motor will drive these appliances. Benches and cupboards should be installed for the carpenters and for small tools.

In the office there should be a drafting table, a master sinker's desk, two cupboards, a blackboard and a leanto desk for the shift bosses. A correspondence file and typewriter are necessary if this is the only office in the field.

A Convenient Headgear

Passing from this building to the headgear, the type usually built is unwieldy. In Fig. 2, a framework is shown which can be built by the blacksmith and erected over the shaft in a short time, and if necessary it is easily moved as a solid unit. The structure is self-bracing and is large enough to handle a 1-cu.yd. capacity bucket.

A self-dumping arrangement is shown in this figure, which works as follows: On the shaft doors, rails are fitted, and after the bucket is hoisted the doors are closed and the car pushed over the shaft top. The bucket is lowered into hooks and is dumped by the hoisting engineer slackening the cable. The empty bucket is then hoisted and the hooks pulled back out of the way of the crosshead. A good speed of hoisting can be attained by having two or three empties stored upon the tracks.

The tracks from each shaft to the dump are shown

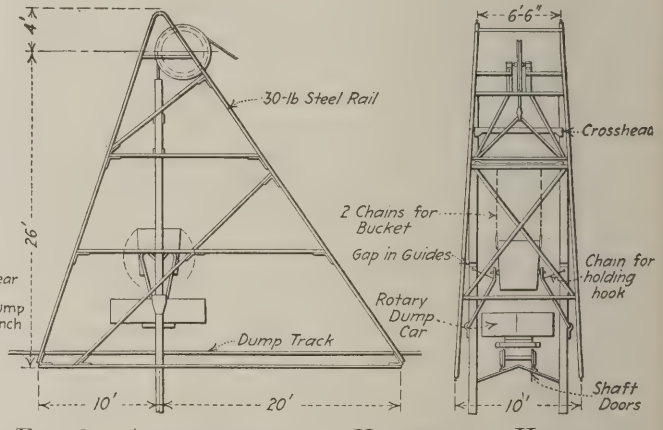


FIG. 2. ARRANGEMENT OF HEADFRAME, HOISTING BUCKET AND DUMP TRACK

separate. By this means, in the event of a derail or trouble with either shaft's dumping arrangement, the other is not affected.

Dump cars of 2 to 2½ cu.yd. capacity are used, and for this size of car, 25-lb. rails are necessary. For a haul of 300 yd., three dump cars per shaft are required. One horse per shift is necessary for each shaft. For these horses a stable must be erected.

A powder house must be supplied sufficiently large to accommodate 50 to 100 cases of explosive. A thaw-house 6x6 ft. has also to be built. It is sunk 3 ft. into the ground and steam heated with the exhaust from the turbine or compressor. Two cases of dynamite can be here stored, arranged in racks for thawing.

In the material yard is set a circular saw and a boring machine for wood working. The timber is so stored that it can be moved, sawed, trimmed and then loaded on a level track leading to either shaft with the least possible handling. With a few conveniences, such as a traveling cradle for use in sawing timbers, four or five carpenters can keep the two shafts supplied with sets.

A ditch to take away the discharge from the pumps is required and has to be figured on along with the other surface arrangements.

From the surface we pass to the shaft equipment.

The formation usually encountered in this district being soft sandstone or shale, churn drills will work well.

Air drills of the shaft-bar type have been tried, but they took too long for setting up and stuck in the holes, causing much delay. It is suggested that drills of the Jackhamer or Hardy Simplex type are much more speedy. Six to eight of these machines should therefore be purchased, with one or two extra lengths of hose.

For water removal, steam sinking pumps of the Cameron type may be used. Considerable delay, however, is experienced with this type of pump owing to sand and grit wearing away the valves, spindles and packing. As an alternative, two- or three-stage centrifugal pumps may be installed, driven by electric motors or steam turbines.

The pump and driving units are bolted between channel irons having a sheave wheel at the top, around which runs the rope for lowering or raising. A safety chain must be employed to prevent excessive swinging in the shaft. A winch may be placed at the shaft top, separate entirely from the main hoist, to raise and lower the pumps; this is advisable to prevent delaying operations. The suction hose should be of the inclosed-spring type and be marlin or chain wound to prevent cutting by flying rocks or by picks. Immediately above the pump, a hose 50 ft. in length is attached to form a flexible connection to the discharge pipe. This and the suction hose must be equipped with quick-coupling joints.

For lights in the shafts, two four-lamp electric clusters may be used, by the light of which all mucking and drilling operations can be carried on. For timbering, however, as well as for placing packing and lagging, two or three torches are necessary.

For placing the guides, a cradle consisting of a platform swung from four ropes should be supplied. This avoids much trouble in lining up and measuring.

Having thus chosen the equipment, the operation of sinking will be considered.

The first question in beginning actual sinking is the disposal of the men. For this size of shaft, eight men including the shift boss can be used to best advantage.

The Shaft Is Started Large

The shaft is started 18x22 ft., thus allowing for a 2-ft. shaft collar. For the first 10 ft., spading the dirt to a platform and then into the car will be the procedure, and with clay soil as usually found this can be continued until a depth of 20 ft. is reached, or until the hardpan upon which the concrete collar rests is encountered. It is seldom, however, that the surface soil will hold back a sufficient time to permit this depth without timbers.

The bearing timbers are then placed, each overlapping the sides of the excavation at least 4 ft. The whole set is lined up with a transit, and where bearing timbers cross one another they are securely bolted. The first shaft set is then swung immediately below this, skin tight to the bearers. Hanging bolts are placed and wrought-iron washers of ⅜-in. or ¼-in. plate used under the nuts. Cast-iron washers will break and ordinary washers pull through the timbers.

The second and third sets are hung on 5-ft. centers. Posts are put in the corners, buntons placed and center posts set, and the whole structure drawn tight with the hanging bolts. Lagging is then nailed on, the 2 ft. of room outside of timbers permitting this to be done. By means of brackets lined up accurately in place at the corners of the top set, the remainder of the sets are plumbed and wedged to the sides of the excavation, the surface soil being shored back with planking to prevent caving in. At least three plumb strings are to be used for lining up timbers, for although the sets are trimmed to templates, a slight discrepancy is noticed when notches are fitted together, and this can often be taken out in the plumbing.

Excavation is then resumed until another set of timbers can be placed. This is put in and the operation continued until a sufficient depth of shaft collar is reached, after which sinking is conducted with the neat size of 14x18 ft. below this depth.

The concrete for the collar is poured all around the shaft. Reinforcement is hung vertically on 18-in. centers and concreting continued until the surface is reached. The collar is built at least 2 ft. above surface level to prevent water running into shaft. The hoisting arrangements are now erected and the headgear set on the collar. When this is completed, the sinking is continued, but no blasting should be permitted until the shaft is sufficiently far below the collar so as not to injure same.

For shooting, it will be found most economical to drill eight 6-ft. holes around the sides of the shafts and four 8-ft. sump holes at an angle of 20 deg. from the vertical. More muck can be hoisted and faster footage made with this depth of holes than if they had been drilled 10 or 12 ft. deep. The constant tramping of the men packs the shale so hard that pick work has to be resorted to, and this takes time. When the holes are finished, six men go to the surface, while the shift boss and a helper stay down to charge the holes. When this is done, they go to the surface and the shots are fired. The shaft is then examined, the débris scraped off the timbers and the men resume mucking. When sinking has reached the depth of 100 ft., it is advisable to make preparation for blowing out powder smoke. This can be done when air drills are used, by opening the manifold at the foot of the air pipe, controlling the same with a valve on the surface.

The carpenters should have a set of timbers ready trimmed, lagging sawed to length and wedges and packing handy when the dirt is mucked out the required distance for the timber. This set is then lowered, lined up, wedged and lagged in place. The strata will not usually hold back sufficiently long to enable the timbers to be built up on hitches, therefore sets are placed as soon as sufficient room is made. A clevis should be used in lowering timbers, and a definite method of lowering wall plates, end plates, etc., understood between the shift boss and the topmen. The center bunton is usually left out in the last set of timbers, so that the bucket can be swung to the shaft side.

It is possible with a well trained crew to timber and lag a shaft set in 3 hr., although if large holes are made inside the shaft, the packing of same will take much longer.

Hitch timbers are to be placed every 80 to 100 ft., and if possible these should rest on a hard pan or rock strata. Heavy shots must not be fired immediately below a hitch set, and the shaft set under this should be particularly well wedged and packed.

Water rings are cut in the shaft at every spring encountered, and the water piped from ring to sump, preventing excessive spraying in the shaft. A ring must be placed over the door set leading to the coal seam; this prevents water from traveling back over the entry timbers.

The door set should be 12 ft. in height and one side of the shaft should be beveled off to permit 30-ft. lengths of rail to enter the mine.

NAME OF COMPANY
Daily Shaft-Sinking Report

		No. 1 Shift	No. 2 Shift	No. 3 Shift	Total
1	No. of holes drilled				
2	Depth of holes				
3	No. of shots fired				
4	Lb. powder used				
5	Buckets of muck hoisted				
6	Sets of timber placed				
7	Time setting timber				
8	Gal. of water pumped				
9	Time moving pump				
10					
11	No. of shift-bosses				
12	No. of drillmen				
13	No. of helpers				
14	No. of muckers				
15	No. of carpenters				
16	No. of pumpmen				
17	No. of topmen				
18	No. of dumpmen				
19	No. of surface-foremen				
20	No. of engineers				
21	No. of firemen				
22	No. of blacksmiths				
23	No. of helpers				
24	No. of carpenters				
25	No. of helpers				
26	No. of laborers				
27					
28	No. of ft. depth Total				
29	No. of ft. depth, per shift				
30	No. of ft. depth Total to date				
31	Material hoisted				
32	Remarks				

Signature of foreman.

Loose Leaf

FIG. 3. FORM OF DAILY COST LOG

Before operations in the seam are commenced, sinking should be continued down to the bottom of the sump; this is timbered and the last shaft set placed on the bottom and securely wedged and blocked underneath, so that when the landing timbers are placed upon it, the drop of the cage does not affect it.

A FAIR STANDARD OF SPEED

This gives the general operation, and it is considered good progress if a round of holes is shot, mucked and one set of timbers placed in three shifts.

The estimated number of men necessary for sinking two shafts will be as follows: One master sinker, one clerk, one warehouse keeper, four 12-hr. shift bosses, forty-two 8-hr. muckers, two 12-hr. pumpmen, four 12-hr. hoist engineers, two 12-hr. firemen, four 12-hr. topmen, eight 12-hr. dumpmen, including drivers; five 10-hr. carpenters, two 10-hr. blacksmiths and two 10-hr. laborers.

It is necessary that a good system of cost keeping be used and followed to prevent excessive expense for labor and supplies.

Forms as shown in Fig. 3 are suitable for keeping these costs and will enable a daily log of the sinking operations to be kept.

ESTIMATED COST OF EQUIPMENT REQUIRED

Boiler House, 20x24 Ft.	
Vertical 100 h.p. boiler	$2,000
Concrete foundation	80
Building and erection	500
Air receiver	120
	$2,700
Engine Room, 20x18 Ft.	
Vertical compressor	$1,800
Turbine and generator	1,200
Concrete foundations	150
Building and erection	300
Erection of engines	250
	$3,700
Hoist Houses, Two, 12x15 Ft.	
Two hoists	$3,000
Foundations	100
Buildings and erection	300
	$3,400
Wash-House, 12x20 Ft.	
Building and erection	$150
Equipment	200
	$350
Supply House, 20x20 Ft.	
Building and erection	$300
Equipment	200
Tools and supplies	1,500
	$2,000
Blacksmith Shop, 20x30 Ft.	
Building and erection	$500
Blacksmith's tools	130
Peerless drill	80
Grindstone	30
Pipe threading machine	500
Punch and shear	70
Shafting	50
Motor	150
Extras	100
	$1,610
Foreman's Office, 20x10 Ft.	
Building and erection	$300
Engineering equipment	500
	$800
Outside Equipment	
Two headgears	$1,000
Ropes, ¾-in. non-twist	500
Dump arrangements	500
Tracks	500
Dump cars	1,000
Stable	300
Powder house and thaw house	150
Circular saw and motor	250
Boring machines	100
Gearing, etc.	100
	$4,400
Shaft Equipment	
Air drills and hose	$1,600
Two centrifugal pumps with motors	2,000
Pump winches and equipment	500
Crosshead and cradle	250
Water tank or reservoir	250
	$4,600
Summary	
Boiler House	$2,700
Engine room	3,700
Hoist House	3,400
Wash-house	350
Supply House	2,000
Blacksmith Shop	1,610
Office	800
Outside equipment	4,400
Shaft equipment	4,600
Boarding House	1,000
Total	$24,550

Say $25,000 would be necessary for equipment, and a fair charge to the shafts for this item would be $8 per foot.

The cost of timber would approximate $10 per foot, thus bringing the cost of dead supplies to $18 per foot.

	Per Foot
Explosives will cost about	$4
Coal	6
Labor	50
Making a total estimated cost per foot of shaft of	$78

The accompanying table shows a rough estimate of the cost for equipment and material required for such sinking operations as have been above described. It will of course be understood that local conditions may greatly alter various figures here presented. It is believed, however, that the estimate here given is a fair one and reasonably represents the majority of cases.

Plant of the Glen Alum Coal Co.

By W. J. Darley*

SYNOPSIS—This article describes the plant in which is installed what is believed to be the longest double-chain retarding conveyor in use at the present time.

Located on a short branch of the Norfolk & Western R.R., about 3½ miles north of Genalum Junction, in Mingo County, W. Va., in one of the most beautiful ravines draining to Tug River, is the newly completed plant of the Glen Alum Coal Co.

Although several distinct coal beds underlie the company's property, only the most promising one is at present being worked. This is 6 ft. thick and the outcrop on the mountain side has an elevation of 1564.25 ft. above sea level. The elevation of the railroad tracks at the tipple is about 1089.25 ft., so that the coal must be lowered approximately 475 ft. from the coal bed to the coal car.

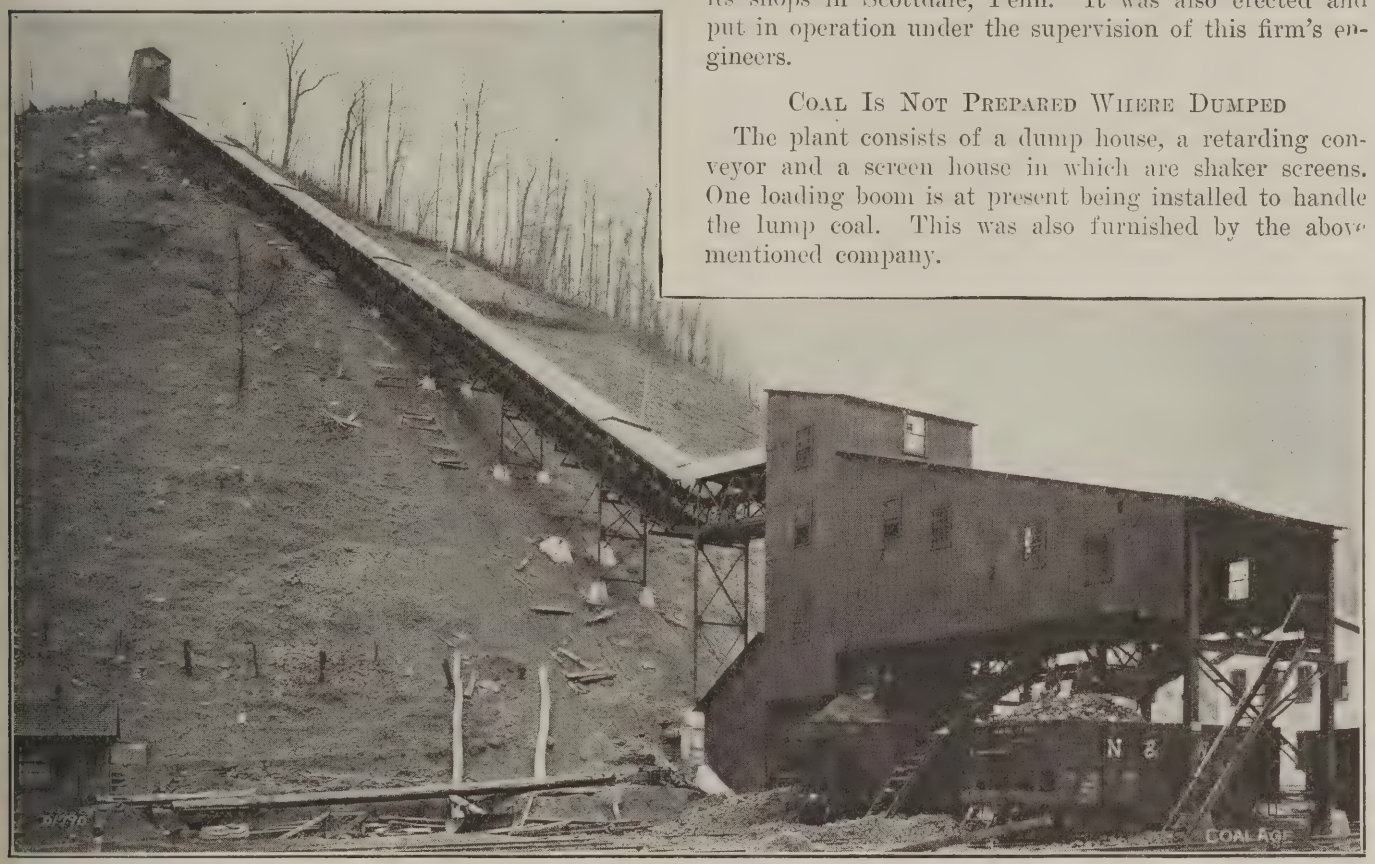


Fig. 1. General View of Dump House, Conveyor and Tipple

The coal received at the drift mouth in two-ton cars is transported by Jeffrey locomotives down a tramroad with a 2½% grade which skirts the mountain side for almost a mile to the dump house. Opening the drift mouth almost a mile away from the tipple served a double purpose, first bringing the opening as near as possible to the center of the coal field, and second, in reducing the vertical distance between dump house and preparation plant, consequently lessening the distance which the coal has to travel between the pit cars and the railroad cars.

As this company has had previous experience with a wooden tipple burning down and throwing the whole operation into idleness the present building is constructed fireproof. The only wood entering into this structure is a few nailing strips, the necessary platforms around the screens and the treads on the stairs. It was considered advisable to employ wood treads, as these give a surer foothold to the workmen than those constructed of steel or iron.

The dump house and entire coal-preparation plant was built by the Scottdale Machine & Manufacturing Co. at its shops in Scottdale, Penn. It was also erected and put in operation under the supervision of this firm's engineers.

Coal Is Not Prepared Where Dumped

The plant consists of a dump house, a retarding conveyor and a screen house in which are shaker screens. One loading boom is at present being installed to handle the lump coal. This was also furnished by the above mentioned company.

The dump house is 16x28 ft. in dimensions. It is provided with a 3-in. oak floor, and the structural steel frame is covered with corrugated sheeting. Cars are lowered one at a time from the loaded trip, pass through a kick-back dump and return to the empty track by gravity. The contents are deposited in a hopper of 18 tons capacity, from whence the material is sent to the retarding conveyor by a reciprocating plate feeder making approximately 30 strokes per minute. The length of the stroke may be varied from 2 to 18 in. to suit any desired capacity.

The feeder is driven by a 7½-hp. Westinghouse direct-current motor, which, together with the driving machinery, is mounted in a steel frame made of heavy channels and plates.

The angle of inclination of the retarding conveyor is 30 per cent. and the linear speed 100 ft. per min. The conveyor trough is made up of ¼-in. steel plates, is 3 ft. 2 in. wide and 12 in. deep. The links of the double

*Scottdale Machine & Mfg. Co., Scottdale, Penn.

conveyor chain are made of ¾x3-in. strap steel containing 0.004 per cent. of carbon. These are joined by 1½-in. pins pitched 24 in. apart, upon which revolve rollers 4 in. in diameter with a 2-in. face. Between the two strands of chain thus constructed, ¼-in. pressed steel flights 36 in. wide and 12 in. deep are spaced 4 ft. apart. A view of the lower end of this conveyor may be seen in Fig. 2.

The Longest Conveyor of Its Kind

While it will be readily conceded that conveyors of the rope and disk or of the monobar type are in existence much longer than this one, it is believed that this is the longest retarding conveyor of its kind in existence, measuring 712 ft. from center to center of the sprocket wheels. The normal capacity of the apparatus is 300 tons per hour, but observations taken on the second day after the conveyor was put in operation showed that this capacity might be increased approximately 65 per cent. Upon this occasion a 50-ton railroad car was loaded with run-of-mine coal in 6 min. without overtaxing the machinery.

The coal is received on the lower strand of the conveyor from the reciprocating feeder above mentioned, and brought down the hill with the least possible breakage and discharged to the shaker screen or to the run-of-mine bypass chutes.

In order to prevent the chain from sliding down the conveyor and possibly wrecking in case the former should break, safety dogs are located every 42 ft. upon the top strand. It is impossible for this part of the chain to run back more than 12 in. before one or all of these dogs automatically take hold, and each one is made sufficiently strong to hold the entire upper part of the conveyor chain.

The dogs are so constructed as to be automatically raised as each roller passes under, but the instant the direction of travel of the chain is reversed the rollers come in contact with and are held firmly by the dogs until the chain can be repaired. The lower portion or "part" of the conveyor travels on $3\frac{1}{2}x\frac{5}{16}$-in. track bars over which is placed an angle-iron guide to prevent the chain from buckling and piling up in case it should break.

The Details of the Conveyor Drive

The conveyor is driven by a 50-hp. Westinghouse direct-current motor, the voltage being 230 and the speed 750 r.p.m. The power is transmitted through three sets of reduction gears, of cut steel, semisteel and cast steel, respectively. The head sprockets are also of cast steel, while the tail sprockets are of cast iron. Each of these carries 7 teeth of 24-in. pitch and are 4 ft. $7\frac{5}{16}$ in. in diameter. The head shaft is 7 in. in diameter and runs at 6.8 r.p.m. This machinery is mounted on a heavy structural frame which prevents the running parts from getting out of line.

The foundation for the driving machinery required about 275 cu.yd. of concrete, which is anchored to the bedrock by a number of steel dowel pins, which were placed in holes drilled in the rock before the concrete was poured. All of the important foundations for the conveyor were anchored in a like manner.

The frame in which the conveyor is carried is 8 ft. wide and 8 ft. high and is built up of angle trusses 48 ft. 6 in. long. It is covered on top with No. 20 corrugated ingot-iron sheeting, while provisions are made for closing in the sides in the future should this be found necessary. In order to prevent the snow from sliding down the 700-ft. roof of this conveyer and wrecking the screen house, deflectors are spaced about 120 ft. apart, which divert snow or rain water over the sides of the conveyor roof. Steps are provided upon either side of the conveyor throughout its entire length.

Three Expansion Joints Are Provided

On account of the extreme length of the conveyor and frame, it was necessary to provide some means of taking care of the expansion and contraction, which amounts to about 3 in. for each 100 deg. change in temperature. The conveyor housing was accordingly made in three sections, the upper end of each being anchored firmly in place, while the lower is allowed to go and come, the joints being made in such a way as to allow the entire structure, including the roof, to move freely for a distance of 2 in. at each expansion joint.

As the coal will naturally pile up behind the flights on a slope of 30 deg. and thus not discharge in an even and constant stream, the lower end of the conveyor was made on an angle of 5 deg. for a distance of approximately 30 ft. This allows the material to distribute itself to

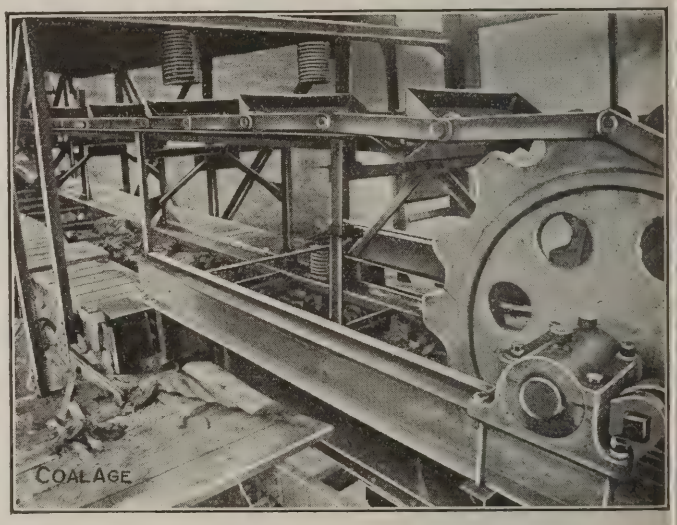


Fig. 2. Lower End of Conveyor, Showing Tail Sprocket

an even depth, thus insuring a constant stream into the shakers.

The shaking screens, which are carried on rollers, are 6 ft. wide and double decked, the upper deck alone being perforated. No veil plates are used, the screens being so designed that run-of-mine, lump or a mixture of lump and egg coal may be loaded on the lump track. Similarly, slack and egg or egg alone may be loaded on the egg track, and run-of-mine or slack on the slack track. In order to reach the slack track, however, the run-of-mine is sent through a bypass chute independent of the screening machinery. It is thus unnecessary to operate the screens when loading run-of-mine coal.

A Separate Structure Supports the Screens

A separate steel frame not connected in any way with the housing or conveyor structures supports all the oscillating parts. This segregates vibration to the supporting structure, there being no possibility of it being communicated to the screen house proper.

The screen motor is controlled by the shaker man, and the conveyor and feeder motors are so wired that by pressing a button he may stop either of these machines. These latter cannot be started again until an electric current in the circuit-breaker is switched on by the shaker attendant. The conveyor should always be started before the feeder, and the motors are so wired as to render any other procedure impossible.

This firm manufactures its own electric energy at a power plant near the old mine about one mile farther up the hollow from the plant in question. The expectation is, however, that a large new power plant as well as a repair shop will be constructed in the near future.

The equipment above described was installed under the direction of Maurice Watts, general manager of the company, to whom I am indebted for the general data above given.

The Increased Coal Output of Arkansas

The production of coal in Arkansas in 1913, according to E. W. Parker, of the U. S. Geological Survey, was 2,234,117 short tons, valued at $3,923,701, as compared with 2,100,819 tons, valued at $3,582,789 in 1912, or a gain of 133,288 tons in quantity and $340,912 in value. The increased production is attributable to a larger railroad consumption, caused partly by a decrease in the supply of fuel oil and partly by increased business. This was offset to some extent by decreased domestic consumption, particularly in Texas, owing to an increased use of natural gas in that state.

The prolonged drouth in August and September had an adverse influence on coal production, as it cut down the wheat crop in Kansas and the cotton crop in Oklahoma and Texas. Transportation facilities were improved over those of previous years, and a reduction in freight rates put into effect in the latter part of the year is expected to have a beneficial effect on the industry by enabling larger quantities of coal to be shipped to the Northwest, where Arkansas semi-anthracite has established a market that has already to some extent replaced West Virginia smokeless coal. The conditions at the close of 1913 represented a more hopeful outlook for the future than has existed in Arkansas for several years.

The number of men on strike for one cause or another in 1913 was 1321, or a little more than one-fourth of the total number employed, while the average number of working days lost by each man on strike was 27. The average quantity of coal produced per man was 480 tons, as against 463 tons in 1912. According to the Bureau of Mines there were 12 fatal accidents in 1913, or just double the number occurring in 1912. The death rate per thousand was 2.58, while 186,176 tons of coal were mined for each life lost. In 1912 the death rate was 1.3, and the coal produced for a life lost was 350,137 tons.



Weak Props That May Cause a Fall

The Purchase of Coal on Specifications--II

By F. R. Wadleigh*

SYNOPSIS—In this second installment, the fallacy of emphasizing the importance of the moisture and volatile content is taken up. Specifications are often exceedingly rigid on these points, when, as a matter of fact, they are either beyond control of the producer or are insignificant insofar as actual heat values are concerned. Ash and clinkers are also discussed, the latter in considerable detail.

Taking all of the different properties and constituents that may enter into coal specifications, a discussion of the advisability and practicability of their use will be made, eliminating every item not absolutely pertinent. It is hoped in this way to work out contract specifications that are easy to understand, practical in operation and fair to both the seller and buyer.

Moisture

The determination of moisture and its part in coal specification demand careful consideration, as there are some differences of opinion on the subject.

The actual heat loss due to moisture as shown by analysis has often been greatly exaggerated. In the first place, there is nearly always a large possible variation in moisture, which sampling cannot always correct. Next, the coal when it reaches the furnace is almost always drier than when it is unloaded. Then the heat necessary to vaporize the moisture and raise it to flue-gas temperature will lower the percentage heating value of the coal only about 0.1 of one per cent. of the moisture in the coal.

For these reasons, the percentage of moisture allowed in a specification contract should be sufficient to take care of all these various items.

For instance, the contract (290,000 tons) for the coal purchased by the London, England, County Council calls for an allowance of 10 per cent. moisture. In case it runs below this, the quantity of coal paid for is increased beyond the actual weight by a percentage equal to the decrease in moisture; but when the moisture runs over 10 per cent., the amount of coal paid for is decreased in a like manner. Moisture is a factor often impossible to control, as when coal is wet by rain or snow after it has been shipped from the mines.

Volatile Matter

The volatile matter of coal is made up principally of:

1—Hydrocarbons of varying composition.

2—A part of the total sulphur.

3—Nitrogen.

4—Combined water.

It should also be remembered that a part of the volatile matter is noncombustible, the amount ranging from 1 to 15 per cent. of the coal.

Specifying a limited percentage of volatile matter and basing the premiums or penalties on such percentage are only justified where the question of smoke enters in.

The method of determining the percentage of volatile matter in coal is an arbitrary one, and the accuracy of the result depends largely upon handling conditions. Two different chemists, in different laboratories, both trying to follow the same method, may, according to Sommermeier, easily obtain results differing 2 to 3 per cent. But a good chemist working in a fixed way with the same crucible, same height of gas flame and same burner, can obtain duplicating results within a few tenths of 1 per cent., and the results, on coals of approximately similar nature, should be comparable within 1 per cent.

"White's Gas and Fuel Analysis" says: "Most of the volatile material (evolved from coal) is a decomposition product where the amount varies with the rate of heating, the maximum temperature attained, the character of the flame, the sizes of the crucible and other conditions."

Messrs. Fieldner & Davis, chemists of the U. S. Bureau of Mines, investigating the question of volatile matter in coal, found that using the ordinary water gas at the Washington laboratory gave a maximum temperature of 970 deg. C. inside the crucible. This was 120 deg. higher than they could obtain with Pittsburgh coal gas or natural gas. The conclusions formed from their experiments are as follows:

> Two laboratories are likely to vary 2 per cent. in volatile matter, both using the official method (of 1899). The percentage of volatile matter obtained from the same sample of coal varies with the temperature and rate of heating. This is not sufficiently defined by height of flame. Temperatures ranging from 160 deg. C. to 890 deg. may be obtained with a 20 cm. natural gas flame, when the gas pressure is varied from 1 to 13 in. of water; variations of 2 per cent. volatile matter are thus produced. Differences in height and sizes of burner influence results from 0.3 to 1.5 per cent. Polished crucibles become hotter and yield about 1 per cent. more volatile matter than dull gray ones.
>
> Laboratories using natural gas are apt to get results on volatile matter that are considerably lower than those using coal gas, unless the following precautions are observed: (1) Gas should be supplied to the burner at a pressure of not less than 10 in. of water. (2) Natural-gas burners admitting an ample supply of air should be used. (3) Gas and air should be regulated so that a flame with a short, well defined inner cone is produced. (4) The crucibles should be supported on platinum triangles and kept in a well polished condition.

Volatile Matter in Specifications

In 1913, the committee on coal analysis, appointed by the American Chemical Society, made its report and recommended the following alternate methods for determining volatile matter in coal. One of these two methods should be specified in all coal specifications where penalties or premiums are enforced on percentage of volatile matter:

> It is recommended that for volatile matter determinations a 10-gram platinum crucible be used having a capsule cover, that is, one which fits inside of the crucible and not on top. The crucible with 1 gram of coal is placed in a muffle maintained at approximately 950 degrees C. for seven minutes. With a muffle of the horizontal type, the crucible should not rest on the floor of the muffle but should be supported on a platinum or nichrome triangle bent into a tripod form. After the more rapid discharge of the volatile matter, well shown by the disappearance of the luminous flame, the cover should be tapped lightly to more perfectly seal the cover and thus guard against the admission of air.
>
> One gram of coal is placed in a platinum crucible of approximately 20 c.c. capacity (35 mm. in diameter at the top and 35 mm. high). The crucible should have a capsule cover which will readily adjust itself to the inside upper surface of

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the crucible. The crucible is placed in the flame of a Meker burner, size No. 4, having approximately an outside diameter at the top of 25 mm. and giving a flame not less than 15 cm. high. The temperature should be from 900 degrees to 950 degrees C. determined by placing a thermocouple through perforated cover which for this purpose may be of nickel. The junction of the couple should be placed in contact with the center of the bottom of the crucible. Or the temperature may be indicated by the fusion of pure potassium chromate in the covered crucible (fusion of K_2CrO_4, 940 degrees C.). The crucible is placed in the flame about 1 cm. above the top of the burner and the heating is continued for seven minutes. After the main part of the gases have been discharged the cover should be tapped into place as above described.

For lignites a preliminary heating of five minutes is carried out, during which time the flame of the burner is played upon the bottom of the crucible in such a manner as to bring about the discharge of volatile matter at a rate not sufficient to cause sparking. After the preliminary heating the crucible is placed in the full burner flame for seven minutes as above described.

The accuracy that should be obtained by a reliable chemist is shown in the accompanying table, taken from the report to the American Chemical Society of its committee on coal analysis, 1913:

	Allowable Variations, %	
	Same Analyst	Different Analysts
Moisture, under 5%	0.2	0.3
Moisture, over 5%	0.3	0.5
Volatile matter, bituminous coals	0.5	1.0
Volatile matter, lignites	1.0	2.0
Ash, no carbonates present	0.2	0.3
Ash, carbonates present	0.3	0.5
Ash, more than 12%	0.5	1.0
Sulphur, in coal	0.05	0.1
Sulphur, in coke	0.03	0.05

Further, a variation in volatile constituents affects the manner and rate at which the gases are given off during combustion, and two coals varying in volatile content may act in the same manner on distillation in a furnace or coke oven. On the whole, the composition of the volatile matter of coals is so varied and our knowledge of some of the constituents so incomplete that it is advisable, as a general rule, to avoid the use of it in coal specifications.

We must call attention here to the fact that, when considering the effect of volatile matter on combustion, especially with regard to smoke production, it is not always the *quantity* that is important, but also its composition. There is always some incombustible volatile matter in coal, such as carbon dioxide, water and nitrogen, that lowers its heating value; varying percentages of the hydrocarbons also affect the heating value and tendency to produce smoke.

Oxygen in combination is also detrimental to the heat of combustion, diluting and rendering ineffective the equivalent combining weight of carbon, hydrogen or sulphur. According to Dr. David White, oxygen has about the same anticalorific effect that the same percentage of ash would have. He says:

"In other words, with respect to their efficiency as fuels, oxygen is an original impurity in coals, which improve according to the extent of its removal." (U. S. Geological Survey Bulletin, 382.)

Ash

The ash of a coal consists of the ash content of the vegetable matter from which the coal was formed and the earthy matter from the strata above, below and in the coal, together with the various substances deposited by water running through the coal seams. Analysis of the ash will yield, in varying quantities, silica, alumina, oxides of iron, lime, magnesia, potash, soda, sulphuric and phosphoric acids.

The following tables give: (1) Ash analyses as showing the variations in constituents of ash; (2) analyses giving also the fusing point of the ash:*

ASH ANALYSIS OF SOME AMERICAN COALS

	Pocahontas	New River	Reynoldsville	Fairmont	Pittsburgh	Ziegler
Silica	37.26	61.26	41.48	36.50	43.95	54.3
Alumina	19.485	24.35	34.68	23.35	39.54	29.1
Oxide of iron	9.21	2.71	18.75	27.58	15.00	9.0
Lime	1.90	0.62	4.38	4.91	1.54	6.3
Magnesia	1.195	1.75	0.12	0.98	.....	1.3
Alkalies	.....	4.76	.....	.....	.....	....
Sulphuric acid	.....	.....	0.42	3.92	0.26	....
Phosphoric acid	.....	.....	.....	0.33	.....	....

COMPOSITION OF ASH AND FUSING POINT OF SOME AMERICAN COALS

Ash in Coal	7.67	4.80	5.49	4.02	8.93	5.40	5.18
SiO_2	41.94	42.17	46.55	39.00	49.99	36.80	49.03
Al_2O_3	24.04	35.58	35.68	26.21	31.97	31.25	41.98
CaO	11.08	4.76	5.00	3.97	2.13	2.80	1.79
MgO	1.28	.....	1.00	0.67	0.81	Tr.	Tr.
Fe_2O_3	14.56	12.70	7.80	21.95	12.23	21.95	5.02
SO_3	4.61	3.21	3.76	4.44	0.26	2.76	1.86
Alkalies[1]	0.49	1.68	0.21	3.76	2.61	4.44	0.32
Color	T. C.[2]	T. C.[2]	L. G.[3]	.....	.....	L. G.[3]	L. G.[3]
Fusing point[4]	2147°	2280°	2350°	2390°	2570°	2640°	3020°

[1]Includes undetermined constituents. [2]T. C. indicates terra cotta. [3]L. G. indicates light gray. [4]In degrees Fahrenheit.

Clinkers

The amount and kind of clinker is of such importance in plant operation that it seems obvious all specifications for coal purchase should contain some provision for handling the question, omitting restrictions as to the firing methods used.

Ash Analysis—To analyze the ash is not always practical, for several reasons:

1st—It will not tell us with any certainty whether a coal will clinker readily or not, under furnace conditions.

2d—Such analysis is too costly and too difficult to make.

3d—It is difficult, if not impossible, to get an average sample of the ash.

Color of Ash—The color of the ash has often been considered as an indication of its fusibility. A reddish or iron-colored ash was supposed to indicate a clinkering coal, and a white or yellowish color, the reverse. This, however, is not always true, as some coals with a reddish colored ash do not clinker readily and some white-ash coals do.

Actual Burning of Coal—This, of course, will always tell whether any coal will clinker, and the nature of the same; but to determine on a standard for specifications from such tests would obviously be impossible.

Ash-Fusing Temperature. Determination of, as Indicating the Clinkering Property of a Coal—The formation of clinkers is due to the temperature of the fuel bed reaching the temperature at which the ash will fuse; or it depends upon the fusing point of the ash and the temperature to which it is subjected. This question as applied to coals was first taken up actively on a commercial basis as far as I know about five years ago, the Fuel Testing Co., of Boston, being the pioneers in the movement. This company, in its Bulletin No. 3, published in 1910, on "Clinkers and the Fusing Temperature of Coal Ash," gave some findings and results from its experiments. It had at that time the only laboratory in this country equipped to do this work on coal ash. Since then, a few other chemists have started similar work, and the U. S. Bureau of Mines is now experimenting along these lines, although as yet it has not given out any results, and does not include the ash-fusing temperature in any of the government coal specifications. The value to the consumer of accurate information on

*Rogers & Auberts "Industrial Chemistry," page 439.

the clinkering of coals can hardly be overestimated, and is of vital importance in steam-plant operation. The amount of clinker made is not of so much importance as is its nature and the temperature at which it is formed. A coal of great purity as regards total ash often has a low fusing point and may make a thin, sticky clinker that is difficult to remove from the grates. This same coal may also have a high B.t.u. value, and yet give unsatisfactory results in burning. It is also a fact that coals with the same amount of ash may have entirely different clinkering qualities.

As a matter of actual fact, the coals that give the most trouble with clinkers are usually quite low in total amount of ash. As the clinker is merely a mass of melted or fused ash, it follows that the ash must have a fusing point at which it begins to melt. If we know this point of fusion and the average temperature to which the ash is to be exposed, we have an accurate means of determining the liability of various coals to clinker under the same furnace and firing conditions.

There is often a great difference in the quantity and quality of clinkers formed from different coals, either from different seams or from the same seam, or sometimes in different shipments of coal from the same mine. Such difference must be due to or dependent upon the temperatures at which the ash of the different coals will fuse.

For further data on the clinkering of coals, see *Engineering News*, Vol. 64, No. 23; COAL AGE, Vol. 1, No. 37; Bulletins Nos. 3 and 5, Fuel Testing Co., Boston, Mass.; COAL AGE, Vol. 2, pages 862, 111, 218.

In the use of the ash-fusing point in coal specifications, it must be remembered:

1st—That the amount of ash fused increases rapidly as the fusing point falls below 2500 deg. F.

2d—That with low-fusing temperatures, the character of the clinker is altered, so that more grate-surface is covered per pound of clinker; in other words, the clinkers will run and spread more rapidly and be harder to remove.

Next in importance to buying the kind of coal best suited to the conditions under which it is to be burned is the ash and clinker question, as the amount present seriously affects the efficiency, capacity and operation cost of the steam plant. No matter what kind of coal is bought, low ash means high B.t.u. value, and conversely. It is a dead loss as far as fuel value is concerned, and when present in a certain proportion it makes the fuel useless.

Summing up the bad effects of ash, we have:

It lowers the heating value in the furnace, as its temperature must be raised to that of the fuel bed.

It must be removed at a more or less high temperature, carrying with it heat, together with some combustible, the amount depending upon the grate and furnace design, working of boiler and skill of the fireman.

A greater percentage of ash increases operation costs and decreases the fireman's output of useful work, making this work harder, and causing dissatisfaction.

It decreases possible boiler capacity and efficiency, by clogging up the grates, heating surfaces and furnace settings, thus retarding combustion.

It increases the wear of grates, furnaces and ash-handling apparatus.

The nature of the ash, whether it has a low or high fusing temperature, and the character of the fused ash or clinkers have more to do with plant capacity and efficiency than any other single element in coal; in fact, more than all the others put together, when considering coals of similar nature.

Knowing the ash-fusing temperature of a coal, we do not need to bother about any analysis of the ash, which at best would only give an approximate idea of its behavior. The ash-fusing determination, on the other hand, gives us definite information which can be embodied in coal specifications and made a basis for payment. To illustrate, two tables of ash-fusing determinations are given below, the first taken from the Fuel Testing Co.'s Bulletin No. 5, on Fusing Temperature of Coal Ash, and the second from my own practice, all of the determinations in the latter, with two exceptions, having been made by the same chemist:

	Character of Coal	Fusing Temperature of Ash Deg. F.	Percentage of Ash in Coal	Percentage of Sulphur in Coal	Percentage of Iron Oxide in Ash
1.	Anthracite	3150	14.85	0.76	....
2.	Semibituminous ...	3070	14.81	1.36	....
3.	Semibituminous ...	2910	7.97	0.96	7.0
4.	Semibituminous ...	2880	7.33	0.70	10.0
5.	Semibituminous ...	2830	13.85	1.78	....
6.	Bituminous	2750	10.60	0.60	....
7.	Semibituminous ...	2750	5.80	0.71	....
8.	Semibituminous ...	2710	7.84	0.96	7.90
9.	Semibituminous ...	2680	10.61	1.00	....
10.	Semibituminous ...	2640	8.90	1.25	12.0
11.	Gas	2640	9.84	0.72	6.6
12.	Semibituminous ...	2610	8.93	2.14	....
13.	Semibituminous ...	2610	8.61	1.29	....
14.	Semibituminous ...	2550	12.85	3.10	23.7
15.	Gas	2520	7.22	1.22	13.0
16.	Anthracite	2520	10.08	0.61	6.1
17.	Bituminous	2510	8.02	1.12	....
18.	Semibituminous ...	2480	4.97	0.76	....
19.	Gas	2460	6.91	2.35	24.7
20.	Coke	2460	9.51	0.80	....
21.	Bituminous	2450	7.26	0.84	....
22.	Semibituminous ...	2440	8.68	3.42	....
23.	Bituminous	2360	9.30	2.29	....
24.	Semibituminous ...	2320	13.06	0.92	7.1
25.	Gas	2300	6.78	0.98	10.6
26.	Bituminous	2280	10.47	3.10	....
27.	Gas	2260	7.25	3.12	34.0
28.	Semibituminous ...	2250	7.11	0.73	12.9
29.	Coke	2190	10.22	1.40	13.9
30.	Semibituminous ...	2170	5.50	0.74	....
31.	Semibituminous ...	2160	5.70	0.76	....
32.	Bituminous	2140	21.37	....	....

	Fusing Temperature of Ash	Per Cent. Sulphur in Coal	Per Cent. Ash in Coal
Semibituminous, Maryland.....	3110	0.91	7.47
Semibituminous, Pennsylvania.....	3000	0.73	4.92
Kanawha Splint, West Virginia....	2910	0.88	6.05
Semibituminous, West Virginia....	2820	0.78	3.82
Semibituminous, West Virginia....	2820	0.72	5.17
Semibituminous, West Virginia....	2820	0.74	8.15
Semibituminous, West Virginia....	2750	1.15	6.84
Semibituminous, Pennsylvania.....	2710	1.18	9.81
Semibituminous, Pennsylvania.....	2692	1.23	6.34
Semibituminous, West Virginia....	2680	0.78	7.83
Semibituminous, Pennsylvania.....	2650	1.18	6.22
Semibituminous, Pennsylvania.....	2640	0.94	8.92
Semibituminous, West Virginia....	2530	0.91	4.49
Semibituminous, Pennsylvania.....	2500	1.62	7.21
Semibituminous, Pennsylvania.....	2460	2.10	7.45
Semibituminous, West Virginia....	2410	0.81	4.78
Semibituminous, West Virginia....	2400	0.79	2.34
Semibituminous, West Virginia....	2390	0.98	6.34
Semibituminous, West Virginia....	2370	1.07	3.02
Pittsburgh 1½-in. coal, Pennsylvania	2360	0.88	6.19
Semibituminous, Pennsylvania.....	2340	2.55	10.71
Semibituminous, West Virginia....	2336	1.10	3.05
Semibituminous, West Virginia....	2320	1.47	6.64
Pittsburgh 1¼-in. coal, Pennsylvania	2320	0.96	6.84
Semibituminous, West Virginia....	2300	0.87	2.66
Semibituminous, West Virginia....	2280	0.91	2.46
Semibituminous, West Virginia....	2280	1.56	4.44
Semibituminous, West Virginia....	2270	1.29	5.53
Semibituminous, West Virginia....	2250	0.78	2.12
Semibituminous, West Virginia....	2250	0.78	4.97
Semibituminous, West Virginia....	2230	1.25	4.19
Semibituminous, West Virginia....	2170	0.66	7.35
Semibituminous, West Virginia....	2170	1.00	3.91
Pitsburgh screenings, Pennsylvania	2140	1.16	11.91

To apply these figures of ash-fusing temperatures to actual furnace temperature determinations, we give the following figures showing observed furnace tempera-

Coal	Furnace Temperature[1] Average	Highest	Lowest
High volatile (53 tests)	2470	2864	2091
Low volatile (12 tests	2435	2785	2059

[1]Degrees Fahrenheit.

All of the above temperature observations were taken at the rear of the combustion chamber, with a Wanner optical pyrometer, and are therefore probably lower than the actual temperatures, especially with low-volatile coals and when running with low boiler capacity. With low-volatile coals also the hottest point will be closer to the grates.

Clinkers are the *bête noire* of the power-plant operatives; a badly clinkering coal will add 50 per cent. to the labor of the fireman and discourage any efforts at economical firing. It may be said, however, that clinkering is often due to the misguided or careless methods of the fireman himself, when he allows his fire to burn in holes and uses the slice bar continually raising the clinkers on the grates to the hottest zone of the fire and lowering the greatest heat down to the grates through holes in the fire.

Extracts from a Superintendent's Diary

It is discouraging to think of the amount of trouble that two or three miners with a grouch can stir up if they are possessed of a little imagination and go about the task with enough determination. I remember an instance where they nearly shut down a mine by systematically stealing powder from their "buddies" until everyone had become disgusted by the annoyance and threatened to move to another camp. Almost the same result was achieved by swapping miners' checks on the tram cars, only this resulted a little more seriously as several of the victims resorted to fist fights before they found out that the ones whose weights were running long were profiting innocently.

Just now we are taking part in a bitter dispute with one of the railroads that uses our coal for passenger locomotive service because some of our men, for reasons best known to themselves, have been sending out cars half loaded with rock so cleverly topped that they have passed through the tipple without being noticed.

Eventually it will transpire that the two or three men who are at the bottom of this planned the ruse very carefully, even to choosing a critical time when the particular railroad effected would be sure to receive the coal intended for them. And if we succeed in placing the blame we can only discharge the offenders.

The motive department of the railroad notified our general office that several of their passenger locomotives had "gone dead" because of inferior coal received from our mine and demanded an immediate inspection of our entire plant and loading facilities. They would welcome an opportunity to cancel our present contract, since the price of coal is lower now than it was when the contract was made. The plotters were probably aware of that fact also.

During the next few days while everything about our tipple is inspected, each one of our weigh-bosses, dumpers, slate pickers and car trimmers will perform his task with fear and misgiving, knowing full well that a shut down at the present time means short rations for all to say the least.

Their anxiety is not without foundation; during a similar dispute with a railroad several years ago I learned that it is not an easy matter to uphold the mine's side of a controversy where quality of coal is the cause of complaint, because although it would seem easy enough to describe quality of coal accurately in a contract, as a matter of fact it is almost impossible to choose words that will prove binding if one of the party really desires to renege.

And to think that this sea of troubles can probably be traced back to some inexcusable misunderstanding originating in a short word passed between a commissary clerk and one of the miner's daughters, or to a gruff answer from a check clerk to a miner who thought he had a certain amount on the payroll when in reality he had nothing.

There's one consolation, however, in all this grim performance, and that is we will get rid of the guilty parties, because even if we don't succeed in finding them out they won't be able to resist for long the temptation to crow to some of their "buddies" about what they did. That's better than having them around indefinitely with a festering grudge, liable at any time to incite our entire community into a strike.

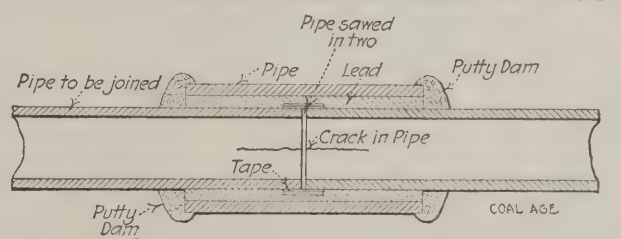
Repairing a Split and Dented Pipe

By N. G. Near

The repair of a broken, split or badly dented pipe may not be a serious problem provided the injured portion is accessible.

Recently a pipe under my supervision got a severe jam, cracked lengthwise and leaked badly. No amount of wrapping with cloth or tape proved effective, and it was evident that some other means would have to be taken to stop the leak.

Accordingly, I sawed the pipe in two at the break, and forced out the dent which had caused the metal to



Cross-Section of Pipe, Showing Method of Repair

split. I then slipped a short section of larger pipe over the break, carefully taped the sawed ends of the pipe together, placed the pipe section in a central position with regard to the break, puttied up the ends and poured lead into the space between the pipe and the covering section.

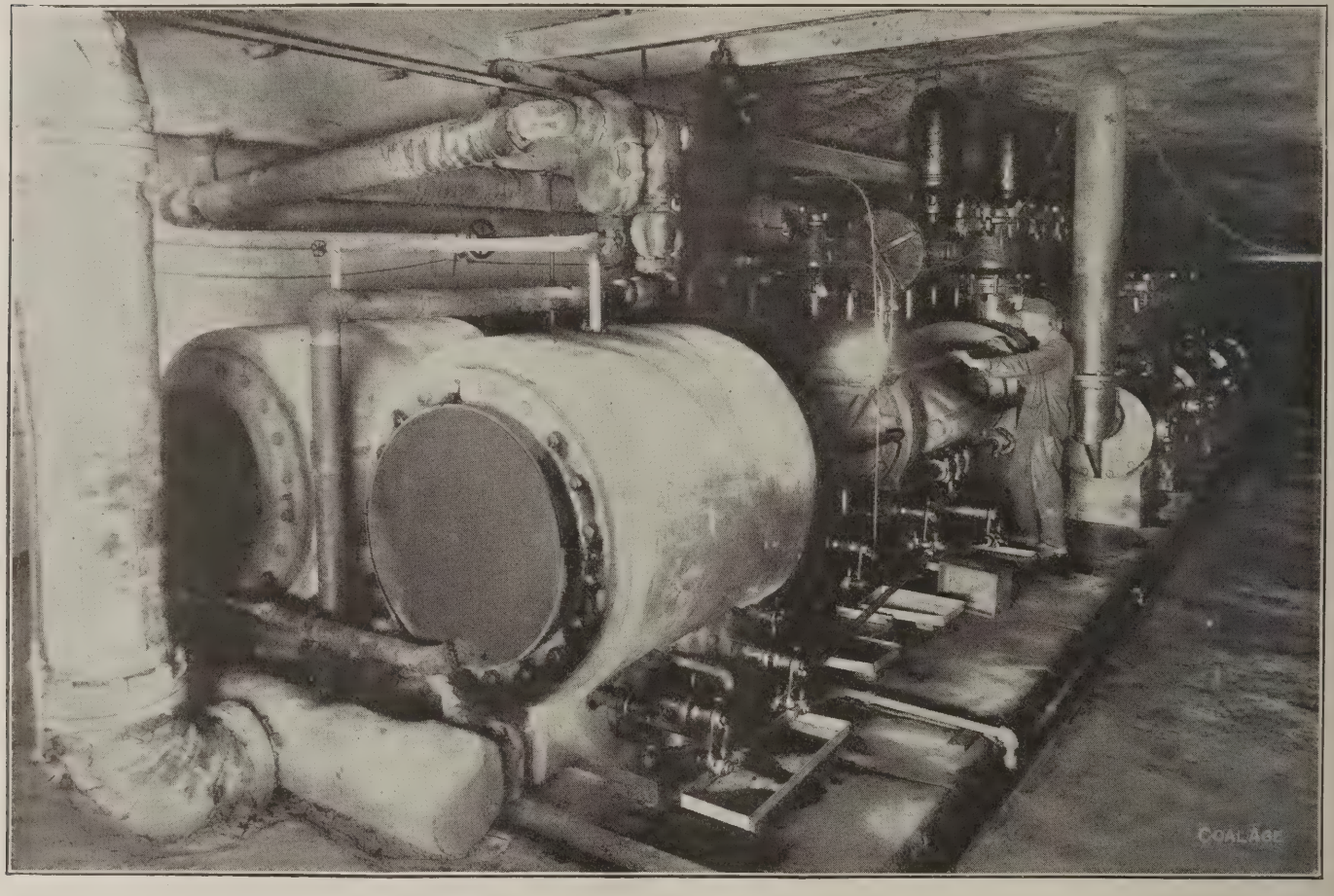
The method of procedure may be clearly seen in the accompanying drawing. The entire process did not require any great length of time and so far as leakage is concerned, there is no sign of a break. While a joint of this kind can be regarded only as an emergency repair, its strength and efficiency are nevertheless surprising.

Electricity may be transmitted through any substance, though in widely varying degrees. The conducting power of any material depends largely upon its physical state. For instance, the conductivity of air decreases rapidly as the pressure increases, while rarified air makes a fairly good conductor of electricity. The conductivity of all substances varies decidedly with change of temperature.

Two Reliable Mine Pumps

SYNOPSIS—Two compound pumps, each weighing 85 tons, that have been handling 3500 gal. of water per minute, 24 hr. per day, practically ever since their installation in July, 1908.

Few people not familiar with the business of coal mining realize the magnitude of the side issues that must sometimes be met. Dewatering a mine may be said to have no direct bearing upon coal digging, yet it frequently happens that unless the water is removed from an operation as rapidly as it enters, the production of coal ceases. In some instances the amount of water pumped or baled from the workings is many times the coal tonnage secured.



THE TWO PUMPS AS THEY APPEAR AT WORK UNDERGROUND

It will be recalled that the first successful steam engines ever built were mine pumps employing a walking beam and long vertical pump rods. While the English have tenaciously clung to a form of machine wherein the power-generating element is on the surface and the pump proper underground, the two being connected by vertical rods working in a shaft, Americans have developed a type wherein the steam and water elements or "ends" are in close proximity, the steam piston rods being rigidly connected to the pistons or plungers of the pump.

In the Jermyn mine of the Delaware & Hudson Coal Co., located at Jermyn, Lackawanna County, Penn., there are installed two compound duplex plunger pumps built by the Scranton Pump Co., of Scranton, Penn. Each of these machines is 41 ft. 3½ in. long over all, 13 ft. 1½ in. wide and 11 ft. 3 in. high to top of air chambers.

These pumps are placed end to end, in an underground pump house. The water ends are adjacent to each other, so that the two suction pipes lead direct to a single sump into which the mine water drains by gravity.

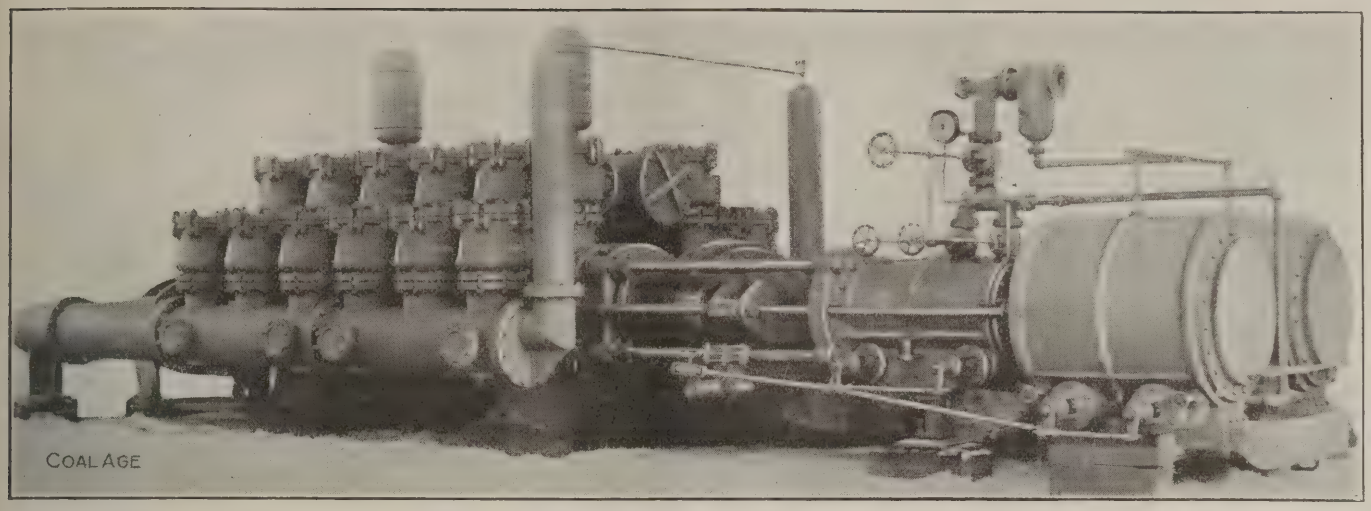
EACH PUMP WEIGHS 85 TONS

Each machine weighs approximately 85 tons and the capacity of each is 5000 gal. per min. The high- and low-pressure steam cylinders are 19 in. and 36 in. in diameter, respectively. The plungers are 21 in. in diameter and the stroke is 36 in. The suction pipe is 21 in. in diameter and the discharge is 18 in. The vertical head against which these pumps work is 300 ft.

Steam which is carried at the boilers at 120 lb. pressure is conveyed to the pumps through piping 350 ft. long. The steam admission opening of each pump is 5 in. in diameter, while the exhaust from the low-pressure cylinder is 10 in. in diameter.

Exhaust from each unit is made to a 12x18x18-in. single independent all-bronze jet condenser, about 6000 lb. of bronze being used in each of these machines, which were also built by the Scranton Pump Co.

Two semirotary steam valves are placed at the bottom of each steam cylinder. These strongly resemble the ordinary corliss valve, but of course are given a



ONE OF THE PUMPS ON THE ERECTING FLOOR

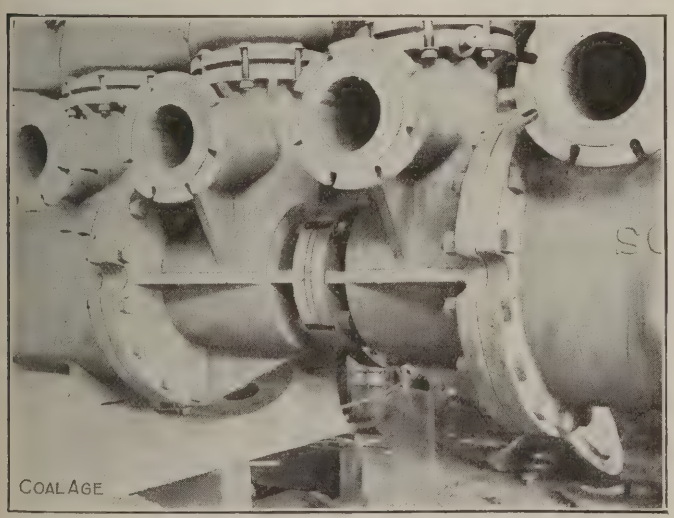
positive motion by the valve-rods. Furthermore, each valve serves both for admission and exhaust. The seats within which they work are bushings with milled ports. These seats are pressed in and doweled, but may be easily removed and renewed should necessity therefor arise. The low-pressure cylinder and both of its heads are jacketed with the drain from the eliminator.

The water end of each pump is provided with 24 bronze pot-valves working on gridiron bronze seats. These machines are believed to be the only ones now in use in the anthracite region supplied with this number of valves.

WATER-BARREL EXTENSIONS ARE EMPLOYED

These pumps embody an improvement upon ordinary pump design in the form of water-barrel extensions. Instead of lengthening out the water barrels to accommodate the 24-pot chambers and using an intermediate flange which acts as the wall partition, the barrels are made for the accommodation of only 16 pots and an elbow in the form of an extension is bolted to each barrel to which the remaining pots are secured. A small blind flange is fastened between each pair of elbows with four bolts and is doweled in place.

In making repairs or inspections, it is only necessary to knock out two dowel pins and remove four bolts, and the partition flange may be taken out. Removal of this flange allows the disengagement of the male and female connection between the barrel and the extension, and either extension or either barrel may be removed, together with the attached valve-pots or other parts, without interference with the balance of the pump.



THE TWO WATER-BARREL EXTENSIONS AND PARTITION FLANGE

The entire water end, so far as possible, is wood lined. Where this is impracticable, bronze lining is employed. The steam and water ends are connected by four 3¾-in. steel rods upon each side. These are shouldered and provided with split collars to facilitate repairs.

As stated above, the capacity of each pump is 5000 gal. per min. Under ordinary circumstances, however, they are run at reduced speed and each handles about 3500 gal. per min. 24 hr. per day. They were installed in July, 1908, and have been in practically constant operation ever since, which speaks well for their design and general "dependability."

Mining Coal in China

The wages paid to coal miners in China are very small compared with those paid in European and American countries, being approximately as follows:

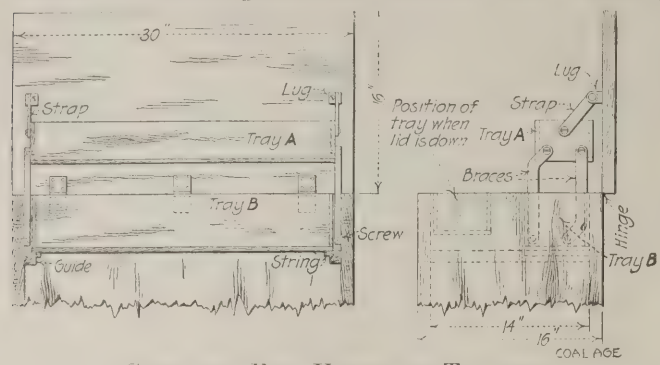
Foremen of mines, and coolies...	$10.00 to $17.50 per month
Mechanics	7.50 to 22.50 per month
Miners	12c. to 20c. per day
Coolies	6c. to 14c. per day

The low standard of skill counteracts much of the economy of the low wages in China, for the following reasons: (1) Greater amount of direction and supervision is necessary; (2) greater waste of material; (3) more ground has to be kept open for accommodating a larger number of men, which increases the cost of repairs; (4) more time taken in lowering and raising a larger number of men in and out of the mine; (5) want of ability to take care of themselves in an emergency, whereby the accident rate will naturally be high.

The cost of production at the pit's mouth in China, without considering interest and redemption of capital, is $1.25 to $1.50 per ton of coal. The miners are generally respectful and faithful to their superiors; they will work in narrow and badly ventilated, as also badly supported workings, and accept their lot cheerfully. They have a lack of thrift and thought for the future, and amuse themselves by attending theaters and gambling.

A Convenient Tool Box

A novel arrangement of tool-box trays has been introduced by C. C. Payton, of the Republic Iron & Steel Co., Sayreton, Ala. This consists in arranging one tray to rise and fall with the tool-box cover. The other tray is arranged to slide backward or forward in the ordinary manner. The arrangement and operation may be readily



SIDE AND END VIEWS OF TOOLBOX

understood by reference to the accompanying drawing.

The advantage of this tray arrangement is obvious, since upon raising the cover the contents of the entire tool box is immediately accessible.

Don'ts for Foremen and Assistants

Don't forget that your position and responsibility demand strict sobriety, and do not hire or allow to remain in your employ any subordinate official addicted to the use of liquor.

Don't forget that you have charge of all matters pertaining to ventilation.

Don't forget to post a notice at the fan engine house, stating the number of revolutions per minute the ventilator shall run.

Don't fail to have every working place examined at least once each day, and if practicable have a second examination made.

Don't fail to direct that the duty of the safety inspector is to look only after the safety of the employees during working hours, and that he is not to relieve the assistant foreman or fireboss of any of his duties.

Don't fail to have a report from each safety inspector every day, and if for any reason he is given other duties to perform, see that a competent person is put in his place.

Don't fail to read carefully the daily report of each assistant mine foreman, fireboss and safety inspector not later than the following day.

Don't fail on your daily inspection tours to see that General Rule No. 12 of the mine law is being complied with and that props are placed and fastened securely.

Don't fail to examine at least once a week all accessible parts of every abandoned portion of the mine in which explosive gases have been found, and immediately remove all dangers existing therein.

Don't fail to examine or see that daily examinations are made, in old sections of the mine being reopened, notwithstanding that these workings were formerly considered nongaseous.

Don't forget that thorough and efficient examinations and inspections before accidents bring better results than the same work after an accident.

Don't forget that we expect you to help us educate the employees to take care of themselves, and this can be best done by personal instruction and attention.

Don't wait for the general inspector to point out dangerous conditions.

Don't fail to take every precaution to insure the safety of the workmen in any portion of the mine that is dangerous or unsafe, and if necessary, withdraw all persons except those required to remove the danger.

Don't fail to see that every person is properly checked out of the mines, or accounted for, before you leave.

Don't allow a light other than a locked safety lamp to be used in any working approaching a place where there is likely to be an accumulation of explosive gases.

Note—Taken from Susquehanna Coal Co.'s book of instructions.

Don't allow anyone, except a duly authorized person, to have in his possession a key or any other contrivance for the purpose of unlocking any safety lamp in any place where locked safety lamps are used, nor to carry matches in said part of mine.

Don't fail to have an examination made before a blast is fired in a district where locked safety lamps are used.

Don't forget that whenever a place is likely to contain a dangerous accumulation of water, the workings approaching such place shall not exceed 12 ft. in width and that bore-holes shall be constantly kept in advance.

Don't fail to have an empty trip hoisted in any shaft or slope where the engine has been standing idle for one hour or more before men are hoisted or lowered.

Don't allow any person to ride upon any loaded car, cage or gunboat in any shaft slope or plane.

Don't allow more than 10 persons to be hoisted or lowered at any one time in any shaft or slope, unless more are allowed by the mine inspector.

Don't allow an accumulation of gas to be removed by brushing where it is practicable to remove it by brattice.

Don't fail to have investigated at once any dangerous conditions reported to you by the officials or workmen.

Don't fail to impress on the miners the importance of reporting any misfire, and after doing so, they shall go home for the day.

Don't fail to have safety holes made at the bottom of all slopes and planes and be kept free from obstructions.

Don't allow employees to travel on any slope or gravity plane while cars are being hoisted or lowered thereon.

Don't employ any person in a mine or section of a mine evolving explosive gases who is not competent to understand the rules and regulations.

Don't forget that not more than 75 persons shall be employed at the same time in any one current or split of air.

Don't fail to have all doors used in assisting or in any way affecting the ventilation hung and adjusted so that they will close automatically.

Don't fail to see that all main doors shall have an attendant, unless a self-acting door is used which is approved by the inspector of the district.

Don't fail to have all main doors so placed that when one door is open, another shall remain closed.

Don't fail to have an extra main door so placed and standing open, so as to be out of reach of accident, and so fixed that it can be at once closed in the event of an accident to the doors in use.

Don't fail to provide a substantial fastening for securing the door while being opened to pass the trips.

Don't fail to have the framework of all main doors substantially secured in stone or brick, laid in mortar or cement, having sufficient clearance between the car and frame on one side.

Don't fail to ascertain, once a week, the quantities of air in circulation, and enter same in the colliery report book.

Don't allow face of breast to advance more than 60 ft. beyond heading. Drive new heading.

Don't neglect to have a heading driven at the face of each breast when finished, to prevent an accumulation of gas.

Don't fail to enter in your report any danger observed in making your examination as required by law.

Don't fail to see that all dangerous or abandoned places in the mines are properly fenced off across the opening so that no persons can enter, and that danger signs are posted.

Don't fail to withdraw men immediately from affected portion of mine in case of accident to a fan.

Don't allow any miner or other person to carry matches where it is necessary to use locked safety lamps.

Don't fail to see that locked safety lamps are used when any others would be a menace to life and property.

Don't fail to see that all safety lamps are properly locked when used in gaseous districts.

Don't permit drill bits to be used unless at least one-eighth (⅛) of an inch larger than the diameter of the cartridge in use.

Don't fail to have doors and stoppings constructed as required by the mine law.

Don't forget that all gangways and main haulageroads driven hereafter where employees travel shall have a clear space of two and one-half (2½) feet from top of car to rib, and also to timbers, always on one side if conditions permit. Otherwise, provide ample safety holes on same side. Both to be always kept clear of obstructions.

Don't fail to keep the distance between prop and top rails of cars used in breasts at least three (3) feet, and space kept free of obstruction.

Don't allow platform, where used in gangways, to extend over top rail of car.

Don't allow chutes to extend more than twelve (12) inches over top rail of car unless they clear top rail at least sixteen (16) inches.

Don't neglect to remove or saw off all the chute or platform when a breast is finished or abandoned.

Don't forget to have examined, each working day, the shafts, slopes, travelingways, etc., as required by the mine law.

Don't fail to provide miners with a sufficient number of sawed up cap pieces of suitable size.

Don't fail to insist that the miner remain at work with his laborer, and do not allow the laborer to remain at work without the miner.

Don't fail to provide special cars in slopes for lowering and hoisting men.

Don't fail to direct and see that efficient safety blocks or devices are placed and maintained in good working order for preventing cars from running into shafts, slopes or planes where used by employees.

Don't fail to see that all hoisting ropes, safety catches, chains or bars, and all other hoisting apparatus are inspected, cones readjusted and bridle chains annealed.

Don't fail to observe the law relating to sinking new shafts.

Don't fail to have all permanent structures inside fireproof, including permanent air bridges.

Don't fail to correct any man you may see handling or using explosives in a faulty manner.

Don't fail to place danger signs when you find gas.

Don't keep a miner in your employ who opens a keg of powder with a pick, or who tamps his charge with an iron drill or needle.

Don't use, or allow to be used, open lights for testing brattice or stoppings for leakage.

Don't fail to notice any dangerous conditions when entering a working place, especially the "top."

Don't employ a man for work with which he is not familiar without giving him instructions, and also call his attention to the rules relating to his work.

Don't fail to keep mine telephones and signals in working order between the surface and all important parts of the mine.

Don't fail to instruct all persons in your employ to close all gates in shafts and slopes.

Don't fail to put up signboards indicating the direction of outlets to the surface.

Don't permit the storage of hay where the smoke may be carried into the main intake in case of fire.

Don't ride or permit others to ride on motors except for the purpose of making an examination.

Don't fail to observe the law governing the qualifications and duties of hoisting engineers.

Don't allow any person in a state of intoxication to enter any mine.

Don't fail to report all accidents as quickly as possible.

Don't fail to have an efficient alarm attached to the front end of every trip pushed by a motor.

Alabama Rate Increase

Following in the wake of the 5 per cent. increase in freight rates granted the Eastern lines, the Southern railroads, operating out of the Birmingham district, have petitioned the Alabama Railroad Commission and the Interstate Commerce Commission to be allowed to increase their freight rates on coal to practically all points in Mississippi, and some in Alabama, Tennessee and Louisiana, 10 to 33 per cent.

From the standpoint of both the Alabama operator and the consumer, this is one of the most important matters ever presented to these bodies; to the operator because it will undoubtedly reduce his territory, which has gradually grown smaller year by year, due to excessive freight rates from this district and more advantageous rates from other districts; and to the consumer because, should he be situated where he cannot get coal from another district, he must stand the additional freight.

It is a well known fact that Alabama in recent years has lost practically the entire state of Georgia, due to the low rates from Tennessee, Virginia and West Virginia, and now the railroads, instead of coming to the assistance of the operators, are asking that they be allowed increases in their rates that will still further curtail the Alabama production. What is true of the territory east of Birmingham, just mentioned, also applies to that north and west. Northern Alabama, on the edge of the Alabama coal fields, gets most of her coal from Tennessee, due to the already too high freight rates from the Birmingham district. Mississippi, just west of these fields, gets most of her fuel from Illinois and Kentucky, for, notwithstanding the fact that the distance is at least 50 to 75 per cent. greater from Kentucky and Illinois fields, the freight rates to practically all Mississippi points are the same from Illinois and Kentucky as from Alabama. And yet the railroads request that they be allowed to raise their Alabama rates.

There are contracts now with Alabama operators amounting to hundreds of thousands of tons of coal from the railroads traversing the Atlantic seaboard, and should the freights be raised, these contracts would be placed in Tennessee or West Virginia. This also applies to the lines in the Mississippi Valley, as they will probably draw their fuel supply from the Illinois and Kentucky mines.

While the proposed rates cover practically all points, a few of the most important are as follows:

To:	Present	Proposed	To;	Present	Proposed
Birmingham, Ala....	$0.30	$0.40	Memphis, Tenn.....	$1.10	$1.25
Birmingham, Ala....	0.40	0.50	Columbus, Miss.....	0.95	1.10
Anniston, Ala.....	0.50	0.70	Gulfport, Ala.....	1.25	1.40
Gadsden, Ala.....	0.50	0.70	Jackson, Ala.....	1.45	1.60
Alabama City, Ala...	0.50	0.70	Meridian, Ala.....	1.10	1.25
Sylacauga, Ala.....	0.50	0.70	Natchez, Ala.....	1.55	1.70
Attalla, Ala.....	0.50	0.70	Vicksburg, Ala.....	1.45	1.60
Talladega, Ala.....	0.30	0.70	West Point, Ala.....	0.95	1.10
New Orleans, La.....	1.25	1.40			

The Chamber of Commerce of Birmingham has taken the matter up, as well as the Alabama Coal Operators Association, and is preparing to make a strong fight at the hearing before the Alabama Railroad Commission, on Sept. 16.

It is estimated that should these increases be allowed, the Alabama production will be curtailed 10 to 15 per cent. annually.

Hungarian Coal Industry in 1913—Despite the unfavorable condition of industries in general, 1913 was a good year for the coal-mining industry, owing in part to the greater demand for coal by the Royal Hungarian state railways. There was a slight increase in the imports of hard coal, briquettes and coke and a decrease in the imports of brown coal. The total imports of brown coal, coke, hard coal and briquettes amounted in 1913 to more than 5,200,000 tons, against 4,870,000 tons in 1912. Exports of these articles in 1913 amounted to slightly more than 390,000 tons, a decrease of about 40,000 tons from 1912. The production of Hungarian coal mines in 1913 is estimated at 10,568,000 tons. Hungarian coal deposits are estimated to contain over 350,000,000 tons in sight, plus available resources of 1,358,000,000 tons.

The coal mines owned and operated by the Hungarian Government have not been profitable. The balance sheet of the Vodnik coal mine showed a net loss of $82,215 at the end of 1911 and of $129,920 at the end of 1912. The books of the Komlo coal mine, likewise operated by the Hungarian Government, showed at the end of 1911 a net loss of $25,578, and at the end of 1912 a net loss of slightly more than double that amount. Other mines owned and operated by the government have also been operated at a loss. It is estimated that the net loss to the government on all the coal mines it owns and operates will be at least $300,000 in 1914.

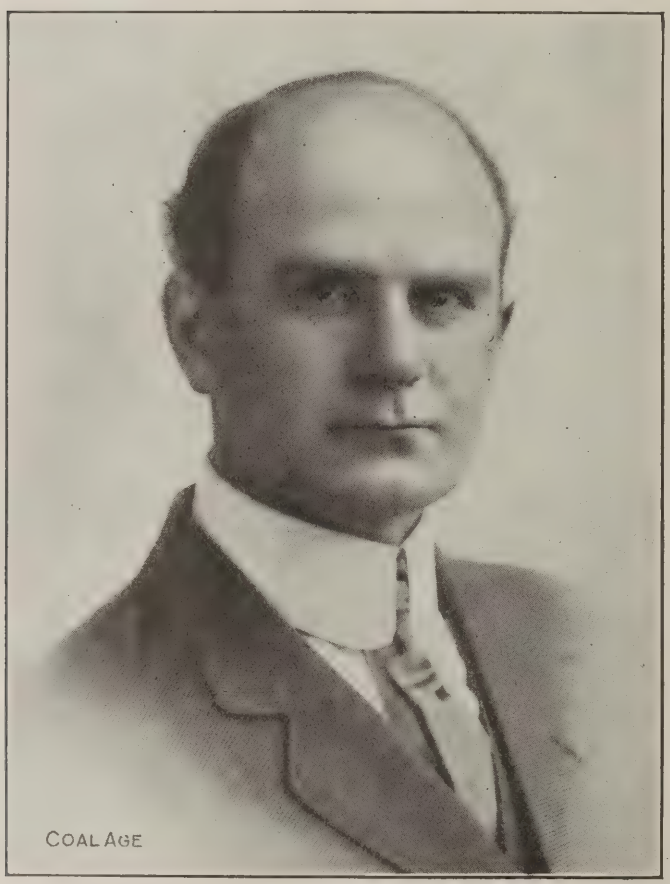
Pure copper possesses many physical properties of great engineering value in addition to its high electric conductivity. It has, to a marked degree, the qualities of malleability and ductility, which make it an ideal metal for wire drawing. Its strength and hardness are greater than that of any other base metal, except iron. It has the power of resisting oxidation, takes a high polish, is easily worked, and can be forged easier than iron.

Who's Who in Coal Mining

George Watkins Evans

Coal mining in the Northwest is becoming quite an industry, and in keeping with the progress of the business itself, a number of engineers are advancing to positions of prominence in the great industrial life of our Pacific Coast country. One man who has rendered valuable services to the fuel industries of Washington and neighboring states is George Watkins Evans, consulting mining engineer of Seattle.

Mr. Evans was born at Abercarn, South Wales, in 1876. He comes of a line of coal-mining men, all of



GEORGE WATKINS EVANS

whom have been connected with the coal industry of Wales since its beginning. His education was obtained in the Washington State College, where he graduated from the mining school with a B. S. degree in the class of 1903.

His experience in the mines dates back to a period previous to his university work, and covers more than 12 years of service in various positions. He also spent five years in Geological Survey work, and for three years was geologist in charge of coal surveys for the Washington Geological Survey.

Following his work for the State of Washington, Mr. Evans did consulting mining work for the U. S. Navy, making a report on the "Alaska Coal Situation." Finishing his work in Alaska, he spent some time as examining engineer for Canadian capitalists, and at the present time is serving as consulting mining engineer, coal division, of the Northern Pacific R.R. He is also consulting mining geologist of the Carbon Hill Coal Co. and mining engineer of the Hyde Coal Co.

Mr. Evans has done a considerable amount of technical and engineering writing. One of his most important works is "The Coal Fields of King County." His report on the Ground Hog anthracite coal field of British Columbia, and his Report to the U. S. Navy on the Matanuska coal field, are authoritative documents and have been read with interest by all coal men interested in the fields covered.

Mr. Evans is an active member of the American Institute of Mining Engineers and was recently appointed by the Institute to serve on the newly created "Coal and Coke Committee." Few men are better acquainted with conditions in the Western coal fields of this country and Canada than Mr. Evans, and there is no doubt but that the character of his work entitles him to rank as one of the principal coal authorities of the Pacific Coast.

The Contraband Question on the Great Lakes

On the matter of coal shipping on the Great Lakes, the United States government has issued the following instructions to collectors of customs:

1. You will permit foreign-bound vessels in your district to clear only after they have filed with you their full and final manifests.

2. You will notify all merchant vessels in your district that they will be subject to inspection and examination of documents, ships, and cargoes by United States authorities before clearance is given, and will be subject to further examinations after clearance, and while such vessel remains within the territorial waters of the United States. Such vessels shall stop and lie to for examination when signaled by a United States vessel.

3. Any foreign-bound vessel whose character as a merchant vessel is established to your satsifaction is entitled to clearance (under the above conditions), no matter what the character of her cargo, or what her destination.

4. You will not refuse clearance to merchant vessels, whether of the United States or other neutral power, or whether of a belligerent power, solely on the grounds that the vessel contains contraband of war.

Coal Mining in South America

None of the South American countries rank as important coal producers. Chile mines about 1,000,000 tons of coal annually for steamship purposes at Lebu and Tolcahuano. Peru mines 330,000 tons annually, while Brazil, Argentine, Venezuela and Colombia produce no coal of consequence.

In Peru, the coal industry is controlled by an American (U. S.) concern, the Cerro de Pasco Mining Co. Their fields are at Goyllarisginsga and Quis-Knarcancha.

Colombia has most extensive beds of coal adjacent to the Panama Canal. These fields would seem to have a bright future, and are worthy the attention of American capital. Practically all the lowlands on the entire north coast of Colombia are underlaid with a good grade of fuel.

The practical unit of electrical resistance is the international ohm, which is the resistance offered to an unvarying electric rurrent by a column of pure mercury at a temperature of melting ice, 14.4521 grams in weight (0.51 oz.) of a constant cross-sectional area, and 106.3 cm. (41.85 in. in length). To obtain a concrete idea of this unit, it should be remembered that a copper wire, having a diameter of $\frac{1}{10}$ in. has, at 68 deg. F., a resistance of approximately 1 ohm per 1000 ft.

Editorials

When the present war commenced, great alarm was felt by American coal operators over the possibility of an exodus of alien miners to Europe to serve in the armies of their native countries. Much of this fear was unfounded as subsequent events have proved. Here and there, we find instances where a dearth of labor has handicapped operations, but generally the expected outflow has not materialized to such an extent that vacancies in the ranks of labor could not be filled. In fact, taking the country as a whole, and considering all its varied industries, careful estimates show that of the 40,000,000 workers in the United States, less than 800,000 have citizenship in the nations at war.

However, where the European war does cause a scarcity of labor in this country through aliens returning to fight, the industry affected will necessarily be obliged to turn more earnestly to the use of machinery, and there could be no more happy solution for the problem. A demand for more mechanical appliances means greater prosperity for our factories and mills that supply such equipment. The history of every recent war shows that inventive genius has supplied the machinery needed to do the work of absent men.

So far as precedent is concerned, there is no basis for the belief that the European war will prostrate business throughout the world for long. During the American civil war, this country entered a period of record production in many of our factories and mills. It is also interesting to note the effect of the Napoleonic wars on the trade of the United States. All Europe was fighting while America was at peace. During the 15 years covered by the European struggle, American foreign trade increased nearly 500 per cent., and the tonnage of American ships even more.

Mine Fires

During the past year there have been a number of serious fires on the surface and underground at various coal mines. These disasters should teach all coal men the advisability of adopting measures to prevent such accidents. A mine fire always has dire possibilities, because of the great number of men who are likely to be affected.

Practically all mine managers realize the dangers that may result from the use of timber in the construction of headgears at colliery plants. It cannot be long before the laws of all coal-producing states will rule against the use of wood in structures adjacent to mine shafts.

We are also coming to recognize the necessity of having a trained fire brigade of colliery employees at every mine. Such a corps of experienced men could render prompt service in overcoming any fires that might occur. This is an age of specialization and men who are quite familiar with improved methods of rescue work are frequently ignorant concerning the best practice in extinguishing a serious mine fire.

One lesson taught by recent fires is the great importance of being able to reverse the mine ventilation. Not so very long ago a fire occurred in the workings of a European mine. At a critical moment the fan stopped, and it appeared impossible to save the lives of the men underground. Fortunately, the downcast shaft contained a number of steam pipes, and the presence of these caused the air to automatically reverse—the downcast shaft becoming an upcast. Many other instances might be cited where the reversal of ventilating currents saved the lives of men.

If you haven't a trained fire brigade at your colliery, organize one immediately and arrange for a course of instruction for the men which will cover the very latest practice and include all modern ideas with reference to the successful handling of mine fires.

The Union's Attitude to Safety

The miners' unions are favorable to safety and first-aid. It is true that occasionally the miners, as at the Delaware, Lackawanna & Western R.R. Coal Department mines, object to the patrolmen but much of that feeling is due not so much to a lack of interest in safety as to an objection to the personnel of the patrol corps or because of a dislike of close supervision. The persons selected for the inspectional patrol are middle-aged and active men of training who are suited for advancement in official capacities and the older miners irk at the authority given them by the company.

Most of our managers would not like to have men at their elbow always nagging them about safety. A little irritation should not be unexpected, at least until the men get accustomed to the unwonted interference. The operator, if we rightly recall, has been known at times to find that important functionary, the state mine inspector, an annoyance and as to some operators' opinions of certain clauses of the mine law, the less said the better.

Indeed, perhaps the operator is sometimes right and the law wrong and even at the face, the miner of many summers may be sometimes correct in his judgment and middle-aged patrolmen wrong. Still laws are good and so are mine inspectors and we believe patrolmen will also serve a good end. Meanwhile let us keep our perfect balance, for the man behind the desk and the man at the face on the whole are at one in wanting to see a safe mine, and perhaps if there is any difference between them, the latter is the man most interested for if the roof falls it is his head or his back which is broken.

We know the old rhyme about "all the bigger fleas have little fleas to bite 'em and little fleas have littler fleas and so *ad infinitum*." The miner must not think he alone is hectored. When the operator is told that he must put in a larger fan, he is as much heckled as the man who is sent out to get his auger made to gage and some operators act in the same petulant manner as the men they employ and say they will shut down rather than comply.

So the operator must "sit tight" on this subject. The probabilities are that he has in his mine, a lot of sympathizers with his safety notions. It is interesting to note that at Charleroi, Penn., when subdistrict No. 3 of district No. 5 of the United Mine Workers of America held an annual outing of miners, the main features were first-aid speeches and field practice.

The unions are giving prizes for first aid and several of them have indorsed the movement and a certain enthusiasm is spreading fast; only there is, of course, a natural feeling against it because the operator will persist in publishing that the miner is to blame for most of the accidents. Of course he is. What else could be expected? There are 200 or 300 men in a mine. If the operator is to blame as often as his men, he is taking more than his due share in making the mine unsafe.

Though the miner is frequently to blame he is probably filled with a due sense of responsibility, but he does not like to be always reminded that the operator thought of safety before he did. After all, it is doubtful if the operator has a patent or even a copyright on "Safety first." This only is probably true: That when the idea did light on him, he had the time and the money to make his wish a general practice.

Let us wait and we shall see that the unions and the individual men will do their part. Sometimes we are apt to think that all they care for is to puzzle out expensive legislation for the operator. But there is another kind of activity and who will say they do not exhibit it?

Ventilation Rules

A study of the laws of the various countries regulating mine ventilation is an enlightening occupation. In no country have the authorities covered the subject in a more comprehensive manner than in France. The French laws aim at three things, (a) a supply of air sufficient to insure hygienic conditions, (b) enough air to avoid an excessive rise of temperature, and (c) sufficient ventilation to guarantee the absence of danger arising from foul gases or smoke.

In French mines the speed of the air current in the shafts and entries must not exceed 26 ft. per sec., except in such places as are not ordinarily used for the transport of material or the traveling of persons. The law only requires that each man be supplied with 1.77 cu.ft. of air per sec., and inspectors satisfy themselves as to the mine owners compliance with this latter requirement by measuring the quantity of air at the intake, and then dividing that quantity by the number of men underground. They further endeavor to see that the bulk of the air reaches the faces of the workings.

The French idea of dividing all mines into three classes; namely, distinctly fiery, slightly fiery and non-gaseous, is a good one. The decision as to which class a mine belongs is left to the local inspector in conjunction with the mine owner and a representative of the workmen. This classification of a mine may relate to the workings as a whole or only to an independent section. The classification of mines in respect to coal dust is on lines similar to that on firedamp.

Another interesting rule of the law is that which fixes a maximum temperature in which men may work underground. This prescribed temperature is 95 deg. F. on dry bulb, or 86 deg. F. on wet bulb.

There is much that legislators who busy themselves in writing laws to control operations in American coal mines might learn from a perusal of mining regulations of some of the European countries. What we need in America is not so much quantity in mine laws as quality. It is inadvisable to enact measures that cannot be enforced at all, or to pass laws that greatly burden operators, without resulting in the attainment of any desirable end.

Animal versus Mechanical Haulage in Mines

Several humane societies, especially in Europe, have as their real object the removal of horses, mules and ponies from mines. We are pleased to note, however, that their original views and aims are somewhat modified. Investigation showed that the evils attendant upon the use of animal haulage in coal mines cannot be abolished at one fell stroke.

The investigators had little trouble in proving that mechanical haulage, as a general rule, is cheaper, faster and more sanitary. It was further shown that where conditions such as suitable gradients, continuity of seam and absence of faults are found, it would be possible for mechanical haulage to entirely supersede horses in new mines, and also in the extension of some old mines where there is a source of power available at a convenient point.

On the other hand, it was evident to those conducting the research that at certain old collieries it might be possible to adapt the workings for mechanical haulage, but at a prohibitive cost. It is interesting to note the conclusions arrived at by the National Equine Defense League officials in England, which organization recently collected data covering the subject of animal haulage in coal mines. Following their research this policy was announced:

(1) To secure by legislation the best possible conditions for the horses and ponies that must be employed in mines.

(2) To insure that no more horses than are absolutely necessary shall be used in mines at the present and for the future.

(3) To promote the use of mechanical traction wherever possible.

Prevention of Breakage

In many places, the question of breakage in loading and handling coal is an important problem. A considerable number of mechanical appliances have been installed to meet the needs of each case. No one solution is of greater value than the belt conveyor. At one mine where rapid dispatch and careful handling were essential, the owners supplied themselves with a coal-belt elevator capable of dealing with 700 tons of coal per hour.

This particular conveyor was 207 ft. long and 42 in. wide; it was carried on a fixed steel girder, and delivered the coal by means of a telescopic shoot provided at its outer extremity with a revolving lip. The entire belt was driven by electrical power.

Under certain conditions, there is nothing that equals the belt conveyor as a means of handling large outputs of coal when the product is easily liable to fracture.

Legal Department

Power of Legislature to Regulate Coal Mining

By A. L. H. Street*

In sustaining the validity of the law enacted in Ohio, Feb. 5, 1914, which regulates the weighing of coal at mines where miners are paid according to quantities produced, and which empowers the Industrial Commission to fix the standard for compensation in case of dispute between operators and miners, the United States District Court for the Northern District of Ohio said in the recent case of Rail & River Coal Co. vs. Yaple, 214 Federal Reporter 273:

"Without determining the soundness of the argument that the act, indirectly at least, establishes a minimum wage, in that it insures the miner full pay for all coal mined in accordance with the prescribed regulation, it may not be said that, in supplying an incentive for more effectually securing the removal of fine coal and coal dust to the surface, and thereby minimizing or dissipating the danger arising from their continued presence in the mines, the act does not provide for the health, safety and general welfare of employees. Furthermore, section 36 was designed to limit, by appropriate legislation, the freedom of contract as regards the methods of mining, weighing and measuring coal. We are not prepared to hold that the Legislature, acting within the scope of that section, may not say that the business of mining coal is so far affected with a public interest as to justify appropriate regulation of the manner of paying employees when they are to be paid according to the quantity produced, and when such regulatory statue will operate to allay discord and strife and conserve the coal supply. The Ohio act does not restrict the right of contracting for the labor of miners by the day, week, month, or year, or in any other manner (except as to quantity) that the operator may deem proper. If the miner or loader by the terms of his employment is to be paid by the ton or weight, the right of contract is then curtailed to the extent that he shall be paid according to the total weight of the coal contained in the mine car, such contents to include, however, no greater percentage of slate, sulphur, rock, dirt, or other impurities than is unavoidable, as determined by the Industrial Commission. If the employee should send to the surface an excess of such impurities, or any of them, the operator is not required to accept the car or pay for its contents as delivered, but is at liberty to agree with him as to the deductions to be made on account of impurities. If no agreement is made, the offending employee may be prosecuted for his violation of the Commission's order as for a misdemeanor. If he be unable or unwilling to pay the fine imposed, he may be imprisoned in the county jail until his fine and costs are paid, or secured to be paid, or he is otherwise legally discharged, provided he be given credit upon his fine and costs at the rate of 60c. per day for each day's imprisonment. He is thus subjected to penalties which are neither obscure nor uncertain. The act does not require the operator to mingle the contents of such a car with the other coal produced, or prevent his removing, by screening or otherwise, the excess of any impurities. It must be presumed that the Industrial Commission will perform its official duty and fix a standard which will exclude all slate, sulphur, rock, dirt, or other impurities, except such as is unavoidable. The operator, if given the unrestricted right of contract, could do no more. If dissatisfied with the Commission's order, which by statute is made *prima facie* reasonable and lawful, he may petition for and obtain a hearing before the Commission as to those features, and may thereafter have a speedy review of its action by the Supreme Court of the state. * * * The law permits the employer and employee to stipulate as between themselves what percentage of coal commonly known as nut, pea, dust and slack shall be allowed in the output of the employer's mine. It is only in case of their disagreement that the Commission may designate such percentage, and its orders in that behalf must possess the same characteristics as those above mentioned, and are likewise subject to rehearing and review."

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Recent Legal Decisions

When Contract to Sell Coal Property Will Not Be Enforced—Suit cannot be maintained to compel performance of a contract to sell coal underlying land, when it appears that the purchaser took the contract for speculative purposes and was unable to perform his part of the agreement until he found a purchaser, and where he delayed four years in demanding a deed. (West Virginia Supreme Court of Appeals, Wilkinson vs. Poling, 82 Southeastern Reporter, 47.)

Oklahoma Gross Revenue Tax—In a decision recently handed down by the Oklahoma Supreme Court, in the case of McAlester-Edwards Coal Co. vs. Trapp, 141 Pacific Reporter, 794, the validity of the following tax law of that state is sustained: "Every person, firm, association or corporation engaged in the mining or production, within this state, of coal . . . shall within 30 days after the expiration of each quarter annual period expiring respectively on the first day of July, October, January and April of each year, file with the state auditor a statement under oath, on forms prescribed by him, showing the location of each mine . . . operated by such person, firm, association or corporation during the last preceding quarter annual period, the kind of mineral . . . the gross amount thereof produced; the actual cash value thereof, and such other information pertaining thereto as the state auditor may require, and shall, at the same time, pay to the state treasurer a gross revenue tax, which shall be in addition to the taxes levied and collected upon an ad valorem basis upon such mining . . . property and the appurtenances thereunto belonging, equal to 2 per centum of the gross receipts from the total production of coal therefrom." Plaintiff mining company is operating under leases from the Federal Government made for the benefit of the Choctaw and Chickasaw tribes of Indians, and unsuccessfully sought to have the law declared invalid as to it on the following grounds: That it does not specify the purpose for which the tax was levied. That it violates the federal constitution in that the United States Government has sole control over the land where the coal is mined, and has granted the company the right to mine such coal, and that the law constitutes an attempt to tax its rights under its leases.

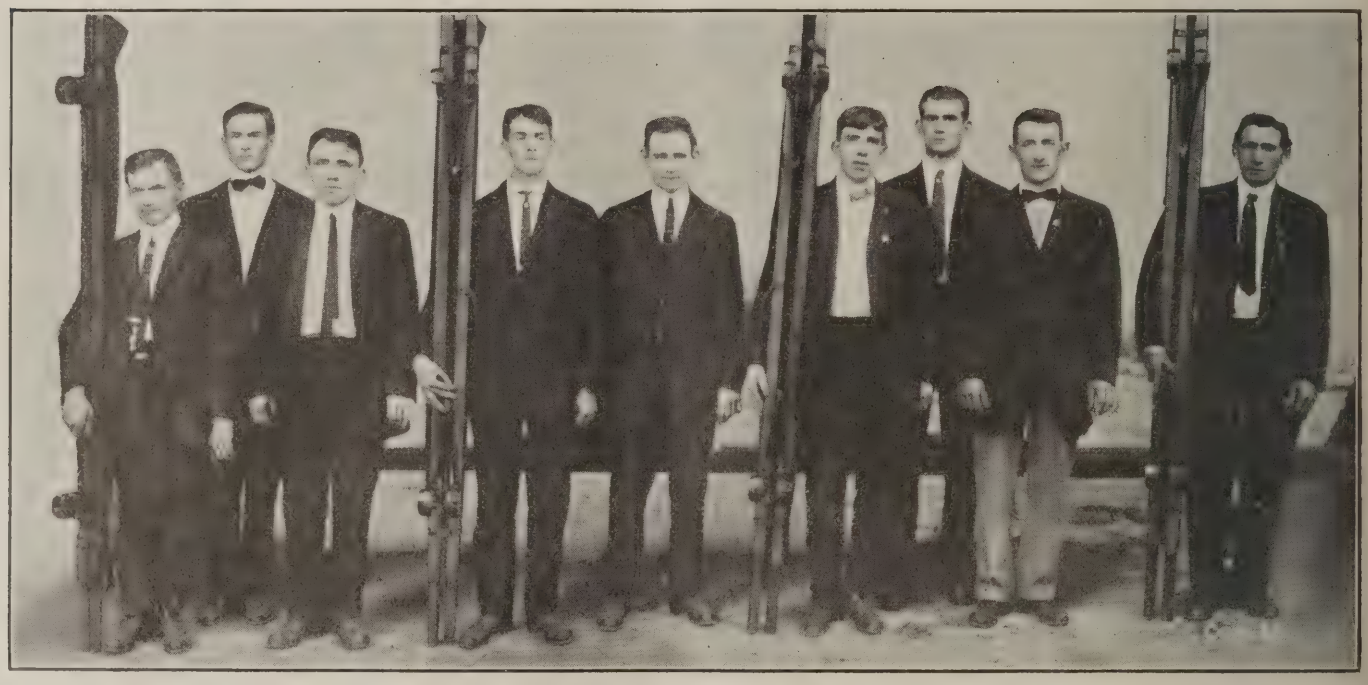
Sociological Department

The Lehigh & Wilkes-Barre Co.'s Meet

First-aid teams from the four districts of the Lehigh & Wilkes-Barre Co. competed at Sans Souci Park, near Wilkes-Barre, on Monday, Aug. 31, that being the company's fifth annual field day.

A general holiday was declared for all men engaged in first-aid work, and about 800 men and boys were gathered on the field when the opening event started. Each year there has been increasing interest in these contests, but this year's competition eclipsed that of former years, and while the rivalry was along spirited lines, a friendliness was manifested among all competing teams which indicated that the men in general are striving for proficiency and that they put service to fellowman above all else.

The teams in each of the four districts competed with each other in four different events. The boys, moreover, had an event of their own. Then the winning teams of each district contested for supremacy with each other. The Parrish inside team carried off the chief prize, each member of the team receiving a bronze medal. In the preliminary event this team made the splendid average of 99, and the work in the final event was so well done that the judges awarded them a rating of 98. The boys' event was won by the team from the Wanamie colliery, with a rating of 96. This team carried off that event last year.



THE LEHIGH & WILKES-BARRE CO.'S LITTER SQUAD

Dr. G. W. Geist, of Wilkes-Barre, was in charge of the program. He is at the head of the company's first-aid work. Edward Griffith, secretary to President Charles Huber, of the L. & W. company, rendered efficient service in working out the details. The judges were Dr. D. H. Lake, in charge of the first-aid work of the D., L. & W. R.R. Coal Department, and Dr. J. H. Hughes, of Nanticoke, Penn. After the events were over the remainder of the day was spent socially.

Event No. 1—This event was for all first-aid teams of the outside and inside corps of the Wilkes-Barre district. The problem given was as follows: "Treat a simple fracture of middle right thigh, a burn of left hand, wrist and forearm and an injury to right eye. Treat for shock, dress fracture with long and short splints and triangulars; dress for burn. Use gauze, cotton or waxed paper and circular roller; dress the eye. Use compress and 2-in. roller."

The judges made the following rating on this event:

Hollenback colliery—Outside corps, 95½; Inside corps, 93½; South Wilkes-Barre colliery—Outside corps, 93½; No. 3 shaft corps, 93; No. 5 shaft corps, 91½; Stanton colliery—Outside corps, 98; Inside corps, 89; No. 4 slope corps, 94; No. 4 shaft corps, 93; The Stanton Outside corps was declared the winner of this event.

Event No. 2—The second event was for all teams, inside and outside, of the Plymouth district, and the problem given was as follows: "Treat a simple fracture of middle of right leg, simple fractures of both forearms and a cut over right temple. Treat for shock. The dressing for the leg should be short splints extending from middle of thigh to 1 in. or more below the foot using triangular bandages; dress cut, using compress and Gibson roller; dress forearms, using anterior and posterior splints and roller bandages."

The judges awarded the following points: Lance colliery—Outside corps, 94½; Inside corps, 98; Nottingham colliery—Outside corps, 93½; Inside corps, 90½; No. 16 Inside corps, 9?½; Buttonwood colliery—Outside corps, 98; Inside corps, 88; Parrish colliery—Outside corps, 87½; Inside corps, 99; the Parrish Inside corps was declared winner of this event.

Event No. 3—All outside and inside corps of the Ashley district competed in the third event. The problem follows: "Treat a compound fracture, 2 in. below middle of left thigh. Much hemorrhage of bright-red blood supervenes; victim has a punctured wound of the chest between third and fourth ribs on the right side, and a laceration of the left temple. Treat for shock; dress for fracture with long external and short internal splints and triangular bandages, using tourniquet to stop bleeding. Dress wound with compress and 2-in. circular roller bandages from chest to waist with suspender over the right shoulder; dress for cut with a cravat bandage with middle of bandage and knot over wound and the turn on opposite side.

Points scored by the various teams in this event follow: Sugar Notch colliery—Outside corps, 85; Inside corps, 95; Wanamie colliery—Outside corps, 96½; No. 2 slope corps, 89½; No. 3 slope corps, 93; Maxwell colliery—Outside corps, $92; Baltimore shaft corps, 94; Red Ash shaft corps, 94.

Event No. 4—This event was for all outside and inside corps of the Honey Brook Division and the problem was as follows: "Treat a simple fracture, 1 in. above the middle of left thigh; fracture of jaw bone and lacerations of middle



Scranton Outside Corps
Winners of Event No. 1



Audenreid Outside Corps
Winners of Event No. 4



Wanamie Outside Corps
Winners of Event No. 3

finger of right hand and thumb of left hand. Treat for shock, using dress compress over wounds; stiffen fractured thigh with long external and short internal splints and secure with triangulars; dress finger and thumb with Spica bandages and the jaw with a Barton roller. The points allowed by the judges were: Honey Brook colliery—Outside corps, 94½; No. 15 slope corps, 97; No. 20 slope corps, 93; Audenried colliery—Outside corps, 98; Inside corps, 97.

Event No. 5—All breaker-boys corps competed in this event and the contest created much interest, not only for the boys, but for the adults also. The problem in this event follows: "Bandage fingers, hands, wrist, elbow, arm and shoulder with 2-in. rollers, using spiral reverse and spica as best adapted to different portions of limbs; also make a Barton bandage of the head."

Points allowed by the judges follow: Hollenback colliery, 94½; South Wilkes-Barre colliery, 92½; Stanton colliery, 93; Sugar Notch colliery, 95; Lance colliery, 93; Nottingham colliery, 93½; Wanamie colliery, 96; Maxwell colliery, 88.

Event No. 6—The Litter Squad of the Lehigh & Wilkes-Barre Co. gave an exhibition drill as the seventh event. For 15 minutes the members of the team held the strict attention of the crowd as it executed various moves and showed its thorough training in litter work.

Event No. 7—This was the big event of the day. The winning teams in the first four events were competitors in the final. The problem was as follows: "Bandage foot, ankle, leg, knee, thigh and hip with 2½-in. rollers, using spiral reverse and spica as best adapted to different positions of the limb; and also make a Gibson bandage of the head."

Points were scored as follows: Stanton colliery—Outside corps, 93; Wanamie colliery—Outside corps, 93; Parrish colliery—Inside corps, 98; Audenreid colliery—Outside corps, 94.

When the last event was over the 800 employees and friends of the Lehigh & Wilkes-Barre Coal Co. went to the upper pavilion of the park and a dinner was served. An orchestra and a glee club from Plymouth rendered several selections. Many of the favorite songs of the day were sung by the guests and Attorney A. H. McClintock, of Wilkes-Barre, was introduced as the speaker of the day. He had just returned from Europe, having had much difficulty in leaving the Continent. He was arrested as a German spy, and many of the stirring events that had taken place on the Continent were fresh in his mind.

Attorney McClintock then presented pennants to the captains of the Stanton Outside, the Parrish Inside, the Wanamie Outside, and the Audenreid Outside teams as a sign of leadership in the events in which they had competed. Then the members of the Parrish Inside team were presented with bronze medals. The captain of the Wanamie Boys' team also received a pennant.



Boys' Corps at Wanamie Colliery
Winners of the Boys' Event

Mining Education in Anthracite Region

The fourth annual report of the Nanticoke district Mining Institute shows a membership of 821 as against 679 last season. There were six meetings of the Nanticoke mining classes with an average attendance of 432. Last season this average was 199. The enrollment of the classes increased from 657 to 841. At the state examinations for mine foreman's and assistant mine foreman's certificate 6 members passed the examinations for the former and 24 passed those for the latter

The fourth annual report for the Shamokin-Mt. Carmel District Institute shows a membership of 788 as against 571 last season. There were seven meetings of the mining classes with an average attendance of 313. Last season this average was 127. The enrollment of the classes increased from 763 to 1016. At the state examinations for mine foreman's and assistant mine foreman's certificates 2 members secured the former and 32 secured the latter.

The first annual report of the new Williams Valley District Institute shows a membership of 332 and ten meetings with an average attendance of 244. The fourth annual report of the Lehigh Valley Coal Co.'s mine schools at Centralia and Lost Creek shows that the enrollment increased from 51 to 65. Two students secured mine foreman's certificates and 9 obtained certificates as assistant mine foremen during the present year.

The Lehigh Valley Coal Co.'s mine schools are not under public-school board control, yet they are open to all, and 13 of the students this year were not in the employ of that company. In addition the company maintains at Drifton an apprentice school where attendance is compulsory, but the students are paid at their regular rate for the time engaged. This school has completed its sixth successful year.

The Philadelphia & Reading Coal & Iron Co. also privately maintains schools for its miners at Mahanoy City, Shenandoah, Minersville and Pottsville, and many of the students from these passed the state examinations for the coveted mine foreman's and assistant mine foreman's certificates. The state reimburses two-thirds of the annual expenses of those schools under public-school control.

Garden Awards in Colorado

By Fred W. Whiteside*

The second annual contest for the Victor-American Fuel Co.'s lawn and garden prizes was held early in this month. Three prizes of $25, $15 and $10, respectively, are offered annually in each town where a contest is held.

The only conditions imposed are that there be three or more contestants, and that those competing for the awards be *bonafide* residents of the town in which the Victor-American Fuel Co.'s mine is located.

The superintendent, doctor and mine clerk are excluded from receiving awards in the contest; although the judges are pleased to give anyone of them honorable mention, should he deserve it. A noticeable improvement was observed this year over that of last, when the first contest was held, many more participating, and of those who entered in 1913, a marked advance was attained in nearly all cases.

*Chief engineer, Victor-American Fuel Co., 307 Ernest & Cranmer Bldg., Denver, Colo.



First Prize Winner at Chandler, Colo.
(Gus Hutter)

In order to make the contest general, no distinction was made between lawns, flower or vegetable gardens. If the plot contained but cabbages, turnips and onions, it received the same consideration and rank as a lawn or garden of flowers, provided it showed the effects of culture, design, neatness and care. And, while this may appear to some a very general classification, it must be borne in mind that the fundamental idea of the founder of the movement is to encourage the people in an effort to develop neat, healthful and sanitary surroundings, to abolish the ash heap, the rubbish pile and the tin can. If a miner is of practical mind and sees greater value in cabbages than grasses or flowers, he has the privilege of planting cabbages and of being qualified to enter the contest. His standing, when the judges make their awards, will be equal to that of the man who cultivates a lawn or plants flowers.

Of the miners who competed, the following received prizes:



Second and Third Prize Winners at Ravenswood, Colo.
Robert Nelson (Second Prize) Joseph Watson, Sr. (Third Prize)

Chandler
First prize, $25, Gus Hutter, House No. 47.
Second prize, $15, Jos. Cherry, House No. 39.
Third prize, $10, W. H. Mulnix, House No. 8.
Edward McMullen, judge.

Delagua
First prize, $25, Mrs. Jas. G. Young, House No. 458.
Second prize, $15, Nick Martella, House No. 471.
Third prize, $10, John Ban, House No. 460.
E. C. Stream and W. Givens, judges.

Hastings
First prize, $25, Mrs. R. Roberts, House No. 6.
Second prize, $15, W. H. Cunningham, House No. 96.
Third prize, $10, W. H. Rinker, House No. 111.
E. C. Stream, judge.

Ravenwood
First prize, $25, Wm. S. Smith, House No. 56.
Second prize, $15, Robert Nelson, House No. 52.
Third prize, $10, Jos. Watson, House No. 62.
Prof. I. E. Stuttsman, judge.





PRIZE WINNERS AT THE SECOND ANNUAL CONTEST AT DELAGUA, COLO.
Mrs. James G. Young (First Prize) John Ban (Third Prize)

On the remaining properties of the company, on account of the scarcity of water and other local conditions, no contests were held.

The Union First-Aid Meet at Charleroi

The fourth annual outing of the miners of subdistrict No. 3 of district No. 5, United Mine Workers of America, was held at Eldora Park, Charleroi, Penn., on the afternoon of Aug. 22 and the miners participated in some first-aid contests.

In the open and closed events the Toms Run Mine team of the Pittsburgh Coal Co. won first place with a percentage of 98 in the open, and 99 in the closed event. The winning teams received silver loving cups to hold till the honor is wrested from them. It will take three victories to entitle a team to permanent possession.

In the open event seven teams were entered. The contest was close and the Toms Run team, with Michael Quinn as captain, only beat the Cokeburg team of the Ellsworth Colleries Co. by a fraction of a point. The team from Cokeburg, under the captaincy of Albert Roth, made a mark of 97⅞ per cent.

The Toms Run team was not so narrowly victorious, however, in the closed event. The Ellsworth team took second honors in this contest under the captaincy of Fred Gulick. It earned a percentage of 96.

Cups and individual gold and silver medals were presented by President Van Bittner of District No. 5. Prof. E. E. Bach of Ellsworth was marshal of the contests, and the judges were Dr. G. H. Hays, Dr. R. V. Stewart, Dr. H. F. Bailey, all of Monongahela, and Dr. J. V. Wilson, of West Elizabeth. The recorder was W. L. Manice, of Pittsburgh.

About 5000 miners and their friends were present to witness the events of the day. The chief speakers at the meet were James W. Paul of the United States Bureau of Mines, Philip Murray of Monongahela and President Van Bittner. At the last moment Dr. J. A. Holmes, chief of the United States Bureau of Mines, sent word from New Mexico, that owing to ill health he was unable to be present and address the meeting.

The Ellsworth Liquor Problem

Much interest was evidenced in the courts of Washington County, on Aug. 15, when the grand jury presented to the court a petition, asking for permission to investigate in detail the charges that the Ellsworth Collieries Co. and prominent men were fostering violations of the liquor laws at Ellsworth and Cokeburg, leading coal towns in the bituminous region.

The court refused to do as petitioned, on the ground that the petition was irregular, and that if such violations existed those aware of them should lay their complaint before the duly appointed officers. The court also declined to grant the petition that the grand jury investigate the possible violations of the law by the coal company.

In the petition regarding the coal town, it was alleged that the Ellsworth Collieries Co., backed by the Lackawanna Steel Co., the Bentleyville Brewing Co. and the Charleroi Brewing Co., and E. E. Bach, sociological superintendent of the Ellsworth Collieries Co., who is recognized as an expert in this work, had conspired to violate the law. It was pointed out that the towns of Ellsworth and Cokeburg were denied liquor licenses at the last term of license court. At that time, when evidence was being heard in favor of license applicants for the two towns, E. E. Bach, the sociological expert, made an extended statement to the court and attorneys, in which he dwelt upon the difficulty of regulating the liquor business in a mining town, and emphasized the necessity for a well ordered and carefully regulated tap house or similar institution.

He gave some details about the liquor-order business, regarding which the grand jury is now making complaint. The jury classes beer agents as "devices to evade the law." The court, however, stated it had not the power to grant such a license as that desired, and since that time it is understood Ellsworth and Cokeburg miners have been getting their beer through an agency which the grand jury states is under the supervision of Mr. Bach.

He who has lost his reputation, is a dead man among the living.

Mine Houses

If the mine owner knew what the public thinks of the average mine house, he would refuse to let his mining engineer or his building contractor do any more designing. And this applies not only to the small companies, but to the large. The buildings are all of the same type of unattractiveness, and money is rarely saved in a degree commensurate with the monotony which has to be endured. And when an attempt is made to plan houses of different design, there are only a few, at most three designs, and the effect is still dissatisfying.

The same is as true of material as of appearance. The mining engineer is not an architect. He has some knowledge of siding, flooring, lathing, plaster and shingles, and he usually satisfies himself with this. But new material and new methods are on the market. What are good and what are bad, he has no chance of knowing, and what is more, he is afraid to take the risk of recommending them to the operator in case of failure. He consequently plays safe and builds on old lines, thus avoiding responsibility.

Buying Houses "Knocked Down"

For this reason, it might be well to select the houses for a town from a catalog and have the materials shipped. There are places, of course, where the freight rates would make this prohibitive, but to save this the North American Construction Co. ships every piece cut, so there is no waste. The saving in lumber from this method is also an item, and the cost of carpentry is reduced, for all the sawing is by machinery. The waste of lumber in an ordinary building is claimed to be 18 per cent. of the whole lumber bill. Everything is planned in these houses so that waste will be avoided, and as all parts are purchased or manufactured in large quantities, the manufacturer of the houses should be able to supply them at reasonable cost ready for erection.

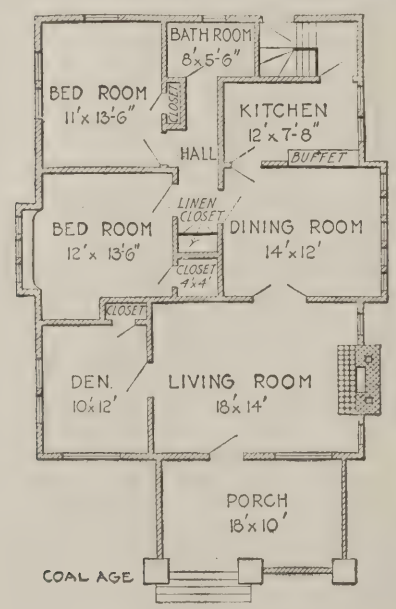
We would advise the coal operator to send to the North American Construction Co., Bay City, Mich., for a copy of "Aladdin Houses." Even if he decides against a purchase, the book in itself is full of interesting suggestions.



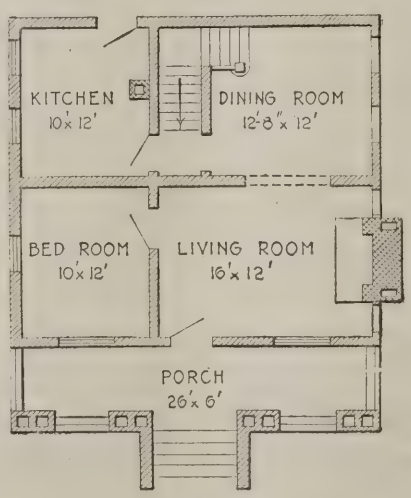
A Comfortable Bungalow with Modern Conveniences

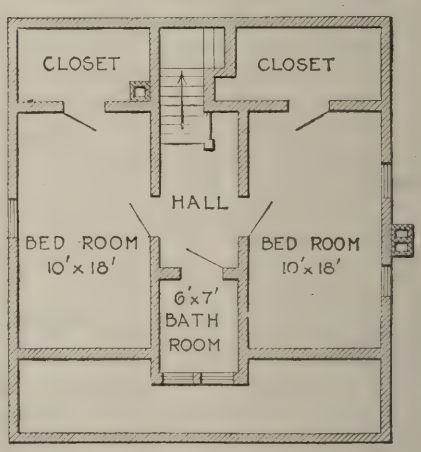


A Two-Story Cottage



Plan of Bungalow





Ground and Second-Floor Plans of Cottage

Long spans in high tension current transmission lines cannot always be made with copper cables, since hard-drawn copper has a strength of only about 50,000 lb. per sq.in. When it is necessary to cross over rivers, lakes or bays with power transmission lines, the current may be conducted through an extra galvanized strand of special steel wire of such size and strength as to possess a factor of safety of at least five. In fact, an entire power transmission line of extreme high potential could be economically constructed with extra galvanized Siemens-Martin strand, the adoption of which in place of copper cables would reduce the number of supporting towers, which are frequently the cause of energy loss and trouble.

The Labor Situation

SYNOPSIS—Much pressure is being exerted by the merchants of eastern Ohio to bring about a labor settlement, and as a result a conference has again been called, though with little hope of a result. The Paint Creek Collieries Co. has a strike involving all its men.

In eastern Ohio, the merchants have been urging a further conference of operators and miners, alleging in the letters to the latter that by reason of the credits extended, the merchants have borne the brunt of the battle.

So conferences have been resumed at Wheeling, W. Va. The Pittsburgh scale is suggested as a compromise basis for settlement. It is said that both parties are willing to accept an exactly equivalent scale, but, as we said last week, there is little evidence of this willingness on either side. The operators desire as liberal terms as the Hocking Valley miners have granted, while the men desire a virtual increase over last year's scale. But both sides proclaim their adherence to the principle that there is no increase or decrease of wage demanded, and try in that manner to obtain public confidence.

Father McEachen's Appeal

The extent to which the public is being brought into the controversy may be judged by the fact that Father Roderick McEachen's lucid statement of the miners' case has been circulated in galley form to the press. The appeal is largely for larger wages in general for miners and for the run-of-mine law; the justice or injustice of the equivalent as offered by the operators is not considered. In fact, we believe we represent the views of the writer in saying that if he had his way, the price would be doubled.

One of his interesting arguments, however, for the equivalent as the miners would have it, is as follows: "For the past 20 years, the screenings have been rated in all the agreements between miner and operator as two-sevenths of the total coal mined. The companies sometimes took a certain amount of coal for their own use. This was not screened. For this they always paid five-sevenths of the screened-coal price. Hence the miner has always worked upon the theoretic basis that five-sevenths of his coal was lump and two-sevenths screenings. Upon this basis, the present rate of mining should be 71c. per unscreened pick-mined ton and 49.64c. per unscreened machine-mined ton. Since, however, the actual amount of screening was greater than 28 per cent. in some districts, the miners made a compromise. They averaged the amount of screenings at 32 per cent. Upon this they base their price of 47c. per unscreened ton of machine-mined coal."

The Other Side

We would point out to the divine, and his statement shows his willingness to admit that the amount of coal, thus paid for at a rate of five-sevenths of the lump coal, comprised but a small portion of the whole product. Any injustice to the operator in the rating of this small quantity of coal could be borne, as it was not likely to cause bankruptcy or any marked exclusion from markets. Moreover, much of the coal mentioned was probably sold to local wagon trade and was marketed at a really fair profit. It is a different proposition to apply this to the whole product, especially to that part where competition is more fierce.

Moreover, we wish to point out that his reference to the price at the market is not a matter at point, unless freight rates and profits to retailers are considered. If the coal trade is groaning under excessive freights and high charges for retailing, the mine operators are only chargeable with their own shortcomings, not with those of railroad men and dealers whose iniquities, if iniquities they are, they are powerless to control.

The operators, in a published statement, invite an inspection of their payrolls that the public may know that the miners are not underpaid. They make the statement that in the first half of July, 1913, the average wages of the loaders of the Roby Coal Co. for each day worked were $3.75 per day. In the second half of that month they were $4.65 per day. The earnings in the first half were reduced by the reduction in tonnage due to a national holiday. Naturally, the operators strenuously object to rumors that miners in eastern Ohio make only a dollar a day.

Conditions in Eastern Ohio

The fans and pumps were restarted at the Fort Pitt mine on Aug. 26. While the engineer at the mine on the 26th was investigating, gas in the engine room exploded, but no harm was done. The mine is full of water, and it will be about six weeks before the workings will be in running order. The pumps have been idle for an equal length of time.

The Coalburgh Coal Mining Co., on Aug. 20, and on Aug. 21, the Bixler & Ohio Coal Co., both of Baileys Mills, near Barnesville, signed the scale agreeing to pay 47c. for machine-mined run-of-mine coal. It is hardly a sufficient defection from the operators' ranks to show even a tendency. The shutting down of the Blockhouse mine, as announced last week, is as reliable an indication in the other direction.

It is understood that Charles I. Albasin, the subdistrict president in eastern Ohio, has secured a large loan from the Illinois operators, by means of which the miners in his subdistrict can continue the resistance to the demands of the operators.

That part of the Pomeroy Bend field which failed to arrive at a settlement in the earlier negotiations, as mentioned in our issue of Aug. 22, p. 299, has now signed up, a compromise having been arranged. In the Bergholz district, an understanding has been reached, but notwithstanding that fact, some of the mines are still idle.

West Virginia Troubles

The Paint Creek Collieries Co. again has a strike at its mines, involving this time seven collieries, Mucklow, Wacoma, Banner, Tomsburg, Hickory Camp and Briar Creek. The mines employ from 1000 to 1200 men. The cause of the suspension—for the miners do not call it a strike—is the failure of the company to make its semimonthly pay at the appointed time.

The miners of the Four States Coal Co. mine at Dorothy, W. Va., in the Coal River field, have withdrawn their demand for an increase in wages, according to Thomas Cairnes, the president of the district (No. 17). The men are still demanding a modification of certain working rules, the check-off and some other concessions. The miners are hopeful that the management will grant their demands.

Governor H. D. Hatfield, acting as an umpire, has decided that the New River and Winding Gulf board of arbitration can hear complaints made by persons who are not themselves aggrieved, but who present the grievances of other parties. It is not necessary for those who are entitled to relief from onerous conditions to bring charges against their employers.

Colorado Labor War

In answer to our inquiry, we learn from W. W. Wothuspoon, major-general, chief of staff, of the War Department, that the men recently hired who are allowed to work for coal companies in Colorado, must be residents of the state, and further, that the order does not specify that they must be citizens. The statement made editorially that all "recently hired" miners must be citizens was taken from an apparently verbatim copy of the notice said to be posted by T. Waterman, lieutenant-colonel, 12th cavalry, at mines in the Boulder-Louisville district. A letter appeared in the "Rocky Mountain News" containing this document as part of its contents. Inquiry is being made as to the correctness of the quotation.

Governor Ammons, of Colorado, after 88 days' delay, has made public the findings of the court-martial regarding the militiamen who took part in the action at Ludlow. Twenty-one men were tried and have been completely vindicated.

The United Mine Workers of America are about to ask the civil courts to declare the court-martial illegal, and to bring the soldiers to trial on charges of murder. Only by changing the venue is there any possibility of the courts finding the soldiers guilty, for the unanimous opinion of the law-abiding public in southern Colorado is that the union has fallen into bad hands and that the militia merits public approval and acclaim.

Twenty prisoners are in jail in Trinidad for offenses alleged to have been committed in the Colorado mine war. William Diamond, a national organizer of the United Mine Workers; James Davis, marshal at Aguilar; Frank Miner, president of the Trinidad Trades Council, and Robert Uhlic, former president of the Trinidad Miners' Union, are among the prisoners.

The federal troops have arrested Helen Schloss, of Denver, for picketing. She was in charge of the miners' hospital at Ludlow.

Discussion By Readers

Gasoline Mine Locomotives

In the answer to the question, "Is there any danger in the installation and use of a gasoline motor in a mine," COAL AGE, Aug. 29, p. 358, it is stated among other details that "A gasoline motor is not an ideal motor for use in a coal mine." The answer goes on to state that "the discharge from such a motor rapidly vitiates the mine air; . . . . the handling of a highly explosive oil, as gasoline, is always a dangerous factor in a mine, owing to the liability to fire or explosion; . . . . the danger of their use is greatly increased by the possibility of a mine wreck when the gasoline tank might be injured and its contents take fire."

I want to say that experience in the development and construction of this class of motor has made it an ideal machine for use in a coal mine. As is true for every other type of haulage locomotive designed for mine use, the success of the gasoline motor depends much on the conditions of service. The gasoline motor has a great many advantages that recommend it for mining use, chief among which are its ability to operate in deep-vein coal mines; in mines with low roofs; under bad roof; in wet mines; on heavy grades; and, last, but not least, in mines which are so gaseous that an electric locomotive could not be installed with safety. This type of locomotive possesses, also, the additional advantage of being able to go anywhere on the main roads and extensions, without incurring the additional expense for wiring or piping, which is necessary in the use of either electric or compressed-air motors.

The further statement that the exhaust from a gas-driven engine vitiates the mine air is not true when this type of locomotive is used for haulage on main or cross-entries, because the exhaust has now been deodorized so that it is not perceptible in a mine where these locomotives are installed. The odor of the gasoline cannot be detected even in the main-return entries of such mines. The only reason that the motors cannot be used for gathering work in rooms or chambers is that the carbon monoxide given off in the exhaust requires to be diluted by an air current in order to render it harmless.

Again, referring to the statement in reference to the danger from fire in case of a mine wreck, permit me to say that, in the improved type of gasoline locomotive, the gasoline is carried in steel, indestructible tanks. The tank is filled and sealed on the surface, and is then taken into the mine and placed on the locomotive when the mine is idle, the other tank being at once removed and taken to the surface to be filled. There is practically no danger of this tank being damaged in a mine wreck, owing to its being located on the locomotive, in such a position as to withstand any kind of a blow.

In closing, permit me to briefly summarize the important advantages of this type of locomotive as follows:

1. Because the gasoline locomotive is a self-contained unit, it does not require for its operation a power house and coal pile; extra boilers; a compressor or generator; a high-pressure pipe line and charging stations; feeder and trolley wires, rail bonds and other electrical connections and equipment, including a specially well laid track, to preserve the bond connections intact; or any separate traveling ways for men and mules, to avoid contact with live wires.

2. Because the gasoline locomotive is a self-contained unit, the following results are obtained in its use: When the locomotive throttle is closed, all expense of operation stops; boilers do not have to be kept under pressure all day to enable the locomotive to handle a few trips at varying intervals; each locomotive generates its own power according to the work it has to perform, which avoids the waste common to other systems, due to generating more power than is actually required; as the length of haul increases, there is no extra expense required for extension of pipe lines or feed and trolley wires.

In my opinion, these advantages are sufficient to recommend the use of gasoline locomotives in coal mines, under such regulations and restrictions as are necessary to eliminate the dangers to which reference has been made.

E. W. HAMILTON, Engineer,
Milwaukee Locomotive Mfg. Co.

Chicago, Ill.

The Foreigner in Mining

Letter No. 3—Mr. Bailey's letter, in reference to the need of educating the foreign element, so largely represented in the coal-mining industry, today, COAL AGE, Aug. 22, p. 315, is interesting, pertinent and suggestive, not only to the coal industry but to the American people at large.

It is clear that the unrestricted tide of emigration from Latin-European countries has foisted upon the American national existence an element whose principles of social, political, industrial and religious life are antagonistic to the basic principles upon which American institutions are founded.

The assimilation and amalgamation of this class as an integral part of American social life could, under ordinary circumstances, be effected by the second method suggested by Mr. Bailey, were it not for the fact that, as a class, they possess a dominant characteristic that is the result of centuries of association with a type of civilization that is wholly un-American, and that forms an insuperable barrier to education along the lines suggested. It is unnecessary to be more specific with respect to the nature and origin of this characteristic trait, as the careful student of race peculiarities will readily perceive the nature of the charges made.

Coming from lands of restricted personal liberties, to a country where the highest degree of freedom consistent with the maintenance of order and the preservation of rights, is assured, it is natural to suppose that these privileges would command their respect and veneration. In-

stead, however, these people regard liberty as unrestricted freedom for the indulgence of the animal propensities of primeval man.

The law under which they have been raised is a menace to their own physical and spiritual life, impelling them to the cultivation of cunning, subterfuge and duplicity—qualities that are not merely detrimental to but destructive of the only element in man, the cultivation of which will elevate him to the high plane of life that his creator designed him to occupy.

While it is true that every normal human being is endowed with the faculty of reason, it is equally true that if this faculty be restricted in its operation, the moral nature of man will become useless as a factor in the attainment of civilization, which is the measure of the standard of morality for every individual, nation or race. Though an individual, nation or race may cultivate physical and mental qualities so as to become giants in these respects, they are no farther advanced in civilization than primitive man. If this is not true, why are the so called civilized nations of Europe engaged in the most barbaric struggle of destruction that has ever disgraced the history of mankind?

The instruction of these people and the cultivation of their mental and moral natures is not, in my opinion, the question that confronts us. To do that is, I believe, an impossibility. That which is in a state of adolescence can be educated and trained, but that which is perverted is beyond redemption. If it were possible to completely separate these people from their environment; disabuse their minds of their perverted ideas of justice, morality and law; demolish the superstitions that constitute the barriers to progress, there would be a possibility of inculcating in them the principles of freedom that form the basis of our social institutions. The task is more than herculean; it is impracticable and the time and labor devoted to its accomplishment is energy wasted.

Many foreigners come to our country with no intention of making themselves American citizens, or submitting themselves to American laws; and, although some go through the formality of taking out naturalization papers, many regard it as an intimation that our customs and institutions are superior to their own. Is this not the case? For the most part, they make no effort and express no desire to be educated in our methods of government. They import their customs and, taking advantage of the extreme liberality of our laws, graft them upon American institutions. The governments of which they are representatives, in their efforts to oppose the establishment of representative governments in Europe, have indelibly impressed upon the minds of the people that earthly rulers exercise their authority by divine appointment.

Such a subversion and enslavement of the masses could be accomplished only by the connivance and coöperation of the ruling powers in state and church. The method adopted was to limit or restrict education; to subjugate the mind by encouraging belief in the supernatural; and to impress upon the mass of the people, by spiritual instruction, the idea that they occupy an inferior position in life through divine will.

Such is the education and training of the people we are importing without restriction and injecting into the industrial and social life of this country. Well may we ask, are they a menace to our social, political and industrial welfare? This question needs no better answer than the incidents quoted by Mr. Bailey in his letter; but if further evidence of the danger is required it may be found in the fact that the sentiment of this class toward our institutions has already been recognized by the introduction of a bill in our national congress, providing for a stringent regulation of immigration along lines in accordance with the facts I have rehearsed. As a rule, our legislators are slow to perceive the existence of a serious or critical situation and when they do recognize such fact the public at large can take it for granted that the conditions actually exist.

Let me say, then, that Mr. Bailey's first suggestion is the only practical solution to the question; namely, "the exclusion of the morally uneducated and mentally undeveloped immigrant." If such a bill could become operative, as a law, there would certainly result a termination of immigration from these countries, since such a qualifying condition would exclude both the governed and the governing classes—the first through being morally perverted, and the second by being moral pervertors.

I. C. PARFITT.

Jerome, Penn.

Letter No. 4—I was much pleased, in reading this week's issue of COAL AGE, to note the great interest taken in the foreign-speaking miner. Truly, there is no subject that should interest the mine foremen of this country more than that of the foreign-speaking miner who, it must be acknowledged, is here and here to stay.

So often we hear the remark, "They all want shipping back to the old country." But, anyone making such a remark simply does not know what he is talking about. It must be remembered that, in coal mining, we depend almost wholly on this class of labor; and, take them as a whole, they are good workers. The better they are treated, the better men they become. I know this to be a fact by experience, having dealt with them for a number of years. I have taken these men right into the mine, as they come from the old country fresh from following the plow, and have watched them grow to be good miners and good citizens generally.

I acknowledge that the majority of this foreign element employed in the mines are illiterate and come from the lowest classes in their respective countries where they never had a chance. On coming to this country, their conditions are so much changed that it often proves too much for them. The man who has been brought up from his boyhood, on the farm where he has found it barely possible to make both ends meet, and has rarely had the sight of money, finds himself almost bewildered on coming to this country and receiving his first pay of a few dollars. Could we put ourselves in their place and imagine that we were in a strange country where we could not see a familiar face or understand a word spoken and where the ways and customs were wholly different from those to which we were accustomed, we would have more sympathy for them in their present situation.

It is, of course, often annoying and very trying for a busy foreman to be obliged to explain a simple thing, in a number of different ways, before he can make them understand what he wants to tell them. But, as foreman, it matters not what these men want to say, I always hear them and, though it takes considerable time and trouble, I try to give them an answer and make them understand. I have always noticed that they are quick to appreciate this treatment. Another feature of the foreigner, is that

he is quick to notice any favoritism shown to another. For this reason, I try to treat all alike. I have noticed, also, it is a hard matter to regain their confidence if this is once lost. A foreigner seldom forgets an injury.

The foreword, COAL AGE, Aug. 29, p. 329, contains much truth in regard to the treatment of miners; but I think this refers more to the mine foreman than to the timekeeper. Where a timekeeper is asked one question by these men, the boss is asked 50 or more; and it is even more important for him to give a civil answer in return, than for the timekeeper who is not responsible for their work. What sounds better than to hear a boss, when going into a place, sing out, "Good morning, boys, what is it going like today." Such a kindly greeting of the boss encourages the men and makes their troubles lighter because of the interest shown in their welfare.

In the daily visits of the boss, to the working places of the men, many matters come up for him to decide; and it is hard for him to know what to say or do, as between the men and his employers. If, however, he is guided by a kind heart. He is sure to come out right in the end. When a man has done something that is wrong, it is generally easy to tell whether he did so, knowingly, or acted in ignorance; but, in either case, no good will come from calling him hard names. Talk to him quietly and show him his mistake and the danger.

In closing, let me say, never be above speaking to your men as you meet them. It pleases them to know that you remember their first name. Because a foreman's wife is with him is no reason why he should not speak thus familiarly to the men he meets. Nothing is more pleasing to them than to be recognized at such times. While giving men all the liberty possible, a foreman should not fail to respect his position, for by that means he will be respected. The American foreign-speaking miner seldom fails to respect his boss when properly treated.

THOS. HOGARTH.

Heilwood, Penn.

Thomas R. Pierce

[Contributors to the Discussion Department will regret to learn of the death, July 9, of Thomas R. Pierce, Scranton, Penn. Mr. Pierce had worked in the mines from a boy. By his devotion to his work, he had contracted disease that, for 19 months previous to his death had kept him out of the mines. His spare hours were spent in reading and writing. His article on The Coal Miner, COAL AGE, Aug. 29, p. 355, published before learning of his death, was one of his best productions, as was also his article on Working Coal under Sandstone Cover, Letter No. 10, COAL AGE, Vol. 4, p. 949.—ED.]

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Drainage—Economic mine drainage requires such a disposition of the openings driven in the seam for the extraction of the coal, including all passageways, headings and chambers, that the water coming from the strata will flow by gravity, either to the main sump at the shaft or slope bottom, or to certain gathering centers from which it can be readily siphoned to the main sump or pumped directly to the surface.

In practically level seams or seams having slight inclination, the question of drainage does not materially affect the general mine plan. In this case, good roadside ditches afford the necessary waterways by which the underground water flows to the sumps provided to receive it. Such sumps or catch basins are located at one or more convenient low places or "swamps," in the mine, where it is possible to install a pump of sufficient size to handle the water of that section at all times.

The rooms or chambers, in practically level seams, are turned off both entries of a pair, which greatly reduces the expense of entry driving and necessary maintenance of roadways and air courses.

In inclined seams the direction and amount of pitch are controlling factors in determining the general plan of the mine, in respect to the course of main roads, cross-headings and rooms or chambers. In respect to drainage, it is important to drive all such openings to the rise, in order to avoid the annoyance and expense of providing artificial means of draining the working faces.

Haulage—Economic mine haulage requires that the coal, like water must gravitate, as far as practicable, from the coal face where it is mined, to the foot of the shaft or slope opening from whence it is hoisted to the surface.

In level seams, the question of haulage does not affect the plan of mine; but, in seams of more or less inclination, it becomes a matter of first consideration.

In inclined seams, it is always possible to drive the main haulage roads in such a direction that the grade of the road will not only favor the movement of the loaded cars, but will be such that the power required to haul the loaded trip out of the mine will be equal to that necessary for hauling the empty trip back into the mine. This is called the "economical grade." (See Mine Haulage.)

The grade of any road, or the road grade, in an inclined seam, may be calculated when the angle of inclination of the seam and the angle the road makes with the strike of the seam are known, by the following rule:

Rule—The tangent of the grade angle is equal to the tangent of the angle of inclination of the seam, multiplied by the sine of the angle the road makes with the strike of the seam.

Or, calling the angle between the road and the strike of the seam, the "road angle," this angle is calculated by the use of the formula

$$\sin \text{road angle} = \frac{\tan \text{grade angle}}{\tan \text{inclination}}$$

The Coal Age Pocket Book

MINE DRAINAGE

The drainage of a mine relates to and includes all methods, means and appliances used to free the mine of the underground water that finds its way naturally into the workings and renders them unfit for work. The expression "unwatering the mine" is frequently used in respect to mine drainage, but applies more properly to the work of removing considerable quantities of water from a mine or section of a mine that is flooded to such an extent as to prevent or seriously impede the operation of the mine.

Underground Waters—The rock strata forming the crust of the earth are the natural receptacle of water that, under the action of gravity, percolates downward from the surface. By the laws of nature, there is, besides, a more or less continuous evaporation of water from the earth's surface into the atmosphere, forming mists and clouds that, again, give up their water by condensation causing the rain, snow and hail that fall to the earth.

There is thus naturally formed three distinct zones or divisions of the waters of the earth, which accordingly may be designated as, atmospheric, surface and underground, the last named being of the greatest concern in the prosecution of mining work.

Water Level—The term "water level," as applied to mining, is frequently misunderstood and its importance, therefore, not comprehended. The term has no reference or relation to the term "sea level," which is a definite term whose meaning is well understood. On the other hand, "water level" varies widely in different sections of the country, and with the change of seasons, in the same section. It is far from being a constant or definite level.

The water level in any locality is indicated, in a general way, by the average water level in the wells in that section. This level is higher in wet than in dry seasons of the year, and is modified locally by conformations of the strata forming basins and synclines more or less isolated and distinct. The term may, therefore, be defined as the natural drainage level in the rock formations.

Water-Bearing Strata—Rocks differ in their nature in respect to their capacity for holding water or permitting water to pass through them. Many of the harder, close-grained rocks of the igneous and metamorphic types, as granite, syenite, trap, and even the sedimentary shales, limestones and clays are wholly impervious to water; while the more porous and coarser-grained sandstones, sandy shales and faulted limerocks afford ample storage for large quantities of water, and permit the ready passage of water through them. These rocks are the so called "water-bearing rocks" of the coal formations.

Effect on Mining—The water-bearing strata form the great underground storehouses and waterways or channels by which the water enters the mine. The rocks themselves, particularly the softer calcareous rocks, carbonates and sulphates, are disolved, disintegrated and worn away by the water, and larger channels and crevices are formed in which the water accumulates under great pressure.

Inquiries of General Interest

Problem in Algebra

While thanking you much for the trouble taken in answering my question, COAL AGE, Aug. 29, p. 357, permit me to ask if there is not a misunderstanding somewhere in this problem. I understand that the conditions stated assume that B changes his rate by increasing it $47^3/_7$ yd. per min., *after* meeting A. By this understanding of the question, the results given in the answer, p. 357, do not prove out. I should be glad to have a further explanation.

STUDENT.

Lincoln Place, Penn.

The statement of the question is somewhat ambiguous. The solution given on p. 357, assumes that B must increase his rate $47^3/_7$ yd. per min. over the entire course, in order to make the rate a "dead heat." We agree with correspondent, however, that the probable meaning of the question is, as he states, that B changes his rate *after* meeting A. We give below the solution of the problem on this assumption.

The question reads as follows:

"A," in running a race with "B," to a post and back, met him 10 yd. from the post. To make it a dead heat, B would have to increase his rate 47 3/7 yd. per min. But, if without changing his pace B had turned back on meeting A, he would have reached the starting point 4 sec. later than A. What is the distance from the starting point to the post

Solution—Let x = the required distance from the starting point to the post, in yards. Then, in the first stage of the race, A runs $x + 10$ yd., while B is running $x - 10$ yd. If, now, without changing his pace, B turns back on meeting A, he reaches the starting point 4 sec. or $^1/_{15}$ min. later than A. The first step in the solution is, therefore, to find the amount A gains on B in the second stage, from knowing the gain (20 yd.) in the first stage.

Since both A and B, in this case, keep the same pace after, as before meeting, and A runs $x + 10$ yd. before and $x - 10$ yd. after meeting, the distance (d) gained in the second stage is found by the proportion

$$(x + 10) : (x - 10) :: 20 : d$$

$$d = \frac{20\ (x - 10)}{(x + 10)}$$

If B goes this distance in $^1/_{15}$ min., his rate of running is as follows:

B's first rate,

$$\frac{15 \times 20\ (x - 10)}{(x + 10)} = \frac{300\ (x - 10)}{(x + 10)}\ yd.\ per\ min.$$

Now, assuming that B increases his rate, at the moment of meeting A, $47^3/_7$ yd. and, by this means, the race is a "dead heat"; he must run $x + 10$ yd. at a pace of,

B's second rate.

$$\frac{300\ (x - 10)}{(x + 10)} + \frac{332}{7} = \frac{347.43x - 2525.7}{(x + 10)}\ yd.\ per\ min.$$

It is necessary, now, to find A's rate, which is unchanged throughout the race. Since, in the first stage, A runs $x + 10$ yd. while B goes $x - 10$ yd., these distances being proportional to their respective rates, A's rate is found thus,

$$(x - 10) : (x + 10) :: \frac{300\ (x - 10)}{(x + 10)} : A's\ rate$$

$$A's\ rate = \frac{300\ (x - 10)}{(x + 10)} \times \frac{x + 10}{x - 10} = 300\ yd.\ per\ min.$$

Finally, in the second stage of the race, when B runs $x + 10$ yd. while A is going $x - 10$ yd., the distances being proportional to the respective rates,

$$(x + 10) : (x - 10) :: \frac{347.43\ x - 2525.7}{x + 10} : 300$$

$$(347.43\ x - 2525.7)\frac{x - 10}{x + 10} = 300\ (x + 10)$$

$$(347.43\ x - 2525.7)(x - 10) = 300\ (x + 10)^2$$

$$47.43\ x^2 - 12{,}000\ x = 4743$$

$$x^2 - \frac{12{,}000}{47.43}\ x = 100$$

$$x = 253.4\ yd.$$

Distance to post.

Other values are as follows:

B's first rate,

$$\frac{300\ (x - 10)}{x + 10} = \frac{300 \times 243.4}{263.4} = 277.22\ yd.\ per\ min.$$

B's second rate,

$$277.22 + 47.43 = 324.65\ yd.\ per\ min.$$

Time, first stage,

$$(253.4 + 10) \div 300 = 0.8780\ min.$$

Time, second stage,

$$(253.4 - 10) \div 300 = 0.8113\ min.$$

Total 1.6893 *min.*

The proof of this solution is the following:

By A, $300 \times 1.6893 = 506.8\ yd.$

By B, one pace,

$$277.22\ (1.6893 + 0.0667) + 20 = 506.8\ yd.$$

By B, two paces,

$$277.22 \times 0.878 + 324.65 \times 0.8113 = 506.8\ yd.$$

Draining Mine Sump

Referring to the answer given to the examination question, COAL AGE, Aug. 22, p. 318, in regard to the time required to drain a mine sump, which is found to be 5 hr. 5.7 min., I do not understand how 28.274 sq.in. divided by 144, which is the number of square inches in a square foot, can give 19.63 cu.ft. How is it possible for square inches divided by square inches, to give *cubic feet?*

CONSTANT READER.

Latrobe, Penn.

Correspondent should have given his name when writing, so that this simple oversight on his part could have been answered by mail. He has overlooked the multiplication by 100 ft., which gives cubic feet.

Examination Questions

British Columbia Examination, May 20, 1914

(*Selected Questions*)

Ques.—Is firedamp compressible? What effect has a decreased pressure of the atmosphere on this gaseous mixture?

Ans.—All air and gases are compressible. Any decrease in atmospheric pressure is accompanied by a corresponding expansion of a firedamp mixture, the expansion in the volume of the firedamp being inversely proportional to the absolute pressure.

Ques.—Which is the most difficult gas to contend with in mining? Explain fully.

Ans.—In respect to its removal, carbon dioxide gives the most trouble in dip workings and deep shafts, while marsh gas often gives serious trouble when generated in volume in rise workings and at the face of rise headings. In respect to explosive conditions in mines, marsh gas and carbon monoxide present the greatest difficulties, owing to their inflammability when mixed with air in certain proportions.

Ques.—What precautions would you adopt to prevent loss of life and property in mines subject to sudden outbursts of carburetted hydrogen gas?

Ans.—An ample circulation of air should be maintained, and this should be so conducted and distributed throughout the mine as to ventilate thoroughly all passageways and working places, as well as the waste and void or abandoned places, in every portion of the mine. To guard against accident, duplicate ventilating fans should be installed. Only safety lamps of approved pattern should be used. Every precaution should be taken to prevent the accumulation of dust, by loading out all fine coal and slack and using only dustproof cars.

Permissible powder should be used, and strict regulations should be enforced in reference to blasting. All shots should be inspected and fired by competent persons. The mine should be equipped with an efficient signal system. Due attention should be given to the system of timbering, with special reference to protecting the working faces against the pressure of the gas where this is in the roof or coal. The method of mining the coal should also be given careful attention, to avoid accident from the same cause.

Ques.—A mixture of marsh gas and air, at its most explosive point, is passing along an airway 4x5 ft., at an average velocity of 500 ft. per min. What quantity of fresh air must be added to this current so that the gas cannot be detected on a safety lamp?

Ans.—The answer to this question will depend on the safety lamp used, and the ability of the observer to discover the flame cap on the lamp. Using the unbonneted Davy, burning sperm or cottonseed oil, it may be assumed that the gas in the air current will not exceed 2 per cent. and escape detection, in ordinary mining practice. The volume of air and gas in this airway is (4x5) 500 = 10,000 cu.ft. per min. A firedamp mixture, at its most explosive point, contains 9.46 per cent. of gas. The volume of gas, in this case, is, therefore, 10,000 × 0.0946 = 946 cu.ft. per min. If this volume of gas is 2 per cent. of the return current after the air is added, the total volume of the current will be 946 ÷ 0.02 = 47,300 cu.ft. per min. The volume of air to be added, therefore, to produce this result, is 47,300 — 10,000 = 37,300 cu.ft. per min.

Ques.—How far can a pair of entries be driven before a cap will show on a safety lamp, if an air current of 4000 cu.ft. per min. is passing in the entries, assuming that the coal gives off 1 cu.ft of marsh gas in every 90 ft. of each entry? Give the proportion of gas and air in the mixture.

Ans.—The answer to this question will depend upon the lamp used for the detection of gas and the ability of the observer to discover the flame cap. Assuming that 2 per cent. of gas can be detected by the use of the unbonneted Davy, the air in this current of mixed gas and air would be 100 — 2 = 98 per cent. In this case, therefore, 4000 is 98 per cent. of the mixture and the entire volume of gas and air is 4000 ÷ 0.98 = 4081.6 cu.ft. per min. The volume of gas that must be given off by the entries in order to produce this condition is, then, 4081.6 — 4000 = 81.6 cu.ft. per min.

Now, if 1 cu.ft. of marsh gas is generated in every 90 ft. of each entry or 2 cu.ft. for every 90 ft. of the pair of entries, the quantity of gas given off is 1 cu.ft. for each 45 ft. of the pair. To generate 81.6 cu.ft., on this basis, would require 81.6 × 45 = 3672 ft., which is the distance a pair of entries can be driven under the assumed conditions.

Ques.—A pair of entries 300 ft. long have five crosscuts connecting them at 60 ft. apart, the pillars between the entries being 30 ft. wide. These entries and crosscuts are all filled with marsh gas (CH_4). If an air current of 6000 cu.ft. per min. is available, what is the least time that will be required to clear out this gas, without fouling the air current further than to cause a small cap on a safety lamp? All the places mentioned are 8 ft. wide and 5 ft. high.

Ans.—The five crosscuts, each 30 ft. long, represent a length of 5 × 30 = 150 ft., which added to the length of the two entries gives 2 × 300 + 150 = 750 ft. of length. The cubical contents or volume of these entries and crosscuts is, then, 750 (5 × 8) = 30,000 cu.ft. Now, assuming the "small cap" represents 2 per cent. of gas in the current of air and gas, the volume of pure air is 100 — 2 = 98 per cent. of the mixture. On this basis, the total volume of the return current of gas and air is 6000 ÷ 0.98 = 6122.4 cu.ft. per min.; and the volume of gas drained off is then 6122.4 — 6000 = 122.4 cu.ft. per min. Making some allowance for the difficulty in draining the gas, it would be safe to assume that the air current carries off, say 120 cu.ft. of gas per min. On this basis, the time required to drain these entries and crosscuts would be 30,000 ÷ 120 = 250 min., or 4 hr. 10 min.

Coal and Coke News

Harrisburg, Penn.

Four of the big railroad companies, operating in the bituminous region, and representing the Central Freight Association, conferred with the Public Service Commission on Sept. 1, regarding increased freight rates in the western part of the state, as granted by the recent ruling of the Interstate Commerce Commission.

George D. Ogden appeared for the Pennsylvania R.R., F. Y. Sladden for the Pittsburgh & Lake Erie; F. C. Baird for the Bessemer & Lake Erie and T. J. Walters for the Baltimore & Ohio. These men asked the Public Service Commission to grant blanket permission to all roads publishing Pennsylvania interstate rates to cancel all tariffs now under voluntary suspension effective on or before Sept. 12, and also asked authority to republish the five per cent. rates as modified by the order of the Interstate Commerce Commission on less than statutory notice of three, five or ten days, or to observe the same number of days' notice as may be granted by the Interstate Commerce Commission.

The commission agreed as to the withdrawal of the present rates but reserved its decision regarding the proposition to make effective the five per cent. increase on less than the statutory notice of 30 days. The commission also made it plain that no matter what its attitude on the latter question may be, it would not affect the question as to the reasonableness of the increased rates.

The production of anthracite coal in August was slightly larger than that of August a year ago. Most of the large producing companies report a normal tonnage, but two of them were ahead of last year's record, and the orders from Canada are reported coming in earlier, though not in greater volume, than last year. August shipments will approximate 5,400,000 tons when the official figures are published.

The labor situation continues quiet.

An interesting development is the shipment by the Lehigh & Wilkes-Barre Coal Co. of 1000 tons of egg coal to San Francisco through the Panama Canal. This is the first shipment of anthracite by this route. Anthracite has been shipped to San Francisco by boat in small quantities as ballast around the Horn, but this was a matter of months. It is estimated that it will take the Lehigh & Wilkes-Barre Coal Co.'s shipment 30 days to reach its destination.

No exodus of reservists of the warring nations is reported, although many of the mine workers are natives of them. Russians, including Poles, Lithuanians and Slavonians, predominate, and next come Italians, Irish, Austrians, and Hungarians, Welshmen, Germans and Englishmen in the foregoing order.

PENNSYLVANIA

Anthracite

Harrisburg—Mandamus proceedings were begun Aug. 3 against James E. Roderick, chief of the State Department of Mines in the Dauphin County Court by miners of the Schuylkill County anthracite district who claim that foreman's certificates have been unlawfully withheld from them. The plaintiffs aver that they took the prescribed examinations, passing them, and are now losing money because of the lack of certificates.

Wilkes-Barre—After being idle for over a week because of the damage done by a cyclone, the Stanton Colliery of the Lehigh & Wilkes-Barre Coal Co., resumed operations Sept. 1. To repair the damage to a point where the colliery could be operated, the company employed 250 men every day for a week.

Wyoming—S. J. Jennings, mine inspector for the Eighth Anthracite District, made presentment to the court recently charging Rissinger Bros., mining contractors, with violating sections of the mine law at the Troy colliery. It is claimed that Rissinger Bros. failed to construct and equipp a mine hospital outside of the colliery, also that engine houses built inside the mines were not of inflammable material. The defendants agreed to comply with the law in these respects and the court by agreement held the complaint of the mine inspector pending the elimination of the grounds on which the violation is charged.

Pottsville—A severe drought threatens to close the collieries here. Some of the coal companies in order to prevent this from taking place are making preparation to haul water for steam purposes. The Philadelphia & Reading Coal & Iron Co. is negotiating for the purchase of Lakeside, a large tract of land which would give the company possession of a considerable body of water. The Girard Estate is rapidly completing a reservoir with a capacity of 278 million gallons.

Joseph Gudonis, on Sept. 3, threw himself down the East Brookside shaft, a distance of 1700 ft., meeting death upon a cage, his fall completely severing his limbs and breaking every bone in his body. Gudonis was employed as a contract miner but quit and complaining of headache went home. A short time later he ran madly toward the shaft and dashed himself to death.

Thropp—The 1500 mine workers at the Pancoast mine of the Price-Pancoast Coal Co. declared a strike on Sept. 2. Several hundred of the workers, who were not present at the meeting on Sept. 1, when the strike was called, reported for work, but were met by pickets who informed them of the strike order. The men at once returned home. The men have two grievances, the most important being that the fire bosses have refused to remain with the union. The six fire bosses joined the organization some time ago, but recently they resigned, and efforts to get them back have been unsuccessful.

Bituminous

Connellsville—The advent of September brought no inquiry for furnace coke for the month, and it is evident that the furnaces which bought coke for July and August are covered for September also. At the present time the trend in consumption is apparently downward, undoubtedly by reason of the industrial unsettlement caused by the European War.

Fayette City—Miners to the number of 450 walked out of the Warner-Yough mine Sept. 3, because one of their number had been discharged for refusing to work in a room which had water in it. This mine has been running steadily for the past two years. Union officials from Pittsburgh hope to get the men and the company together soon. The closing of this operation leaves only two mines running at this place at the present time.

Washington—The Fidelity Title & Trust Co. of Pittsburgh, receiver for the Pittsburgh & Westmoreland Coal Co., filed suit in court recently against the Pennsylvania R.R., to recover $26,611.83 damages. In April last while cars were being placed in the Hazel Kirk mine, No. 3, it is claimed that the cars derailed demolishing a coal tipple.

Charleroi—With a number of the mines along the Monongahela River partially or entirely closed owing to the scarcity of empty craft to load, the shipments of coal down bound passing Lock No. 4 for the month of August were light. The report of the lockmaster shows that 12,648,000 bushels of coal from the mines along the upper Monongahela River were passed through the government lock during the month.

Seward—With three shifts of men working eight hours each, operations at the new plant of the Conomaugh Smokeless Coal Co. are being pushed to completion. The shaft is down now a distance of 160 ft. The John Thomas & Sons operations near Cramer are being worked to capacity and heavy shipments are being made. The Keystone Coal & Coke Co.'s mines are working four days a week instead of two or three days, as has been the rule for several months and everything indicates that a big demand for coal is in sight.

WEST VIRGINIA

Charleston—The report of a wholesale reduction of wages in the mining operations in the Norfolk & Western Field appears to have been decidedly exaggerated. As nearly as can be ascertained the rumor had its origin in the fact that in one operation a slight reduction in the wages of some of the employees was recently made in order to bring them at that particular operation to conform with those made at adjacent mines conducted under similar working conditions. There has been no general reduction either effected or in contemplation.

Wheeling—State Mine Inspector, Earl A. Henry, recently stated that the Eastern Ohio coal strike which is creating no comment in this section at the present time is not throwing much business to the mines of West Virginia. This is due

to the fact that the markets for Ohio coal are not easily reached from the mines of this state, the larger part of its production going to the Atlantic Coast while the Ohio coal is mostly sent to the Lakes.

Fayette—The contention of the Black Betsey Coal & Mining Co. and the Boomer Coal & Coke Co. that they acted in accordance with the Constitution and the By-Laws in discharging certain of their employees recently was sustained at a conference held between the excutive boards of the United Mine Workers and the Kanawha Coal Operators Association. It is stated, however, that the companies will voluntarily give employment to the men whom they discharged.

Bluefield—All coal loading records of the Chesapeake & Ohio R.R. in West Virginia and Kentucky coal fields were broken during the month of August. A total of 2,202,115 tons of coal were loaded or an increase of 140,865 tons over that loaded during the month of July. The last day of August broke all records for a single days loading and a total of 113,755 tons were handled or an increase of 3265 tons over Aug. 3 which was the previous record.

Along with new movements for a better citizenship in country, town and city, come new courses in the schools. The Concord State Normal School will this year offer a new course for the benefit of those who expect to go into mining communities to teach. The course will be offered primarily for the purpose of helping the teachers make better schools in the mining sections of the state. The course includes a study of mine gases, their properties and effect on the miner, the analysis of mine air, the use of the barometer and hygrometer, as well as the use and misuse of safety lamps. Moving pictures and lantern slides will be used to illustrate the safe methods of mining, and better means of sanitation for mining towns.

TENNESSEE

Nashville—The reduction ordered last winter by the Interstate Commerce Commission on freight rates on coal hauled from points in Kentucky, Tennessee and Alabama and by which adjustment of switching practices also was ordered, has been sustained by an opinion handed down in the Federal Court, much to the satisfaction of the commercial interests of this part of the country. J. W. Warrington, Circuit Judge, and John E. McCall and E. T. Sanford, United States Circuit Judge, signed the finding, which it is hoped is the final entry in the long drawn out coal rate and reciprocal switching case.

KENTUCKY

Barbourville—The wage scale for the union miners emproved in this section, where, however, only a portion of the mines are worked by union workmen, is due to be adjusted sometime this month. It was to have been taken up the first week in September but was postponed for later consideration. It is not expected that the adjustment will be attended with any difficulty.

OHIO

Coshocton—George Lent has started suit in the Coshocton County courts against W. A. and Daisy Hahn to secure a clear title to a tract of coal land which he leased from the defendants in March. The plaintiff says that through oversight there were no witnesses to the lease and he wants the error corrected.

Columbus—Professor Frank A. Ray, of the chair of mining engineering at the Ohio State University has just issued a publication entitled "The Ohio Coal Supply and its Exhaustion." Among other things he says that "All calculations upon the depletion of Ohio's coal supply are more or less pure speculations. Our knowledge is yet deficient and we must know more of the facts both as to the coal reserve and the future consumption before the total depletion of the Ohio coal supply can be predicted."

It is stated that hundreds of small coal mine owners who lease their property for operation will be affected by the decision of the State Industrial Commission recently announced which makes the owner liable in all cases of injury for payment of compensation. The desire of mine owners to maintain their property in good condition has resulted in most contracts being so drawn that the lessee is not an independent contractor but merely an agent of the owner.

INDIANA

Indianapolis—The International Executive Board of the United Mine Workers of America, at a recent session, passed the following resolution:

"Resolved, That we, representing more than 400,000 mine workers of North America, express ourselves as against war in any form. We are for peace and for a peaceful solution of all disputes arising among nations without resorting to arms; and be it further

"Resolved, That we commend the President of the United States for his efforts in behalf of peace. His offer of the services of our government to the warring nations of Europe as a mediator touched a responsive chord in the hearts of all peace-loving people. In like manner the tactful, wise and patriotic manner in which he conducted affairs so as to prevent our government from becoming involved in a war with Mexico ought to be appreciated by every true American citizen."

ILLINOIS

Herrin—By a vote of three to one, the miners of southern Illinois have abolished the sub-district system of government, saving the organization thousands of dollars each year in the administration of affairs of the United Mine Workers. Instead of several sub-districts, there will be 12 districts created, and each will be under a president who will handle the work that heretofore has required 10 officials.

Lincoln—After an idleness of five months the Latham coal mine recently resumed operation. This company has sufficient contracts to warrant work for several weeks. About 350 men are affected.

West Frankfort—For the fiscal year ending June 30, 1914, the mines of Franklin County produced a total of 6,569,099 tons of coal. Twenty-one fatal accidents occurred during the year or four less than the previous year. There were also 137 non-fatal accidents. The Old Ben Mining Co., of West Frankfort, worked 262 days and produced 869,982 tons without a single fatality. It appears that operators are sparing neither pains nor expense in making working conditions as safe as possible.

ARKANSAS

Fort Smith—Damages to the amount of $1,283,462.21 are asked in a suit filed in the United States District Court by Franklin Bache, receiver of the Bache-Denman Coal Co. against the national, district and local officers of the United Mine Workers of America. It is charged that the national organization indorsed the destruction of the company's property by fire and dynamite in a riot last July.

OKLAHOMA

Adamson—Eleven miners were imprisoned on Sept. 4 in the mine of the Union Coal Co., as the result of a cave-in which blocked the mines entrance. On Sept. 7, hope of ever reaching the entombed men alive was abandoned, as it was believed that it would take at least a week to remove the debris at the entrance of the wrecked mine.

COLORADO

Trinidad—Six arrests were made recently on indictments returned by the Las Animas County grand jury investigating coal strike disorders. Those arrested were William Diamond, international organizer of the United Mine Workers, three saloon men and two strikers. Th six are charged with murder on several counts growing out of the battles between strikers and mine guards during October of last year and April of 1914.

Denver—Coal land valued at half a million dollars in Jackson County reverted to the government and was lost to the Northern Colorado Coal Co., by a decree recently issued in the United States District Court. By this decree the company must pay the costs of the case and the patent to the land, bought by the company from individuals reverts to the government.

UTAH

Sunnyside—In spite of unfavorable smelter conditions, the coke plant at Sunnyside is working five days per week, and it is believed that unless something unforseen occurs, this schedule will prevail for some time to come. With improvements in the copper situation, the plant will again be put on a seven-day-a-week basis.

Recent Coal and Coke Patents

Apparatus for Regulating Combustion in Furnaces. J. F. Canady, Jersey City, N. J., 1,102,718. July 7, 1914. Filed Sept. 21, 1909. Serial No. 518,812.

Signal System for Mines. G. T. Plumb, Johannesburg, Transvaal, 1,101,951. July 7, 1914. Filed May 18, 1908. Serial No. 433,541.

Smoke Washer. L. Bottenstein, Albany, N. Y., 1,101,996. July 7, 1914. Filed Feb. 9, 1914. Serial No. 817,432.

Apparatus for Localizing the Effect of Mine Explosions. J. F. Balfour, Edinburgh, Scotland, 1,102,228. July 7, 1914. Filed July 5, 1912. Serial No. 707,795.

Superheater Boiler. J. E. Whittlesey, Pittsburgh, Penn., 1,102,836. July 14, 1914. Filed Mar. 11, 1912. Serial No. 683,136.

Steam Superheater. R. C. Stevens, assignor to Skinner Engine Co., Erie, Penn., 1,102,361. July 7, 1914. Filed Feb. 10, 1913. Serial No. 747,368.

PERSONALS

Geo. W. Evans, consulting mining engineer of Seattle, is in Montana examining coal properties.

A. H. Wood, of Petros, Tenn, president of the Petros Coal Mining Co., is organizing a company for the development of a considerable tract of coal land in Harlan County, Ky.

A H. Whiteside has recently been appointed vice-president and general sales manager of the Goulds Mfg. Co., of Seneca Falls, N. Y., manufacturers of hand, triplex and centrifugal pumps.

K. W. Rittenhouse, formerly connected with the Central West Coal Co., has taken a position as northern Ohio representative for the William J. Hamilton company, of Columbus.

Thomas J. Barr has been appointed professor of mining engineering in the College of Mines and Metallurgy, at the University of Kentucky, to succeed Prof. H. D. Easton, who recently accepted a position as instructor in the Illinois Miners' and Mechanics' Institute.

John Morris of Beckley, W. Va., is understood to be making arrangements for developing a tract of coal land on Coal River, which was recently secured by him and associates. A charter has been obtained with the object of starting the work of opening up the coal deposit.

F. P. Wright, of Bevier, Ky., was reëlected president of the Western Kentucky Coal Operators Association at the meeting held a few days ago in Louisville. Other officers reëlected at this meeting were as follows: Vice-president, C. W. Taylor, of Greenville; secretary-treasurer, B. Stewart Miller, of Owensboro.

John H. Jones, mining engineer of Wilkes-Barre, has been engaged by the Scranton School District, together with Ellsworth Davis, of Scranton, in making an investigation of conditions under the No. 40 school building. The engineers will determine which coal company is responsible for a recent disturbance of the surface, which caused damage to the school.

John J. Buttermore, president of the Catawba Coal Co. and George S. Connell have purchased the Elizabeth Mine of the Connellsville Coal & Coke Co., at Montana, W. Va. They will begin operations immediately under the name of the J. J. Buttermore Coal Co. The offices of this firm will be in Connellsville, Penn.

George Hippard, owner of the Coulterville mine and who resides at Belleville, Ill., was seriously injured when he fell from the top of the tipple at the coal mine at Coulterville, while supervising some work. He was given temporary treatment and sent to his home in Belleville, where several fractures of his arms and legs will keep him confined for sometime.

J. W. Reed, who has been an inspector at the mines of the Consolidation Coal Co., at Jenkins, Ky., for eight years, has taken the examination at the College of Mines and Metallurgy, preparatory to applying for the position of first assistant state inspector of mines. The appointment is made by the Board of Trustees of the State University, and the governor issues the certificate.

OBITUARY

Thomas E. Hughes, manager of the Philadelphia office of the Standard Underground Cable Co., died at his residence in Atlantic City recently. Mr. Hughes had long represented the Standard Co. throughout its Atlantic Coast territory from Philadelphia South, and for the past 17 years had been manager of its Eastern and Southeastern branch office sales department.

CONSTRUCTION NEWS

Chattanooga, Tenn.—It is announced that work on building the million dollar coke oven and byproduct plant of the Durham Coal & Coke Co. in Alton Park will be begun on or about Sept. 30.

Athens, Ohio—Work on repairs of the coal hoisting apparatus at Mine 209 on Sugar Creek is being pushed day and night, and it is hoped that this mine will again be ready for operation within a short time. It has been idle for several days.

Huntington, W. Va.—Another new mining town is being built on Allen's Creek in Wyoming County about four miles from Mullens, where the Wyoming Coal Co. is opening a new mine. Houses for the miners are being built and it is expected that the company will begin shipping coal within a few weeks.

Coshocton, Ohio—The Ohio Cannel Coal Co. expects to open its 5-ft. bed of coal underlying 1200 acres in Bedford Township within 30 days. The opening of the mine is in charge of S. B. Priest and George T. Heckle, who with John Orr and Simon Ashcraft own the controlling interest. The company expects to commence building tipples and installing machinery at once.

NEW INCORPORATIONS

Columbus, Ohio—Papers have been filed with the Secretary of State, changing the name of the Pomeroy Fuel Co. to the Alma-Thacker Fuel Co. The concern is located in Columbus.

Ottawa, W. Va.—The Big Eagle Mining Co. has been organized with an authorized capital of $25,000. The incorporators are J. M. Moore, James Clark, A. M. Rogers, and Edward Zwilling of Ottawa, and George S. Wallace of Huntington.

Jackson, Ohio—The Ohio & Indiana Collieries Co. has been incorporated with a capital of $150,000, to deal in coal lands and to mine and sell coal. The incorporators are E. E. Morgan, Walter McCloud, David Armstrong, Morgan J. Jones and E. E. Eubanks.

Scottsboro, Ala.—The McKenzie Coal Co. has been incorporated with a capital stock of $7500, to develop mines in Jackson County, Alabama. The officers are A. R. McKenzie, president; John D. O'Connor, vice president; J. H. McKenzie, secretary and treasurer, all of Scottsboro, Ala.

Crown, W. Va.—A charter of incorporation was recently granted to the Lowash Coal Co. of Crown, Logan Co., W. Va. This company has an authorized capital of $20,000, and the incorporators are G. I. Putnam, R. L. Carmichael, Ethel Carmichael, H. B. Summers, Mary A. Summers, of Crown, and Ida L. Putnam of Athens.

Homer City, Penn.—An application has been made for a charter for a coal mining and holding concern to be known as the Crown Hill Coal Mining Co. which will operate in central Indiana County. The incorporators are M. A. Lowther, B. M. Barker, and W. C. Lowther. This firm holds considerable coal in the Indiana field.

INDUSTRIAL NEWS

Philadelphia, Penn.—W. A. Stone & Co. have discontinued their branch office in Philadelphia.

Philadelphia, Penn.—The Italian steamship "Fert" recently cleared from this port with 7746 tons of coal destined to Italian ports.

Charlestown, W. Va.—More than 2000 claims were handled in August by the Workmen's Compensation Division of the Public Service Commission, while in one week over 525 claims were considered.

Belt, Mont.—George W. Merkle has acquired a 5-year lease upon the Anaconda Copper Mining Co.'s operation at this point, and will within the next few days place a force of men at work preparing the mine for the production of coal.

Columbus, Ohio—The Ohio Public Utilities Commission has set the time for the suspension of car-service rules on cars

loaded with fine coal to Dec. 1. The application of the Kanawha & Michigan R.R. Co., which brought the action, asked that the suspension be made permanent.

Columbus, Ohio—The Ohio Public Utilities Commission has granted the application of the Kanawha & Michigan R.R. Co. for permission to store fine coal on its lines without the usual demurrage charges. This is done in order not to flood the market with small sizes. The order will be issued in a few days.

Cincinnati, Ohio—The tow boat "Sally Marmet" struck the Government dredge boat in charge of the "Sea Lion" and sunk three barges of coal at the foot of Manchester Island on Sept. 3. The "Marmet" left for this city with the remainder of the coal. The damage in total will amount to several thousand dollars.

Washington, D. C.—Secretary of the Interior Lane receintly presided at a conference of American manufacturers of coal tar chemicals, and pharmaceutical products ,to determine whether the government can render aid in bringing about an American production of such coal tar products as hitherto have been imported.

Washington, D. C.—The third Conservation Bill that the House of Representatives has had under consideration, provides for the operation of coal, oil, gas, potassium and sodium deposits on the public land and is regarded as extremely important. The nation is rich in its natural resources but for want of adequate legislation, too many of these resources are now in a state of non-use.

Erie, Penn.—The Lake coal trade is said to be the lightest it has been this season. A number of ships that were idle the forepart of the year because they were dependent upon the coal produced in Ohio, are now busy, but those that carried coal all spring are unable to get it now in anything like operating quantities.

Connellsville, Penn.—Advices from the head of the Lakes indicate that the coal docks have a burden of about five million tons and that vessels are not getting as good despatch as a few weeks ago. The railroads are taking only small amounts of fuel, but it is expected that as soon as the grain crops start to move from the Northwest, the roads will load the cars with coal for the return trip.

Huntington, W. Va.—The Chesapeake & Ohio R.R. has received a large number of new steel coal cars, which were on order, within the past few months, and is putting them into service as fast as they arrive. This road has taken about 1300 wooden, 40-ton, flat bottom gondola cars out of service, and will put steel center sills into them at the local shops. After this, the cars will be put back in the coal trade.

Columbus, Ohio—The Ohio Public Utilities Commission has issued an order requiring the Hocking Valley Ry. Co. to operate an electric car service on the Wellston and Jackson Belt Line, connecting Jackson and Hamden. The electric service was taken off this line several weeks ago and the people along the route protested to the Utilities Commission. The company was not given the alteration of operating a steam service.

Birmingham, Ala.—Local industrial circles were recently somewhat agitated by the report that the Tennessee Coal, Iron and Railroad Co. was loading at Pensacola and Mobile cargoes of coal for the Hamburg-American line of ocean steamers. It was said that this coal was paid for in gold as soon as it was loaded. This report, however, which was thoroughly discussed and generally believed has been neither confirmed nor denied.

Connellsville, Penn.—The statement of the bituminous coal tonnage originated on the lines of the Western Maryland R.R. shows that during June, shipments amounted to 187,006 tons or a decrease of 41,796 tons as compareed with the corresponding month of the previous year. Total shipments during the first six months of 1914 were 1,363,135 tons or a decrease of 182,297 tons as compared with the corresponding period of the previous year.

Clear Creek, Utah—The Utah Fuel Co. recently made a record of 360 ft. in one month in driving an 8x12 ft. tunnel through hard rock at its Clear Creek mine. This tunnel will eventually be 4000 ft. long. Two shifts are being worked. Sixty per cent. gelatine powder is used to break the rock, the holes being on an average 6 ft. deep, 3¼-in. drills being used. New electric and other equipment will eventually be installed.

Pittsburgh, Penn.—The keen inquiry for moderate sized coal tracts convenient to railroads is taken as foreshadowing industrial revival before long. There are few buyers for large coal lands, but wherever a block of minable coal of a few hundred acres is offered for sale, it is disposed of readily at a good price. One broker, who specializes in coal lands is quoted as recently saying, that in his 12 years' experience, he never before had so many inquiries for coal properties as he has at present.

Charlestown, W. Va.—Great Britain has long enjoyed the reputation of having the best conducted and the safest coal mines in the world. A comparison of British records with those of West Virginia, however, reveal some interesting facts. In Great Britain there are 3289 mines as against 817 in West Virginia. The production per employee in 1913 was 267 tons, while in West Virginia it was 855 tons. Each person employed underground in England produced 332 tons, as against 1048 tons in West Virginia.

Newport News, Va.—A total of 1,108,539 tons of coal were dumped over Hampton Roads coal piers at Lambert's Point, Sewall's Point and Newport News during the month of August. These figures are expected to be exceeded by the September dumpings as foreign steamers awaiting cargo aggregating approximately 100,000 tons are already in port and a large fleet of others are expected to arrive to load cargoes for foreign countries which hitherto have been getting their coal supply from England and Germany.

Birmingham, Ala.—There has been no event in the Birmingham district during the past few years which has so disturbed the coal industry as the proposed increase in coal rates. It is said that the tariff of the railroads if granted by the State Commission will cost the Birmingham district 1,500,000 tons of coal per year. The production in the Birmingham district seldom exceeds 7,000,000 tons per annum, and if from that amount the railroads by proposed tariff cause to be cut off 1,500,000 tons, it will be a severe blow to the industry.

Columbus, Ohio—The Jeffrey Manufacturing Co. has issued a monthly publication, styled "Jeffrey Service," which is designed to benefit the employees of the company. W. A. Grieves, superintendent of employment and welfare, is editor-in-chief. Reporters have been named from each of the 50 departments of the huge corporation. The publication is designed "to know more about ourselves." The company has started a co-operative grocery, meat market, shoe store, bakery, dairy and restaurant for the benefit of its hundreds of employees.

Montreal, Canada—One and a quarter million tons of coal have been shipped since the opening of navigation to the St. Lawrence ports, Montreal, Quebec, Three Rivers and Levis with 35 steamers of the Dominion Coal Co. as carriers. This indicates that two million tons which are intended to be brought from Sydney during the season of navigation will be sent as the amount already arrived shows that the schedule is being lived up to. The program for September is to bring 350,000 tons of coal to the St. Lawrence ports, most of it being destined for Montreal.

Washington, D. C.—The United States Bureau of Mines is planning a comprehensive exhibit for the Panama-Pacific Exposition. The Bureau has in mind not only the value of interesting those engaged in the various mining and metallurgical industries but also the education of the general public to a better knowledge of the magnitude of these industries and to the efforts which are being honestly made by miners and mine operators toward a more safe conduct of mining and a more efficient utilization of the products of the mine after they are secured from the earth.

Newport News, Va.—Notwithstanding the embargo on credit which has proved a stumbling block in the way of South American trade since the outbreak of European hostilities, it is an interesting fact that coal shipments have been steadily proceeding during the month of August to Brazilian ports. The Booth Line during this month has sent four steamers from New York and Hampton Roads to Brazil with cargoes to Para, Manaos and Iquitos, Bahia and Pernambuco. These cargoes included 15,000 tons of coal shipped by the company from the railway terminals at Norfolk and Newport News. There is every prospect that these shipments will continue and increase.

Vivian, W. Va.—The Pittsburgh Coal Washer Co. recently closed the contract for a large modern steel tipple for the Bottom Creek Coal & Coke Co. This structure will be one of the finest ever built in the Pocahontas field. The same firm is at present building two steel tipples for the U. S. Coal & Oil Co. at Holden, W. Va., one steel tipple for the Main Island Creek Coal Co. at Logan, W. Va., one steel tipple for the Logan Coal Co. at Ethel, W. Va., two steel tipples and car hauls for the Rail & River Coal Co. at Bellaire, Ohio, one steel tipple at the Lick Branch mine of the Pocahontas Consolidated Collieries Co., at Pocahontas, Va., and several wooden tipples at various points throughout the state of West Virginia.

Coal Trade Reviews

General Review

Anthracite trade steadily improving as the season advances. Operations active and the full circular prevails. Bituminous steam trade disappointing in all parts of the country, but operators continue confident as to the future. Market well maintained. Domestic grades beginning to open up as the season advances.

The anthracite trade is steadily gaining momentum through the fall transitional period preceding the winter rush. The weather is already becoming a potent factor in the situation, some unexpectedly low temperatures having materially accelerated retail buying and created additional activity among the wholesalers. The customary slowing down at the opening of the month has disappeared and most of the companies are now well covered. Full circular prices are generally the rule and a heavy fall and winter business is in sight.

The Eastern bituminous maket is generally dissapointing though still replete with many latent possibilities. There has been a heavy increase in the foreign trade but even under the most favorable conditions this cannot attain sufficient proportions to directly affect the general market. On the other hand, the more or less complete demoralization prevailing in the world's established channels of commerce, has unmistakably crippled local industries to such an extent as to have a marked effect on the fuel consumption. But in spite of this adverse situation there are occasional reports of an incipient shortage at some points and operators are aggressively maintaining the market, confident of an active trade in the immediate future.

Indications for an early closing of Lake navigation has caused the Pittsburgh district operators to relinquish their last hopes of placing any surplus tonnages in that direction. Prices are spotty and irregular. Complications regarding credits in the Canadian trade are still puzzling producers selling in those markets. A more favorable condition prevails as regards the Lake trade in Ohio and domestic coals are also holding steady; steam grades are slowing down perceptibly and prices are under some pressure due to the tendency to reduce immediate expenditures to the minnimum.

There is considerable negotiation on foreign business in the Southern market and domestic trade is beginning to open up with the approach of the fall buying season. Some demand for steam coal is noted in the Middle Western market due, in part, to a tendency among large users to stock up before the car shortage period. The market is erratic but with a favorable undertone.

ATLANTIC SEABOARD

BOSTON

No significant change in Pocahontas and New River. Local spot demand very light, but contract shipments are well up to seasonable mark. Georges Creek loading slow because of off-shore requisitions. Pennsylvania grades continue strong. Good September in anthracite.

Bituminous—Pocahontas and New River have been marking time and there are no significant developments to report. The export trade is the chief topic of interest and apparently little attention is being paid to the market coastwise. While the volume of receipts here continues large, it is practically all contract, the local market seeming to be about as far removed from an active spot demand as heretofore. Stocks are large at all points and there is not quite the interest on the part of buyers that was predicted a few weeks ago. Many of the textile mills have closed down for a fortnight, beginning Aug. 29, and some will stay closed unless a way is found to get German dye-stuffs.

A few more steam colliers have been put back in commission and most of the agencies are moving a fair tonnage from Hampton Roads. Market cargoes are a little more easily absorbed than a month ago, but the demand for inland shipment is rather spotty and unreliable.

The Georges Creek shippers have more business just now than they can comfortably handle. The off-shore demand is strong and coastwise boats are frequently being held until clearance is given steamers for foreign ports. In some cases bottoms intended to load this grade have been diverted to Hampton Roads loading.

There is practically no change in the generally strong position of the Pennsylvania grades. All-rail there is a steady demand and consumers are beginning to urge shipments with more frequency. Most of the shippers are optimistic over the fall prospect and with Georges Creek beginning to break down on deliveries and Hampton Roads coals in line for heavy business later, it is hard to see anything unfavorable ahead, especially for the more popular grades. Prices have not changed except in scattered instances.

Anthracite—The early September demand has exceeded exceeded expectations. Orders are coming in freely. The retailers are up to their maximum for deliveries and they are likely to continue so throughout the month. A few independent offerings have been made at 5@10c. off the current circular, but as usual little tonnage was placed. Most of the companies already have about all the September orders they can handle and there is no doubt now that the market will be active for the balance of the season.

Current prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.25@1.65	$1.67@1.77	
Philadelphia*	2.15@2.80	2.00@2.90	2.92@3.02	
New York*	2.45@3.10	2.80@3.20	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.85@2.95
Boston†	.....	.....	.....	3.63@3.68
Providence†	.....	.....	.....	3.63@3.78

* F.o.b. †On cars.

NEW YORK

Satisfactory bookings ahead in anthracite. Insistent demand all rail and individual coals now bringing the full circular. Bituminous demand on contracts increases. Prompt market continues rather flat, though the outlook is hopeful.

Anthracite—The demand for anthracite domestic sizes for rail shipment, both East and West, continues in good volume, although not quite as strong as the latter part of August. Orders are now booked ahead for perhaps two or three weeks and with anything like a turn in the weather conditions the demand for all domestic sizes should increase. Stove continues to be the short size in all the markets. The activity in the rail markets has had a tendency of taking individual coal away from tidewater, the result being a general stiffening of prices and all sizes in the standard grades are now bringing the full circular.

The demand for pea coal for rail shipment has improved materially, but it is still inactive at tidewater. The fine sizes in the higher grades are in good demand, whereas inferior coals in the buckwheat sizes are begging.

There is a more or less general movement on the part of the retail dealers toward urging the consumer to put in his supply at once. This, in view of the increase in prices of other staple commodities due to the war is effecting the movement of retail coal and the trade generally looks for a very active and winter demand.

The market continues quotable on about the same basis as last week as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.10
Egg	5.35	5.10@5.35	5.30	4.95@5.30
Stove	5.35	5.35	5.30	5.30
Chestnut	5.60	5.50@5.60	5.55	5.35@5.55
Pea	3.55	3.45@3.55	3.50	3.20@3.50
Buckwheat	2.80	2.75@2.80	2.50@2.75	2.10@2.75
Rice	2.30	2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.75@1.80	1.75	1.30@1.75

Bituminous—Conditions generally seem to be improving. While the railroad-supply movement shows a falling off as compared with August, there is a notable improvement in the demand from commercial users, though the majority of the coal is moving on contract. Probably it is too early to say what effect the European war will have on general manufacturing business, and there may be no definite de-

velopments along this line for several months, but should there be a largely increased demand for goods manufactured in the United States, the coal business will be benefited.

The cooler weather should bring a larger demand, and the increased exportation of coal is a favorable factor. Reports from the mining regions indicate a more hopeful view on the part of the operators, practically all of whom report more orders for the month of September. While some coal is being offered at tidewater at low figures, the larger operators have made no change in their prices. We continue nominal quotations of last week as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

PHILADELPHIA

Situation about the same as last week although demand is not so marked, and activity in certain sizes has fallen off. Labor Day holiday causes a decrease in output. Bituminous still uncertain, but a better feeling prevails.

Anthracite—The last week of August saw a large influx of orders, with instructions to ship that month or cancel. This was particularly true of the rail business, although the Tidewater trade was also heavy. With most of these orders cleaned up, the market has eased off again, and while there is every indication that it may start up at any time, it is now the indifferent period between the summer dullness and fall activity.

The operations at the mines the past week have had their usual September set back, due to the holiday on Monday. It is understood that most of the mines commenced operations on Wednesday morning, and continued for the balance of the week. Outside of the chestnut and pea sizes, the maket still contirnues to absorb the output. Prices at Tidewater are as follows:

	Circular	Individual
Broken	$4.75	$4.75
Egg	5.00	5.00
Stove	5.00	5.00
Chestnut	5.25	4.90 @ 5.00

Bituminous—There seems to be a much better atmosphere to the bituminous situation. Consignees at Tidewater are complaining that they cannot get the coal when they want it. This applies particularly to the better grades. This undoubtedly indicates that the rail business is improving, and it is confidently expected that the end of the month will find a much better feeling all through, this branch of the trade. The outlook is promising, although there are no definite predictions as to when the improvement will occur. There is considerable tonnage moving, but the prices are not satisfactory. The demand does not seem to warrant any increase in current quotations.

BALTIMORE

Export trade continues to grow but local conditions fail to improve. Slack still farther off color. Prices generally low.

In the face of a growing export trade the domestic situation seems remarkably dull. In some cases, notably with slack, there have been sales below the quotations of last week.

At the export piers it is said that the daily shipment keeps growing. New connections are constantly being made abroad or in South America, and the coal of this country is at last a genuine competitor with the Welsh product. Charters are particularly heavy for the Argentine Republic, and many inquiries are in from that country, which is reported short of fuel.

At the mines of West Virginia, Western Maryland and Western Pennsylvania there are general reports of poor demand. The light call for industries using slack has caused that fuel to touch as low as 50c. and sales five cents off that have been recorded in some cases. Three-quarter gas is selling around 30c. at the mines in West Virginia. Pennsylvania low grade fuels are obtainable as low as 95c. to $1, and medium to best grades are offering at from $1.15 to 1.35.

HAMPTON ROADS

Shipments moving both foreign and coastwise. Inquiries still coming in for large cargoes for export. Dumpings for August amount to 1,108,539 tons.

Dumpings at tidewater for the past week have been heavy, coastwise shipments have shown up well and a large number of cargoes have moved to foreign destinations. Foreign buyers continue to look to Hampton Roads shippers for supplies and inquiries are coming in daily for large cargoes to be shipped to various South American ports; although actual sales are being made, and cargoes moved, it is difficult to ascertain at what price coal was sold. Shipments are also moving to a umber of European ports. It is understood that prices on the export coal range from $2.85 to $3, although only a small part of the coal is being sold at the latter figure.

Cargoes moving foreign during the week went to Elba, Iquique, Kingston, Canal Zone, Rio de Janeiro, Curacao, Port of Spain, Piraeus, Buenos Aires, Chaparro, Genoa, Gibraltar, Para, Cagliari, and Barbadoes. In addition, the U. S. Government has taken one large cargo to be landed at Cavitie or Olongapoo, P. I.

There is a fair accumulation of coal in the various railroad yards with shipments coming in promptly from the mines and unless there should be an exceptionally heavy demand for prompt cargoes shippers at Hampton Roads are well prepared to take care of large orders. The war conditions caused export shipments to increase greatly during August and in consequence dumpings for that month have reached well over a million tons. The dumpings over the Norfolk & Western piers at Lamberts Point amounted to 539,607 tons, from Newport News over the C. & O. Ry. piers 285,053 tons and from Sewalls Point over the Virginian Ry. 283,879 tons or a total for the three pies of 1,108,539 tons.

The Spanish Cruiser "Carlos V" is at present reparing at the U. S. Navy Yard and will take on a supply of bunker here before proceeding on her homeward voyage.

LAKE MARKETS

PITTSBURGH

Demand light all along the line and market unsatisfactory. Prices continue irregular and well below the circular figures. Mining at about 65% of capacity.

Pittsburgh district coal operators have hopes that eventually the war will improve trade, by increasing exports, at least from other districts, but thus far at any rate the influence has been in the opposite direction, exports being light and so many vessels remaining in port that consumption is reduced. The last hopes for an improvement in the Lake trade are now gone and shipments are expected to be relatively light for the remainder of the season, with an early closing of navigation at that. Manufacturing demand keeps up fairly well, but is scarcely as heavy as a fortnight ago, and the retail dealers are not yet stocking up to any extent.

Altogether the position of the coal market is quite unsatisfactory and compares unfavorably with a fortnight ago. Mine operations average about 65% of capacity. Prices continue extremely irregular, both for free coal and upon contracts. For prompt shipment slack is 50@60c. and mine-run is done at only a trifle above a dollar. Circular prices are unchanged, but purely nominal: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Little life to the bituminous trade and not much indication of improvement. War influence and the financial outlook the controlling factors. Anthracite is doing better.

Bituminous—There is difference of opinion as to the state of trade, some finding the demand fairly good, while others report it as poor; the latter class doubtless predominates. One difficulty is with the Canadian trade; Canada is not paying for coal promptly and there is doubt as to the future liabilities. Some shippers are declining to sell to new customers there, on the grounds that if old connections are not satisfactory new ones are not apt to prove so. The situation is not pleasant. There is a general hesitation in every direction. The European war has hurt all branches of business and if it lasts very long there will be no money left in Europe to buy anything with; in addition, it may be many years before the old purchasing power returns.

Anthracite—There is some slacking off of trade early in the month, as usual, on account of extra buying late last month to escape the 10c. advance, but the regular fall trade is now in sight. The improvement in demand is everywhere reported. The independent anthracite dealers claim an almost full trade and at this rate there will soon be the usual fall clamoring for stove and chestnut. The Lake trade is not good for this time of the year. There is now trade enough in the West to relieve the Upper-Lake docks, so that there is room for coal there, but there is complaint that the coal is not coming forward freely, the inference being that the Eastern demand is looking up.

Anthracite shipments by Lake for the week were only 95,000 tons; for the month, 509,620 tons, and for the season, 2,728,355 tons, as against 3,308,821 tons to date last year.

TOLEDO

Domestics in fair demand and prices close to the list. Fine grades in excess supply and difficult to move. Lake shipping heavier than for some time.

The coal situation is looking brighter than for a long time past and dealers are inclined to take an optimistic view. There is a fair demand for domestic coal and prices are close to the list. A strong effort is being made to bring up the price of Hocking lump. Fine coal which formerly brought 70c. is now selling at 25c., and with but little demand. It is believed that there will be a cessation of operations shortly, unless there is an improvement in the price of fine coal.

Pocahontas can no longer be secured at circular prices and the market on lump is now $2.50. The Lake shipping is stronger than it has been for some time and more boats are moving. The coal was well cleaned up here one day last week and there was some real demand, which was, however, quickly supplied. There is as yet no congestion on the railroads. The Pittsburgh No. 8 scale committee has not yet reached a settlement.

COLUMBUS

Lake and domestic trade fairly active but steam business continues slow. The new circulars well maintained. Small sizes very weak.

The best features of the trade during the past week are the strength in the Lake and domestic departments. Both are showing a good tone and future prospects are considered bright. The steam business is slow and there is not much prospects for a betterment in the immediate future.

Fuel requirements for manufacturing are generally small as business is at a low ebb. Many factories are closed down and others are being operated with a curtailed force of men. Consequently they are not buying steam coal is as large quantities as formerly. Most of the steam contracts which have been closed are at fairly profitable figures. In the railroad-fuel business, practically all of the larger contracts are still to be let.

Lake trade is still active, although the Toledo docks of the Hocking Valley Ry. did not show up as good last week as in previous weeks. The demand from the Northwest is still good and docks at the Upper Lake ports are generally in good shape. An interior movement from the docks has started. It is predicted that there will be activity in the Lake trade up to the closing of navigaion.

Prices in the Ohio fields are:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Rescreened lump	$1.70		$1.75	
1¼ inch	1.60		1.60	$1.60
¾-inch	1.45	$1.20	1.45	1.45
Nut	1.15		1.50	1.15
Mine-run	1.20	1.05	1.15	1.15
Nut, pea and slack	0.35		0.45	0.35
Coarse slack	0.25	0.35	0.35	0.25

CLEVELAND

Retail trade brisk, but other demands are comparatively light. Markets flooded and prices have been forced lower. Lake movement light.

The coal trade is much the same as it was a week ago. The low prices at which operators have disposed of their products have forced quotations lower, but the demand has not increased. With most plants shut down last Sunday and Monday, there was no great demand over the week end. Another reason for the excess supply of coal is the meager Lake shipments. So many of the docks are not taking their usual quota of coal that operators have flooded the other markets to keep their mines going.

The condition of the market is well illustrated by the following quotations:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.85				
Lump, 6 in.			$2.50		
Egg	3.85				
Egg, 6 in.			2.10		
Lump, 1¼ in.		2.50	2.20		
Lump, ¾ in.		2.25	2.15	2.05	2.05
Mine run	2.75	2.15	1.95	1.90	1.95
Slack	2.55	1.60	1.60	1.60	1.55

CINCINNATI

Domestic and steam business dull. Labor and transportation facilities are plentiful. Some foreign demand.

The closing down of some large manufacturing plants has resulted in a worse situation locally. Other plants are running on short time, and the net result is that the steam market is slower. Small domestic consumers are waiting until an actual need for fuel arises, because of lack of money with which to buy other necessities. An optimistic view is still maintained.

Dealers are not buying to any extent just now, and the movement has been reduced to practically nothing, although there is still some coal going to the Northern and Northwestern markets by all-rail routes. There are plenty of cars offered, and men are in good supply.

COKE

CONNELLSVILLE

Coke market absolutely stagnant. Consumption promises some decrease, but production and shipments unchanged thus far. Prices not quotably changed, but probably largely nominal.

The market has been completely stagnant since last report, but this represents no material change. Four merchant furnaces, depending upon the Connellsville region for coke are just blowing out and shipments of coke have already been discontinued. One, however, will blow in late this week. Consumption by the steel interests is unchanged since they are keeping their furnaces in blast even though steel production has been slightly reduced. News has just come out of a transaction made quietly three weeks ago, a valley interest buying coke for September and October shipment to two furnaces, involving about 25,000 tons altogether, the price being $1.75. Possibly this figure could now be shaded. Market quotations are approximately as follows, though largely nominal: Prompt furnace, $1.70@1.75; contract furnace, $1.75@1.90; prompt foundry, $2.25@2.35; contract foundry, $2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Aug. 29 at 25,683 tons, an increase of 18 tons, and shipments at 273,397 tons, an increase of 9284 tons. Shipments have been exceeding production for several weeks past, reducing the amount carried in stock.

BUFFALO

There is no stir in coke, as the furnaces are all running about as slow as ever, but some dealers find a slight shortage of stock coke and are quoting a few cents more. Local receipts of iron ore are good and stock piles are not unusually large. Quotations are on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

BIRMINGHAM

The coke market shows very little change over last week, but present indications are that it will shortly improve.

SOUTHERN

BIRMINGHAM

Market seems stronger than for some time. Negotiations on the South American order still under way.

While the local demand for steam coal is about the same as last week, the war has brought out heavy orders for bunker fuel at all Southern ports. One of the large operators is shipping about 1000 tons per day through the port of Pensacola for bunker purposes, and the demand at both Mobile and New Orleans has increased.

The South American business has not yet been definitely placed, due to the fact that conditions pertaining to bottoms and finances have not yet been completed; they are reported well under way, however, and it is hoped that arrangements can be completed within a short time. Some of the large operators have accepted orders subject to these arrangements being made.

Lump coal seems to be in better demand and September business promises to be much larger than August. Blacksmith coal is in a satisfactory condition with prices remaining firm. Pig iron manufacturers report many small sales with prices the same as last week.

LOUISVILLE

Trade marking time. Domestics fair but steam grades heavy. Large inquiry from Brazil.

The Kentucky trade is marking time. Prices quoted the first of the month run only to the fifteenth, and are subject to change at that time. The domestic market continues the most active, with some improvement in the industrial section of the market, though not as much as could be wished.

Prices, f.o.b. mines, are: $1.75 for block, $1.42 for 2x4 round and from 75 to 85c. for the best grades of nut and slack. Low-grade steam sizes are more or less a drug on the market.

MIDDLE WESTERN

INDIANAPOLIS

Improvement in the demand for domestic grades continues. Extra supply of screenings has caused the price to slump to 40c. Better buying of steam grades while cars are plentiful. Mines on better running schedules.

The collapse in the price of slack is the feature of the Indiana market. Two weeks ago this was in strong demand at 90c. to $1 a ton at the mines but now it is said there are offerings at less than that range, though there are also sales up to 70c. The slump is the result of the better movement of domestic grades and the consequent increase in the supply of screenings.

Good domestic coal is selling at $1.75; the best grade of mine-run at $1.20 for No. 4 and $1.10 for No. 5. There is also a slightly improved demand for steam coal, due probably to the desire of the plants to accumulate a coal pile before the season when the car shortage develops. There are plenty of cars available at present. The mines are making better time as a result of the demand for lump coal. Some of the large mines are on full time and operations over the state generally are considerably better than half-time. Retailers have made no advance in September prices yet.

CHICAGO

Steam trade light while demands for domestic coal are unusually heavy. Indiana operators also report a strong demand for domestic sizes. Prices for screenings continue to decline.

The domestic trade is unusually heavy but the steam trade is equally light. With the advent of cooler weather buying of coal for domestic purposes has taken on its customary activity and dealers report a satisfactory business.

The price for screenings has been on a decline for several weeks, 35c. a ton at the mines being a common figure. A considerable improvement has been noted in the demand for anthracite coal. The circular price on Hocking and splint has advanced 10c. a ton to $1.60. The smokeless situation remains about the same.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.22	$2.55@2.80	$2.27	
Steam lump	1.87@1.92		1.97	
Egg		2.15@2.25		$3.30@3.45
Mine run	1.87	2.55@2.80	1.87	4.05@4.30
Screenings	1.12@1.17	1.45@1.55	1.12@1.17	

Quotations for Harrisburg coal are: Domestic lump and egg, $2.55@2.80; steam lump, $2.15@2.20; mine run, $2.15@2.25; screenings, $1.45@1.55; No. 1 nut, $2.55@2.80; No. 2 nut, $2.40.

Carterville prices are: Lump and egg, $2.55@2.80; No. 1 washed, $2.80; No. 2 washed, $2.35@2.40.

ST. LOUIS

Market erratic and uncertain, but generally weak, particularly as regards the steam grades.

There is a somewhat uncertain tone to the market, occasioned principally by the fact that in the past two weeks the demand for high-grade 6-in. lump coal has exceeded the supply. This caused the market to advance to $1.75@2, as compared with $1.35@1.60 a few days previous. The high prices stopped the buying, and this sudden curtailment in the production of lump and egg was the only thing that saved the steam market from utter ruin. The result is that the past few weeks, prices for lump and egg have been a trifle unsteady, while the demand for No. 1 washed has picked up, though all the other sizes of washed coal have gone down. Screenings are also weak and are dropping.

This pertains to the coals from the Williamson and Franklin County fields. Indications are, however, that the market on these grades will continue to be good, although steam sizes may drop to a lower figure than in past years, on account of the depression in manufacturing circles.

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	....	....	$1.05	$0.90@1.00	$0.90@1.00
3-in. lump	....	....	1.30	....	....
6-in. lump	$1.65@1.85	....	1.40	1.10@1.20	1.15@1.25
Lump and egg	1.85@2.15	$2.25	....	....	1.15
No. 1 nut	1.25@1.50	....	....	....	....
Screenings	0.70@0.75	....	0.80@0.85	0.30@0.35	0.30@0.35
Mine-run	1.00@1.15	....	....	0.75@0.80	....
No. 1 washed nut	1.50@1.60	2.25	1.50	....	....
No. 2 washed nut	1.25@1.35	....	1.35	....	....
No. 3 washed nut	1.10@1.15	....	....	....	....
No. 4 washed nut	1.00@1.05	....	....	....	....
No. 5 washed nut	0.25@0.30	....	....	....	....

KANSAS CITY

Retail trade slightly better. Prices did not advance as usual on Sept. 1. Situation unsettled.

Cooler weather was a factor in larger retail trade. Prices did not advance Sept. 1; there was a general feeling, however, that the advance will occur Sept. 15. It is very generally expected among Kansas City wholesalers that prices will be raised 25c. a month during the interval between the middle of September and December, and some say this will continue to February.

Steam and slack coal are irregular; high-grade Missouri block coal is ten cents higher at $2.10. There has been a good market here for Illinois coal. The settlement of the strike in the Kansas field promises more liberal and steady supplies.

PORTLAND

Supplies light and regular circular has been advanced. Some mines closed down.

Utah and Wyoming coals advanced 50c. Sept. 1 and are now selling at $10 for lump and $9.50 egg, retail, with no reduction on larger than three-ton lots. Dealers say that the supply on hand is exceedingly light and that the advance is fully justified by conditions.

Some of the mines are shut down, among them being the big Carbon Hill mine and the MacKay and Hyde mines.

No coal is reported coming here from Australia this season and whether any will come from the Atlantic Coast by way of the Panama Canal has not been ascertained yet.

FOREIGN MARKETS

ENGLAND

Prices irregular and production heavily restricted. High water freights and heavy war insurance charges complicate the situation.

The London coal trade is moving very quietly this week. Best coals maintain their prices, but all second qualtities are difficult to sell. Fortunately the supplies are limited through the dislocation of the railway traffic and short time at the collieries, or the depots would become congested. Prices are very irregular. The shipping trade is weak.

Now that the bond and embargo on the exportation of coal have disappeared, the coal trade at the exporting centers is gradually recovering from the stagnant position in which it has remained since the outbreak of the war. There are still many difficulties, however, which continue to restrict trade, and among these those of high freight and war insurance risks rates and of finance may be mentioned as the more important.

On the whole the demand has been healthier during the past week, and altogether the outlook has improved. Although the Wear market is still greatly disturbed, the situation is more promising. At Cardiff the withdrawal of the triple bond has served as a great stimulant to the outward market, though the home demand has fallen off somewhat. In the Midlands business is quiet, especially in Lancashire.

A deputation of trade unions laid certain proposals before the Prime Minister for alleviating the financial effect of the war upon unions.

A special conference of the South Wales Miners' Federation is to be held to consider means for alleviating the distress caused by the restriction of employment at some of the collieries.—"The Colliery Guardian."

ITALY

There are no manufacturers of importance at Brindisi, and the coal imported from the United Kingdom and United States is mainly used for bunkering, the manufacture of patent fuel, and by the railway. In 1913, 153,884 tons of coal were imported. At Bari 105,398 tons were imported, at Barletta 52,079 tons, and at Taranto 70,653 tons.

According to the Corrier d'Italia, a report on the quantities of coal existing in the harbours of Genoa, Savona, Naples, and other important stations on the Italian seaboard, was demanded by the Council of Ministers on Thursday last, and the next day Commissioners commenced an inspection, with a view to giving the required information. The British coal export trade having been seriously injured by the outbreak of hostilities, especially as large quantities of British coal used to be taken by Germany, it is suggested that the moment is now a propitious one for arranging a considerable export of coal to Italy. The managing board of the Italian State Railways is, our contemporary learns, prepared to place very large orders for coal in Great Britain, as well as in America. —"The Colliery Guardian."

COAL AGE

Vol. 6 NEW YORK, SEPTEMBER 19, 1914 No. 12

There are mines in almost every coal field of the United States where the men are working a seam that carries bands of impurities which must be separated from the coal to make it marketable.

In any given district, these bands of impurities are fairly uniform in number as well as in thickness and composition, but in comparing different fields, every conceivable variation is encountered. Often the question of whether a certain seam of coal can be worked profitably, hinges entirely on the possibility and cost of eliminating the slate and bone.

There are three possible methods for handling such impurities—1. Separating the refuse and the coal inside the mine while loading the mine cars. 2. Loading the entire seam just as it comes (coal and bands of impurities), and then depending on mechanical means such as washeries and picking belts to eliminate the waste rock at the tipple. 3. A combination of 1 and 2.

The last method is the one generally adopted.

At all mines where either the first or last plan is in vogue, some system of inspection has to be employed to check the work of the loaders. In connection with such inspection a system of dockage is enforced to punish all offenders who load more than the maximum allowable quantity of refuse, and in extreme cases the guilty ones are discharged. Just now with miners plentiful and orders scarce the "slate bosses" are rarely questioned when they turn in discharges.

In many camps the earnings of the miners as well as the dividends of the operating company are largely dependent on the method of enforcing the dockage system. For example, if the character of the coal seam is such that the miners can just make a living at best, they are liable to take chances occasionally and load more rock than they should, hoping that the inspector won't happen to pick the outlawed car. As a result when the miner does get caught, he is either fined so heavily that his earnings for the month are reduced below the possible living minimum or he is discharged.

The operating company is also a heavy loser, because the average quantity of impurities in the "mine-run" is increased and the constant changing of miners is costly.

Much of this trouble can be eliminated by employing inspectors to watch the loading of the coal at the working face. These inspectors give the miners to understand that the company does not want to dock them and should have no need for docking them; they instruct the miners as to the best method of shooting and loading the coal and whenever necessary load a part of a car just to show the worker that it can be done. Four or five inspectors can cover a pretty large mine if they are conscientious and manage to visit every working place several times each week.

The miner is thus made to realize that he can earn just as much by following instructions as he could under any other plan, and he can save the energy formerly wasted in topping cars of dirty coal, besides he can keep a clear conscience and relieve his family of the constant fear of his discharge.

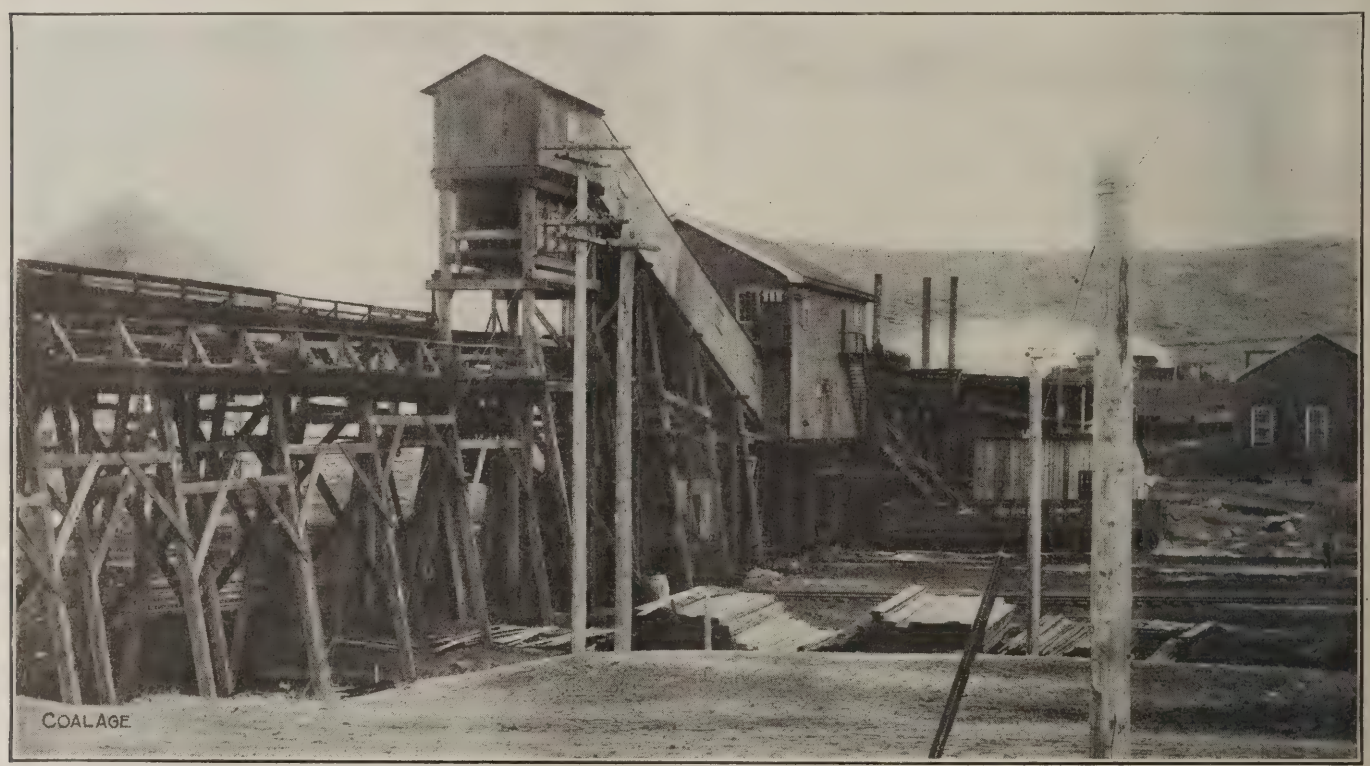
A clear conscience is a pretty good taskmaster; help the miner to keep it awake.

The Electrification of the Cottonwood Coal Co.'s Mines

By Cornelius Webber*

SYNOPSIS—A thorough investigation of conditions led to the belief that electric operation would be cheaper than steam. Records kept after electrification was completed verified the soundness of this conclusion.

After a thorough investigation covering operating expenses and the various advantages to be gained by changing from steam to electrical operation, the Cottonwood Coal Co., of Stockett, Mont., installed the latter system and commenced operation with the new equipment in November, 1912.



General View of a Tipple

At the time the electrification was completed the company was operating three mines, Nos. 5, 6 and 7.

Number 5 mine is located about one mile northwest of Stockett, No. 6 mine about two miles southeast and No. 7 mine about 4½ miles northwest.

Originally these three mines were operated by steam driven air-compressor plants, Nos. 5 and 6 mines having been operated from an installation common to both. The latter plant, as well as the haulage and crusher equipment, was located in the town and between the mines.

No. 7 mine was provided with a separate steam-driven compressed-air plant and the coal was loaded from a separate tipple.

Compressed-air coal punchers, drills, pumps and hoisting engines were used in all mines, a steam-driven rope-haulage system transported the coal from Nos. 5 and 6 mines and separate steam-driven ventilating fans supplied fresh air. The crusher plant, slack-coal conveyor, box-car loader, rock hoist, sawmill and machine shop were all operated by steam engines.

The comparatively low cost of electrical energy and the elimination of many high-priced men were in a great measure responsible for the electrification. The old air compressor plant, at Stockett, was abandoned, and a new motor-driven plant provided. The steam haulage machinery was retained, while motors were substituted for steam engines in the crusher plant, box-car loader, sawmill and slack-coal conveyor. Electric lines were extended to mines Nos. 5 and 6, for operating the old steam-driven fans and motors.

With the present arrangement 3-phase 60-cycle current is purchased from the Great Falls Power Co., and enters the substation in Stockett at 50,000 volts. After passing through suitable high-tension switching apparatus it is stepped down by means of three 1200-kv.-a. water-cooled transformers to 2200 volts.

Two 500-hp., 2200-volt, 3-phase, 450-r.p.m. induction motors with external starting resistance and two belt-driven Ladlow-Dunn-Gordon, two-stage, 24x29-in. (low-pressure cylinder) 110-r.p.m. air compressors are installed in the same building, the pipe line being connected to the old air mains.

One 2200-volt, 3-phase line runs to No. 5 mine and another to No. 6. At each of these two plants the current is stepped down to 220 volts. A 35-hp. induction motor at No. 6, and one 35-hp. and one 10-hp. induction motor at No. 5 mine operate the ventilating fans.

*Electrical engineer, Cottonwood Coal Co., Stockett, Mont.

The current is also stepped down for operating the sawmill the slack-coal conveyor, a 30-hp. motor and for the company lights.

The crusher plant is located near the No. 5 mine 2200-volt line, which is tapped to supply a 75-hp., 2200-volt induction motor and a 2200- to 440-volt, 3-phase transformer, which supplies a 50-hp. box-car loader and a 10-hp. rock conveyor motor. A 2200-volt primary lighting distributing circuit supplies the town.

At No. 7 mine the steam-driven compressed-air and ventilating plants were entirely abandoned and electrical coal-punching machines, drills, pumps, fan and hoist motor, together with an electric-locomotive haulage system were installed.

The current comes in at 2200 volts, 3-phase from a substation at Sand Coulee, one and one-half miles away, and operates a 200-hp. induction motor, direct-connected to a 125-kw., 250-volt, direct current generator, which supplies the electric locomotive.

A branch 2200-volt circuit feeds two 50-kv.-a., 3-phase, 2200- to 440-volt transformers, the latter supplying a 35-hp. fan motor, a 35-hp. hoist motor, a 7½-hp. and a 10-hp. pump motor, besides two 5-hp. drills and six 7½-hp. coal punchers.

Lighting service is furnished by a separate transformer at 110 volts secondary, and a forge blower in the blacksmith shop operates from the same mains.

Meters have been installed at various points and accurate account was kept of the operation. The figures below show the average consumption of current per month during the first year and a comparison between direct application of electrical power and indirect application through electrically operated air compressors.

NUMBERS 5 AND 6 MINES

Average number of working days per month..... 20

Average Kilowatt-Hour Consumption of Electrical Energy, per Month

Compressors	Crusher Plant	Mine No. 5 Fan	Mine No. 6 Fan	Slack Coal Conveyor	Lighting
228,000	3750	8970	4500	820	1650

Total, 247,690.

Average tonnage produced per month..... 30,300

Average Kilowatt-Hour Consumption per Ton Produced

Compressed Air	Crushing	Ventilation	Miscellaneous	Total
7.52	0.123	0.444	0.08	8.168

Average number of pounds of coal consumed per ton produced previous to electrification.....	114.4
Average number of pounds of coal consumed per ton produced after electrification.....	27.2
Percentage cost of power-plant labor after electrification to cost of same item before electrification..	60.6

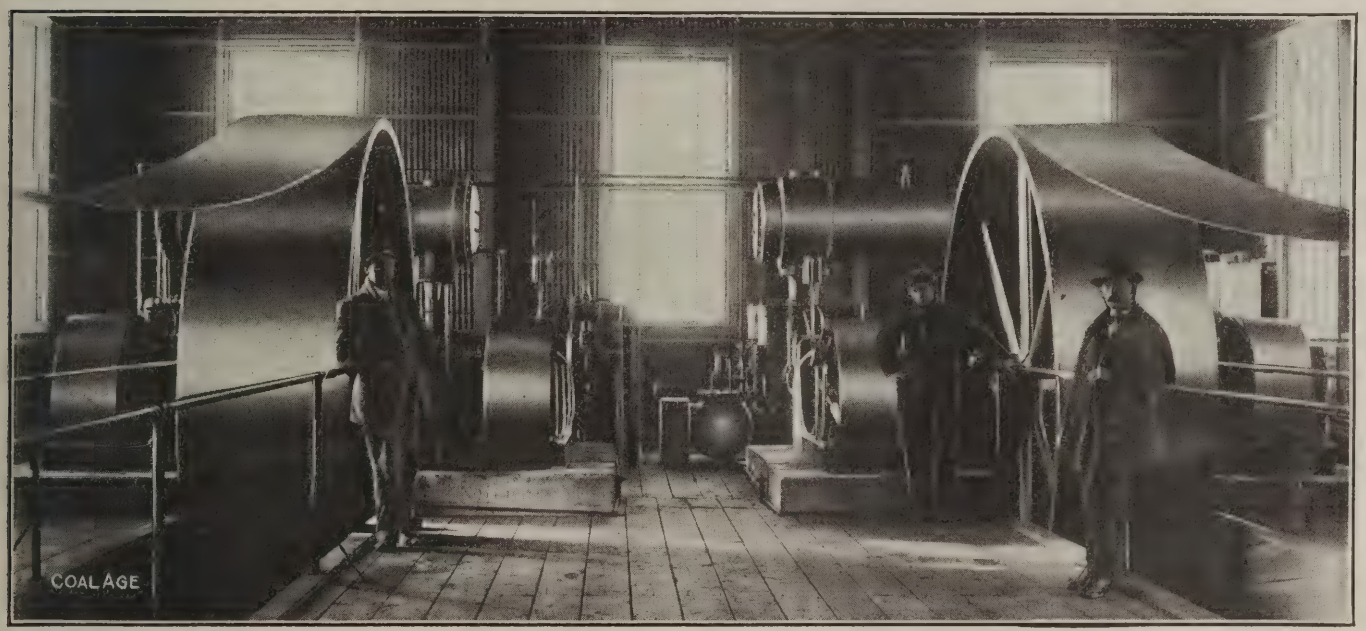
No. 7 Mine (Month of August, 1913)

Number of tons of coal produced.....	4,444.3
Number of kilowatt-hours consumed, mining machines, drills, pumps and electric hoist combined..	3,290
Ventilating fan.....	1,675
Haulage system.....	5,725
Total	10,680

Kilowatt-Hours Consumed per Ton Produced

Mining machines, drills, pumps and hoist.....	0.718
Ventilation	0.377
Haulage	1.29
Total	2.385

It is apparent that direct application of electrical power at the machines brings about great economy of current consumption. Furthermore, the plant at No. 7 mine requires no station operator, the motormen and blacksmith being selected to oil and operate the apparatus.



COMPRESSOR ROOM, SHOWING THE TWO BELT-DRIVEN UNITS

No. 7 mine produces coal on a much smaller scale than either No. 5 or No. 6, and has the consumption of current for haulage taken into consideration, whereas Nos. 5 and 6 require extra coal and the services of haulage engineers.

It seems, however, that the average machine man cuts less coal per day with an electric puncher than with an air puncher, owing to the fact that the former has only one speed of operation. The economy of energy, however, offsets this loss unless current sells at an extremely low price.

The electric drills in use at present give little trouble, but are rather heavy for fast work. A good electric drill that would penetrate sulphur balls without breaking the steel and that would not exceed an air drill in weight would be a boon to the coal miner and operator in places where sulphur balls are encountered and would greatly facilitate electric mining.

Development of the Jenkins-McRoberts District of Kentucky

By W. B. Webb*

SYNOPSIS—In spite of many obstacles in the way of transportation facilities, Jenkins and McRoberts in the Elkhorn field of Kentucky have risen from a wilderness to thriving and prosperous communities in less than three years.

One of the largest coal mining plants in this country is that of the Consolidation Coal Co. in the Elkhorn field of eastern Kentucky. Three years ago, eastern Kentucky, particularly the Elkhorn field was practically unknown. About that time the above mentioned company purchased approximately 100,000 acres lying largely in Letcher County along the tributaries of the Kentucky and Big Sandy Rivers.



The Surface Plant at No. 201 Mine

Development work was immediately undertaken in and about Jenkins. The nearest railroad upon one side was 100 miles away, and on the other, about 35 miles with rough country lying between. The Lexington and Eastern R.R. owned by the Louisville & Nashville system built an extension from Jackson south into the head waters of the North Fork of the Kentucky River, approximately 103 miles in length. On the other side the Chesapeake & Ohio constructed a branch along the Big Sandy River. The Baltimore & Ohio also constructed a branch road from Shelby Station, in Pike County, a distance of about 32 miles.

As soon as the railroad construction was well under way the building of McRoberts, which was to be its terminus, was commenced. Mills were installed in the forest, in which was manufactured the lumber necessary for the building of the miners' houses and other structures. A brick plant was also established, likewise a power plant of 10,000-kw. capacity. This latter supplies McRoberts, Dunham, Burdine and other nearby mining towns, besides half a dozen or more substations. This plant is now said to be the largest south of Mason's and Dixon's line.

This power plant furnishes power to the Elkhorn Mining Corporation, the Elkhorn Fuel Co., the Milwaukee Gas & Coal Co., and the Beaver Creek Coal Co., at Weeksbury and Wayland, some 30 miles distant, while lines are now being built into Van Lear, almost 70 miles away.

All the new towns of this company, including Jenkins, McRoberts, Durham and Burdine were remarkably rapid in their growth, especially when one considers the rough topography of the country, and the poor roadways over which it was necessary to haul much of the material and equipment. Thus practically all of the machinery entering into the power plant had to be transported over the mountains by wagon.

Only a portion of the acreage of the Consolidation Coal Co. is being developed by that firm itself, the balance being subleased to other operators. This company also has plants in the Somerset section of Pennsylvania, the Fairmount region of West Virginia, the George's Creek big vein region of Maryland, and some extensive operations in the Miller's Creek section of Johnson County, Kentucky.

The Nicola Building Co., of Pittsburgh, Penn., built Jenkins and the other towns for this firm on contract, putting up 1600 houses in Jenkins alone, all of which were modern structures plastered inside. There were also many other buildings, houses, offices, stores, Y. M. C. A.'s, churches, school buildings, etc. There were also a bakery, ice plant and other structures, costing all the way from $25,000 to $70,000 each to be built, all of which work, as well as road building, was carried on by the Nicola company, with promptness and dispatch.

One of the principal ideas kept in mind by the Consolidation company in the development of this property

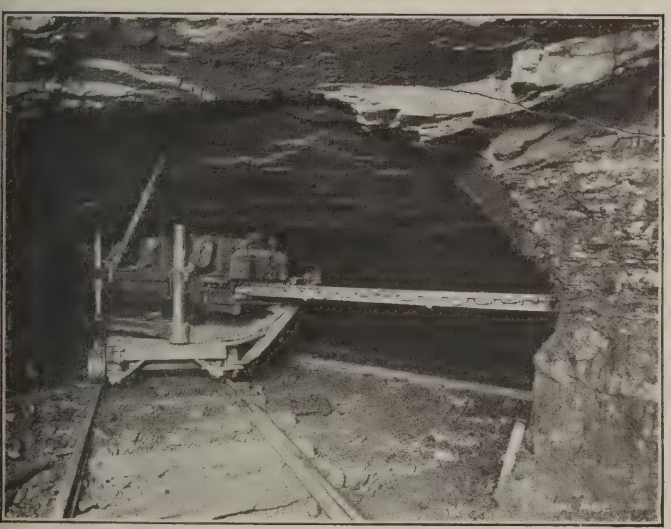
*Sergent, Ky.



Tipple for Mines Nos. 207 and 208



Power Plant of 10,000-Kw. Capacity at Jenkins



Type of Mining Machine Used

was the interests of its employees. Almost as soon as any work was started at all, a Y. M. C. A. headquarters was established. This temporary beginning was later enlarged and finally a creditable permanent Y. M. C. A has been built. The mines of this section begin at No. 201 and go to 207. No. 201 is located at Burdine, 202 is between that point and Jenkins, while Nos. 203, 204 and 205 are located at the latter point. Nos. 206 and 207 are at Dunham, on the headwaters of Elkhorn Creek.

At McRoberts, the mines are Nos. 211, 212, 213, 214 and 215, while the same coal bed is worked as that at Jenkins. This seam is about 12 ft. thick, with thin slate partings. The roof is said to be perfectly safe, and thus far there have been no fatalities from falling slate.

At the present time, coal orders are coming in at an unusual rate, and increases in operating force are contemplated. At present about 160 cars, or approximately 7000 tons are mined per day. By the end of the year it is hoped that this amount may be doubled. This is believed quite possible, depending only on market conditions.

There are now something over 2000 men employed at the mines in Jenkins and McRoberts, exclusive of the office force, which comprises about 100 men and which will, of course, be increased as mining progresses.

Jenkins today has a telegraph and telephone system, electric lights, water-works, a national bank, a bakery, dairy, ice plant, a weekly newspaper, a city hospital, supply and machine shops, schools, churches, Y. M. C. A.;



A Street in Jenkins



The Jenkins Post Office, Y. M. C. A. and Drug Store

in fact, almost everything which goes to make up a live, wide-awake city. Miners and others coming to Jenkins can educate their children as easily as they can in the large cities, since there is a large central school in a $30,000 building and five division schools, all supplied with competent teachers.

Rents in both Jenkins and McRoberts are reasonably low, and every inducement is given to tenants to save money for the proverbial rainy day. Hundreds of men are taking advantage of this, but there is here, as elsewhere, a shiftless, happy-go-lucky class, such as often frequents mining towns. These people are constantly on the move and do little good anywhere. It is believed, however, that there are inducements here that cannot be found in any other mining community in the country.

We are indebted to William J. Flaherty, who kindly assisted in securing the photographs here presented, as well as the descriptive matter. Mr. Flaherty, who is one of the congenial office men, came to Jenkins when the first developments were started, and has consequently had an opportunity of seeing the town grow from a wilderness to its present status.

Texas Breaks Coal Records

The State of Texas mined in 1913, 2,429,144 short tons of coal, valued at $4,288,920, according to E. W. Parker, of the U. S. Geological Survey. This production was almost evenly divided between lignite and bituminous coal, with the balance slightly in favor of the latter.

Both classes of fuel showed increases in production, and both made their record output. The total production in 1913 exceeded that of the previous year by 240,532 short tons, or 11 per cent. in quantity, and by $633,176 or 17 per cent. in value. Most of the increase in tonnage was derived from the lignite mines, whose output showed a gain of 190,451 tons, the production of bituminous coal increasing 7081 tons. In point of value, however, the advantage was as much in favor of the bituminous coal as the gain in quantity favored the lignite. The value of lignite increased $123,971, while that of the bituminous product increased $409,205.

The coal beds of Texas belong to three distinct geologic systems—the Carboniferous, Cretaceous and Tertiary. The Carboniferous coals are found in the north-central part of the state, the principal mining operations being in Eastland, Palo Pinto, Erath, Wise and Young Counties. The Cretaceous coals occur near the southern part of the state, and are mined chiefly near Eagle Pass, in Maverick County. The coals of this district which extends into New Mexico and are mined extensively at El Fenix near Sabinas and at Esperanvas, are classed as bituminous coals, and in the southern portion of New Mexico make a fair grade of coke.

The lignite beds are of enormous extent and occur in a wide belt, which stretches from the Sabine on the north-east of the Rio Grande in the southwest. Like the Cretaceous coals these seem to improve in quality to the southwest, and near Laredo, in Webb County, the lignite is changed to a higher-grade coal approaching cannel in character and classified as bituminous. The principal lignite operations have been carried on in Anderson, Bastrop, Fayette, Henderson, Hopkins, Houston, Lee, Leon, Medina, Milan, Rains, Robertson, Shelby, Titus, Van Zandt and Wood Counties.

The development of the lignite resources of Texas began in the closing decade of the 19th Century and except for a temporary setback in 1902 and 1903, after the discovery of petroleum, has progressed steadily with the development and growth in population. Lignite is found to be an excellent fuel for the gas producer and the vast resources of Texas in this regard possess great potentialities for the future.

The first record of the production of bituminous coal in Texas is contained in the volume of mineral resources of the United States in 1884, which states that the quantity mined in that year was 125,000 tons. The total production of lignite and bituminous coal in 1913 was about 20 times the output of 1884.

Government Aids Coal Exporters

With a view to aiding the coal operators of the United States to expand their markets at a time when the exporters of other coal-producing nations are inactive, the Bureau of Mines has issued a bulletin describing the various coals of the country which are best available for foreign shipment. The bulletin, which is printed in Spanish, Portuguese and English, will be given special distribution among the large coal users and importers of South and Central America. That this important field is as yet slightly developed as a market for United States coals is shown by the statistics of coal exports. Of 16,083,101 tons of coal exported during 1913, but 450,000 tons went to South America. Canada was the best customer, taking 11,500,000 tons.

The bulletin lists as available for this promising export trade seven groups of coal fields. These are the Pocahontas and New River coals of West Virginia, with Norfolk and Newport News as shipping ports; the Maryland and eastern Pennsylvania coals, to go through Baltimore or Philadelphia; the Virginia, Kentucky and Tennessee coals, through Hampton Roads or Charleston; the Alabama coals, through Mobile or New Orleans; the western Pennsylvania coals, through New Orleans; the Illinois and Indiana coals, through New Orleans; and the Washington coals, through Seattle. The bulletin gives in detail the general characteristics of the various coals, and points out which are the best adapted to railroad use, manufacturing, gas-making or coke-making. Average analyses are given, and the heating values are expressed in British thermal units and in calories.

"Coals of excellent physical character and of high heating value are available for export," states the bulletin. "For this reason and because of the modern facilities at the collieries for properly grading large shipments, the American producers can export coals suitable for any kind of service. The transportation systems from the mines to tidewater and the coal-handling equipment for loading boats at the various ports are highly developed so that producers are able to give excellent service to foreign buyers. Enormous quantities of these coals have been used by railroads, manufacturing plants and seagoing vessels, and for household purposes. Much of the coal available for export is superior to that heretofore supplied to foreign users from other

Geology and Location of the Coal Fields of Pennsylvania

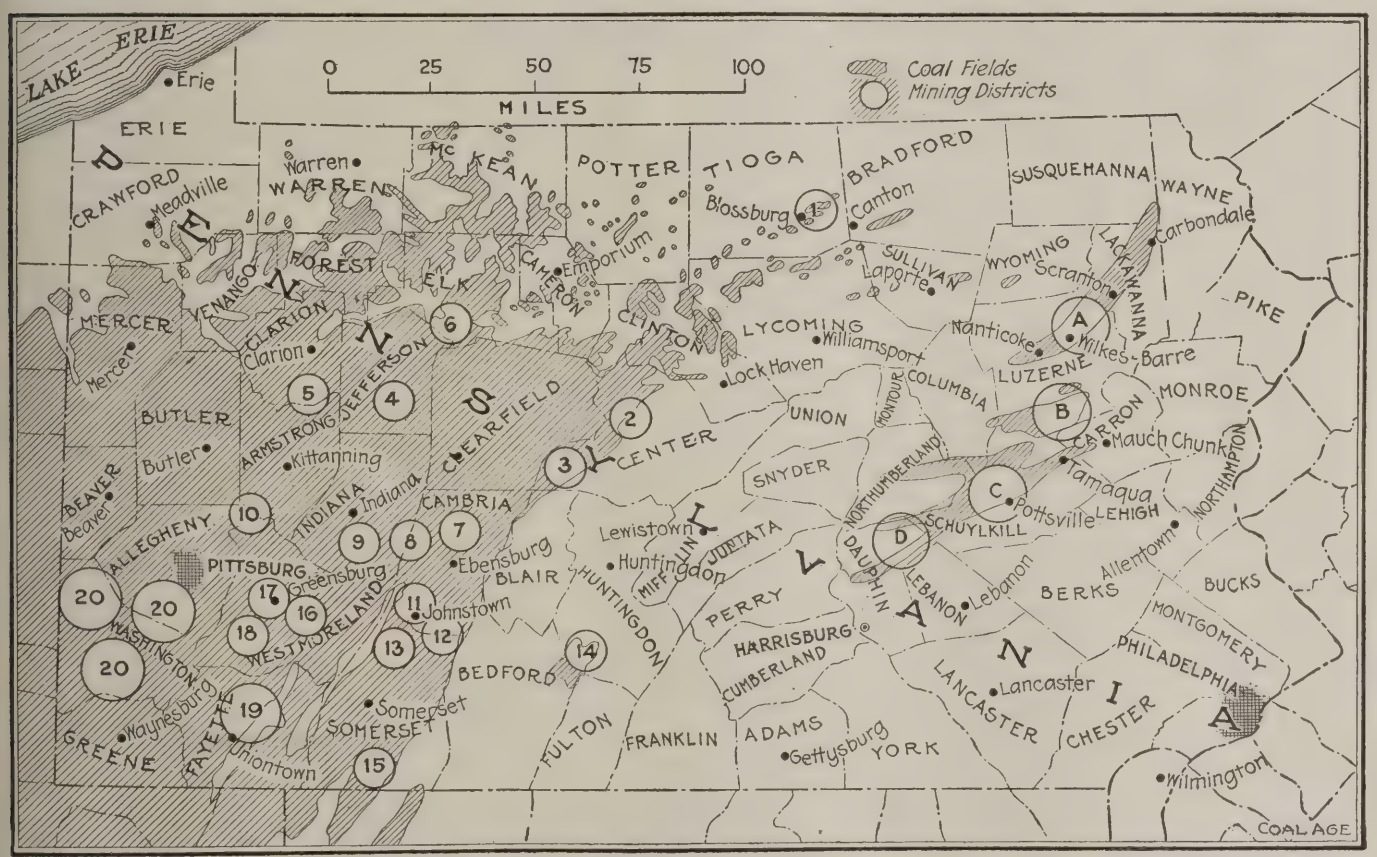
By J. S. Burrows*

SYNOPSIS—A geological classification of all the Pennsylvania coals with comments on their commercial importance. Also map showing location of the different fields. The uses to which the various coals are generally confined together with the railroads draining the districts are noted.

The accompanying tables and map covering the bituminous coal fields of Pennsylvania have been compiled with the object of providing, for convenient reference, a key to the coals of that state. While all of the best authorities have been consulted in preparing these data, the tables have been purposely limited in scope to the essential facts relative to the correlation, location and commercial importance of the coal beds.

Pennsylvania was the first state to have a systematic gelogical survey of its coal fields, the data obtained in the original survey having been augmented by later investigations of both the state and national government; as a result the distribution and correlation of the coals are considered to be accurately determined.

*Fuel expert, Castner, Curran & Bullitt, Inc., Norfolk, Va.



Coal Areas of Pennsylvania and Location of the Different Districts

MAP NO.	NAME OF DISTRICT	RAILROADS	BITUMINOUS DISTRICTS KIND OF COAL	PRINCIPAL USES OF COAL	Index Nos. Important coal beds
1	Blossburg	Erie-NYCRR	Semi-bituminous (c) (low volatile)	Smithing	3-4-6
2	Snowshoe	PRR	Semi-bituminous (low volatile)	Smithing and steam	6-8-9
3	Clearfield	PRR-NYCRR	Semi-bituminous (low volatile)	Steam, bunker, railway and coke	6-8-9
4	Reynoldsville	BR&PRR-PRR	Bituminous (d) (medium volatile)	Steam and railway	6-9
5	Low Grade Division	PRR	Bituminous and cannel (c) (high volatile)	Steam, railway and domestic	6-8-9
6	Shawmut	PS&N	Bituminous (high volatile)	Railway, steam and domestic	5-6-9-10
7	Cambria	PRR NYCRR	Semi-bituminous (low volatile)	Steam, bunker and coke	6-8-9-10
8	Two Lick	PRR (a)	Semi-bituminous (low volatile)	Steam, bunker and coke	6-8-9-10
9	Indiana	PRR	Bituminous (high and medium volatile)	Coke and steam	6-8-9-10
10	Alleghany River	PRR	Bituminous (high volatile)	Steam and domestic	6-8-9-10
11	Johnstown	PRR	Semi-bituminous (low volatile)	Steam and coke	6-8-9-10
12	Southfork Windber	PRR	Semi-bituminous (low volatile)	Bunker and steam	6-8-9-10
13	Quemahoning	B&ORR	Semi-bituminous (low volatile)	Steam	6-8
14	Broadtop	PRR (b)	Semi-bituminous (low volatile)	Steam and coke	3-4-6-10-11
15	Meyersdale	B&ORR	Semi-bituminous (low volatile)	Steam	10-13½-14-16
16	Latrobe	PRR	Bituminous (high volatile)	Coke, steam and railway	16
17	Greensburg	PRR	Bituminous (high volatile)	Coke, steam and railway	16
18	Youghiogheny	PRR	Bituminous (high volatile)	Illuminating gas, coke and steam	16
19	Connellsville	PRR-B&ORR	Bituminous (high volatile)	Coke	16
20	Pittsburgh	PRR&B&ORR	Bituminous (high volatile)	Steam, railway, coke and domestic	16-18

ANTHRACITE REGIONS

A. Wyoming B. Lehigh C. Schuylkill D. Lykens Valley

Notes—(a) Cherrytree and Dixonville Ry. (b) Huntington & Broadtop RR. (c) Low volatile—12 to 22% volatile matter. (d) Medium volatile—22% to 30% volatile matter. (e) High volatile—over 30% volatile matter.

The Bituminous Coals of Pennsylvania

Index Number	Series	FORMATIONS	NAMES OF COAL BEDS	LOCAL NAMES OF COALS	COMMERCIAL IMPORTANCE
26	Permian (Dunkard)	Greene	Ninevah		Commercially unimportant.
25			Dunkard		Commercially unimportant.
24	(Upper) Carboniferous System	(Upper Barren) XVI	Jollytown		Commercially unimportant.
23		Washington	Washington		Mined to some extent in Washington and Greene Counties.
22			Waynesburg B.		Commercially unimportant.
21			Waynesburg A.		Commercially unimportant.
20	Pennsylvanian	(Upper Productive) XV	Waynesburg		Best development in portions of Greene, Washington and Westmoreland Counties where it is mined for local use.
19		Monongahela	Uniontown		Important only in Fayette and Washington Counties and not extensively mined.
18			Sewickley	(Mapletown in Washington and Greene Counties)	Best development along Monongahela River in Greene County where it is extensively mined and used locally as a high grade domestic fuel.
17			Redstone		Of little value and probably affected by extraction of underlying Pittsburgh coal.
16			Pittsburgh		The most uniform in quality and thickness and, for a given area, the most valuable coal bed in the bituminous coal field of Pennsylvania. It is estimated that this bed originally contained more than ten billion tons of available coal. The main body of the coal lies in the southwestern corner of the state, embracing the whole of Greene and Washington Counties, and extending east into Fayette County and north into Allegheny County. There are several large areas in Westmoreland County and isolated patches in Somerset and Indiana Counties. The Pittsburgh coal is the source of the famous Connellsville coke and the Youghiogheny gas coal. It is extensively mined except in the center of the Greene-Washington County area where the bed lies deep below the surface. More than half of the coal produced in the state comes from this bed.
		(Lower Barren) XIV		(Painter in Westmoreland County)	A variable unpersistent bed occurring in the top of this formation, and mined locally in Westmoreland County.
15		Conemaugh	Little Pittsburgh		A commercially unimportant thin bed having a wide extent in Greene, Washington, Fayette, Westmoreland and Somerset Counties.
14			Elk Lick		A commercially unimportant variable bed of workable thickness in Somerset County and formerly mined in Fayette and Westmoreland Counties.
13½				(Berlin in Somerset County)	Although this coal has not been correlated with any of the well known coals, it is the most valuable bed of the Berlin district in Somerset County where it is extensively mined for shipment.
13			Bakerstown	(Price in Somerset County)	Mined to some extent in Allegheny County and correlated with the Price coal of the Berlin district in Somerset County where it underlies a large area, and is one of the most important coals.
				(Coleman in Somerset County)	Furnishes a small amount of coal in the Berlin district of Somerset County.
				(Philson in Somerset County)	This bed which has not been correlated is mined to some extent in the Berlin district of Somerset County.
12			Masontown		Commercially unimportant.
11			Gallitzin (*Mahoning*)	(Spear in Bedford and Huntingdon Counties) (Brush Creek and Millerstown in Butler County) (Brush Creek in Lawrence County)	Commercially unimportant except in Broadtop field of Huntingdon and Bedford Counties.
10		(Lower Productive) XIII	Upper Freeport	(E) (Lemon and Cokeyard in Cambria County) (Kelly in Bedford County) (Sawmill along Pa.-Md. line) (Represented in Beaver County by 4-foot and 5-foot beds) (Cap seam in Clearfield County) (Connellsville in Greene County)	One of the most important coals and source of great production. Extensively mined as the Kelly bed in Bedford County. Principal source of coal along Kiskiminitas River in Armstrong County. Most important coal in Indiana County, and next to the Lower Kittanning bed, the most valuable coal in Cambria County. Extensively mined in Westmoreland County, and has a large area and is mined to some extent in Somerset County. The important coal mined as the E seam in Lycoming County is regarded as belonging to this horizon.
9		Allegheny	Lower Freeport	(D) (Moshannon in Clearfield and Center Counties) (Limestone in Southern Cambria County) (Schantz and No. 5 in Butler County)	Chief coal of Clearfield County and the source of an enormous output in the following districts: Reynoldsville, embracing portions of Jefferson, Indiana, Clearfield and Elk Counties; Phillipsburg-Houtzdale, embracing portions of Clearfield and Center Counties, Punxsutawney, of Jefferson and Indiana Counties; and the Patton-Barnesboro district of Cambria County.
8			Upper Kittanning	(C′) (Darlington and North Washington cannel in Beaver County) (Woodland cannel in Clearfield County) (Middle or Big bed in Center County) (Cement in southern Cambria County) (Cement or Rock vein in Somerset County) (No. 4 and creek vein in Butler County)	One of the important sources of coal and the horizon of the Pennsylvania cannel coals. Principal coal, as the Big bed, of the Snowshoe district in Center County. It is one of the principal coals of Somerset County, extensively mined about Johnstown in Cambria County, and is largely workable throughout Butler County.
			Gorman		Commercially unimportant.
7			Middle Kittanning	(C) (Twin seam-?-in Bedford and Huntingdon Counties)	Generally too thin and dirty for mining, though worked at a number of points for local use. It is found in its best condition and development in the northern and eastern portions of the main field.
6			Lower Kittanning	(B) (Miller or Sonman in Cambria County) (Dagus or Daguscahonda in Elk County) (Bloss- -in Tioga County) (Barnet in Bedford and Huntingdon Counties)	Next to the Pittsburgh bed this coal is the most persistent, uniform and reliable bed in the bituminous field of Pennsylvania. The zone within which it lies includes nearly one-half the entire area of the main coal field. It is exposed in workable thickness in Armstrong, Jefferson, Indiana, Clarion, Center, Clearfield, Cambria, Blair, Somerset, Fayette and Elk Counties. The principal mining operations are in Center, Cambria and Somerset Counties. As the Barnet bed of Bedford and Huntingdon counties, it is the most important coal of the Broadtop field.
5			Clarion	(A′) (Pardoe-?- in Mercer and Butler Counties) (Clermont-?-in Elk, Forest and McKean Counties (Scrubgrass in Clarion, Venango and northern Butler Counties).	Of little commercial importance except in the vicinity of Clermont in McKean County.
4			Brookville	(A) (Pardoe-?-in Mercer and Butler Counties) (Clermont-?-in Elk, Forest and McKean Counties) (Cook or Fulton in Huntingdon and Bedford Counties) (Cushman or Seymour in Tioga County)	Of little commercial importance but mined to some extent along eastern margin of main coal field and in the Broadtop field of Huntingdon and Bedford Counties. It is of workable thickness in Jefferson, Clearfield, Center, Cambria and Somerset Counties.
3		(Seral Conglomerate) XII	Mercer Group	(Upper and Lower Mercer) (Upper Middle and Lower Alton in McKean County) (Mt. Savage along Pa.-Md. line) (Gaines in Potter County) (Bloss in Tioga County) (B-?-in Lycoming and Bradford Counties) (Bear Run in Blossburg basin) (A′-?-in Bernice basin)	Generally lacking in persistence, but locally important group of coals, and the principal source of fuel in McKean County where the Upper, Middle and Lower Alton beds are extensively mined. The most important coals of Potter, Lycoming and Bradford Counties belong to this group. The Bloss coal of Tioga County, the B coal of Lycoming County, the Bear Run coal of the Blossburg basin, and the A coal of the Bernice basin are considered by some geologists as belonging to this group.
2		Pottsville	Quakertown		Commercially unimportant.
1			Sharon	(Block) (Quakertown-?-in Warren County) (Upper Marshburg in McKean County) (Railroad seam along Pa.-Md. line) (Mehoopany in Wyoming County)	Commercially unimportant but formerly extensively mined in Mercer County.

Pennsylvania First to Correlate Its Coal Seams

As Pennsylvania was the first state to correlate its coal seams and adopt official names for them, these names have been accepted as a standard to which all the Carboniferous coals of the country are referred.

The table of bituminous coals covers all of the seams found in Pennsylvania, from the lowest shown at the bottom consecutively up to the highest known coal in the state. Under the column headed "Formations" is shown the division of the coal beds into the distinct geologic formations which have been recognized. The old formation names are shown in parentheses and the official names in bold-face type. The Monongahela and Alleghany formations are by far the most important, and yield nearly all of the coal mined in this state.

In the column headed "names of coal beds" is shown the official names of the coals while the adjoining column shows the more important local names applied to these coal beds in different districts.

The column of index numbers refers solely to a similar column in the table of mining districts for the purpose of locating the more important coals being worked in the mining districts of the state. They have no official connection with the names of the coals. In the first column of the table of mining districts will be found a series of numbers which refer to the numbered circles shown on the map indicating the important mining districts of the state.

Pennsylvania is the leading coal mining state of the Union. Besides embracing the only anthracite deposits of importance in this country, it stands first in the production of bituminous coal. The entire anthracite industry is confined within a small area of 480 square miles in the eastern half of the state.

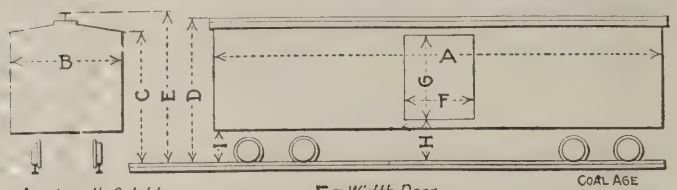
The bituminous field occupies the greater portion of the western half of the state, and forms a part of the Appalachian coal field which extends southward into Alabama, across the intervening states. The area of this great coal field, lying within the state of Pennsylvania is 14,200 square miles, and the available supply of coal remaining in the ground has been estimated by the U. S. Geological Survey as approximately 108½ billion short tons. This amount of coal would supply the entire United States, at the present rate of consumption, for a period of approximately two and one-quarter centuries. The bituminous fields contribute about one-third of the total coal production of the United States, more than 95 per cent. of which is mined in the districts shown on the accompanying map.



Squeezing Him If He Is Not Careful

Required Clearances for Freight Cars

In the designing of structures adjacent to or straddling railroad tracks, it is most important that the maximum clearances required for the class of equipment



A = Length Outside
B = Width at Eaves or Platform
C = Height, Rail to Eaves
D = Height, Rail to running Board
E = Height over All
F = Width Door
G = Height Door
H = Height from Rail to Door
I = Height from Rail to Floor
For flat cars D is height from Rail to Top of Platform

DIAGRAM OF FREIGHT-CAR MEASUREMENTS

used, be accurately determined. Data of this kind are frequently difficult, if not impossible to obtain. As a result it often happens that expensive alterations are necessary on construction work of this character.

TABLE SHOWING PRINCIPAL DIMENSIONS OF FREIGHT CARS

Road and Type of Car	A Ft.	A In.	B Ft.	B In.	C Ft.	C In.	D Ft.	D In.	E Ft.	E In.	F Ft.	F In.	G Ft.	G In.	H* Ft.	H* In.	I* Ft.	I* In.	Capacity Cu.Ft.	Capacity Lb.
Pennsylvania; box	36	4	9	10¼	11	8	12	4⅝	13	0⅛	5	4	6	7¾	3	11	3	6	1,981	60,000
Pennsylvania; produce	38	6	9	10	12	0¼	12	8⅝	13	9	4	2	6	1¾	..	..	..	..	2,091	100 000
Pennsylvania; furniture	41	11¼	9	11¾	12	3¼	12	10⅞	13	6¾	6	6	8	0	2	6	3	4	2,923	60,000
Pennsylvania; furniture	36	4	9	10¼	11	7½	12	4⅜	12	10¼	5	4	6	7¾	..	..	..	..	1,981	80,000
Pennsylvania; automobile	38	6	9	6¼	12	7⅝	13	4 1/16	13	10 1/16	12	2	8	4½	..	..	..	..	2,650	100,000
Penn.; gondola-bottom hopper	33	0	10	1½	..	...	3	6	10	7¼	..	..	.	...	..	..	..	..	1,672	100,000
Pennsylvania; flat	40	2	9	3	..	...	3	10⅛	6	7⅜	..	..	.	...	..	..	..	..	371	100,000
Pennsylvania; gondola, long	52	0	9	10¾	..	...	3	4¾	7	3⅛	..	..	.	...	..	..	..	..	1,452	140 000
Pennsylvania; box	38	6	9	10	12	0¼	12	8⅝	13	2⅝	6	0	7	5¼	..	..	..	..	2,448	100,000
N. Y. Central; box	34	0	9	3¾	10	6½	11	4¼	13	1½	5	0	5	9½	4	0	3	6	1,670	50,000
N. Y. Central; refrigerator	37	5	9	6	12	1	12	10	14	0	5	0	5	10	..	..	..	..	1,707	50,000
N. Y. Central; stock	37	0	9	8	11	7½	12	4	13	5	5	0	6	9	..	..	..	..	2,142	60,000
Lehigh Valley; automobile	43	9¼	9	8⅝	12	7⅜	13	4⅜	13	9¾	12	0	8	2¾	..	..	..	..	2,950	60,000
Lehigh Valley; box	34	10¼	9	4½	11	6	12	3	12	11⅛	5	7½	7	0½	..	..	..	..	1,904	60,000
Lehigh Valley; carriage	46	5	9	8¾	13	0	13	9¼	14	1	8	8¾	8	6½	..	..	..	..	3,040	40,000
Lehigh Valley; stock	38	2	9	5½	12	0	12	9	13	6	5	3¼	7	5	..	..	..	..	2,406	50,000
Lehigh Valley; gondola, wood	25	9½	..	...	5	0	..	...	6	8	..	...	.	...	..	..	..	..	227	40,000
Lehigh Valley; cinder	36	0	..	...	7	11	..	...	6	6½	..	...	.	...	..	..	..	..	1,273	80,000
Erie; furniture	50	7¼	9	10⅛	13	10⅜	14	7⅞	14	7⅞	10	0	9	5	..	..	..	..	4,532	80,000
Erie; box	34	8 3/16	9	3½	11	7¾	12	7	13	3½	5	7	6	5	4	2	3	4	1,927	60,000
D., L. & W.; box	34	10½	9	4	11	7	12	3	13	1	5	6	6	8½	..	..	..	..	1,913	60,000
D., L. & W.; stock, double deck	36	10½	9	5½	12	1	12	9	13	5½	5	0	3	3	..	..	..	..	2,327	60,000
D., L. & W.; hopper	30	9	10	1	10	0½	..	...	10	8	..	...	.	...	..	..	..	..	1,680	100,000
Cent. R.R. of N. J.; box	34	10	9	7	11	7	12	5	12	10	5	6	6	6	..	..	..	..	1,994	60,000
Cent. R.R. of N. J.; refrigerator	34	3	9	8	12	4	13	1	13	8	5	0	5	9½	..	..	..	..	1,747	40,000
B. & O.; furniture	40	6	9	6¼	12	3⅛	13	0¼	13	9⅞	6	0	7	11¼	3	6	3	1	2,321	50,000
Pere Marquette; box	40	0	9	11	12	0	12	3	13	0	5	10	7	4	..	..	..	..	2,562	50,000
Rock Island; furniture	51	6	9	10	13	4	14	0	14	0	11	10	8	10	..	..	..	..	4,037	60,000
Rock Island; gondola, steel	38	0	10	1	..	...	..	...	8	8	..	..	.	..	..	..	..	..	....	100,000
Great Northern; hay	33	0	9	2	12	0	12	9½	12	10½	5	0	7	4	4	1	3	3	1,983	40.000
Northern Pacific; lumber	41	0¾	9	8½	..	...	12	3⅝	14	0½	5	6	8	3½	..	..	..	..	2,990	80,000
Southern Pacific; automobile	41	1 1/16	9	10	14	0 13/16	14	11 15/16	15	6 3/16	9	8½	9	5½	..	..	..	..	3,670	100,000
Southern Pacific; box	41	10	10	0	13	3 1/16	14	1 15/16	14	7¾	6	0	8	8⅞	..	..	..	..	3,370	100,000
Atchi., Top. & S. Fé; furniture	34	9	9	10	11	7	12	1½	13	8	5	2	6	7	..	..	..	..	....	50,000
Atchi., Top. & S. Fé; coal and coke	34	0	9	10	12	2½	11	10	13	3	..	..	.	...	..	..	..	..	....	44,000
Mo., Kas. & Tex.; refrigerator	42	4½	9	9½	12	1¾	12	10½	14	0	4	0	6	2	..	..	..	..	1,972	60,000
Norfolk Western; box	36	1	9	6½	11	5⅛	12	4⅛	13	3½	5	6	6	3½	..	..	..	..	1,896	50,000
Norfolk Western; flat	33	6	8	3½	4	4¼	7	1½	..	...	..	..	.	...	..	..	..	..	3,458	100,000
Norfolk Western; coke, steel	42	0	10	0	13	6	..	...	13	6	..	..	.	...	..	..	..	..	3,458	100,000
Merchant Despatch; refrigerator	36	1¾	9	9	12	2¾	13	1	14	1½	5	0	5	8¼	4	2	3	6	1,829	60,000
Canadian Pacific; horse	47	1⅜	9	9	12	2¾	13	3½	13	3½	5	0	6	9	..	..	..	..	2,036	24,000
N. Y., N. H. & Hartford; auto	38	6	9	7	12	6⅝	13	2	13	10	6	0	7	7	..	..	..	..	2,448	80,000
Boston Maine; ice	37	1	9	4	12	7⅜	..	...	13	11⅝	5	8	7	7	..	..	..	..	2,371	60,000
Boston Maine; grain	36	9¾	9	7⅜	12	0	13	3¾	13	11⅝	6	0	7	10⅞	..	..	..	..	2,460	60,000
Max. dim. taken from dif. cars	60	11⅝	10	7	14	11¼	15	7¼	15	7¼	12	2	9	10	4	2	..	..	....	110,000

*Approximate.

Not only is it necessary to anticipate the kind of railroad cars it is expected to load at the plant under consideration, but due attention must be given to all kinds of equipment which are liable to pass over the tracks in question. It is often the case that the very largest kind of a car may be shunted into a mine siding during the process of switching operations. Where such a contingency is liable to arise, it is obvious that due preparations must be made for it. The accompanying table and sketch, taken from the *Iron Trade Review*, gives the principal overall dimensions of various types of cars on the American railroads. Even though the list is necessarily incomplete it may be taken as typical and will be of material assistance to designers of mine structures.

Coal in Eastern Montana

An account of an area of workable coal recently examined by G. S. Rogers, of the U. S. Geological Survey, in the northern part of Big Horn County, Montana, three or four miles from Waco, on the Northern Pacific Ry., has recently been published.

The coal-bearing area lies on Pine Ridge between Yellowstone and Big Horn Rivers, at the head of Mission and Sorrel Horse Creeks, beginning about 8 miles southeast of Custer, and capping the ridge for 6 miles.

The coal is of a good sub-bituminous grade. In physical appearance and stocking quality, it is described as superior to the coal mined near Sheridan, Wyo., but somewhat inferior to the Red Lodge and Bearcreek coals.

No development has taken place, but from samples procured in adjoining areas to the east, it is concluded that the Pine Ridge coal will prove to have a heat content in excess of 10,500 B.t.u. The bed has a thickness of more than 30 in. throughout the area of 5 or 6 miles, and is more than 3 ft. over much of this territory, attaining at one point a thickness of 4½ ft. In the northern part of the area the coal is much affected by faulting, but the best fuel is not disturbed.

It is estimated that more than 20,000,000 tons of coal underlie the field examined, of which at least 60 per cent. is recoverable. It is possible that other fields south and west of the district examined, are also underlain with workable deposits.

This report is published as Bulletin 541-H, a copy of which can be obtained on application to the Director of the Geological Survey, Washington, D. C.

In rebonding old tracks, it is often advisable to use exposed bonds, since if the splice bars are removed from the old rails, the bolts frequently have to be cut, and it is often impossible to draw the plates back into their original space.

An Unusual Underground Organization

By G. S. Brackett*

SYNOPSIS—During the past few years the small coal mine is the only one that has been making any money. The results obtained by reorganizing a large mine into practically a collection of little ones have been decidedly encouraging.

It has been a common maxim, during the recent years of small net earnings in coal production, that the only mines showing a reasonable margin of profit are the small ones with an output of 100 to 200 tons daily and a correspondingly small acreage.

These mines are worked by pick mining, without power equipment, and a short haul on the mine stock due to the small field of coal. The virgin tonnage is not sufficient to permit of much outlay in capital for the installation of any machinery; the long main heading and expensive track over which hundreds of acres of coal must be moved are replaced by short room headings, some feeding direct to the pit mouth.

To assume conditions in the smallest of these mines, the drivers coming to the tipple probably dump their own cars, and return to the mine with the same empties, and the only necessary outside laborers are the trimmers on the railroad car. Probably the foreman is the blacksmith, and the mine-track work is done under his supervision by the drivers after the miners have cleaned up, which, in a pick mine, usually occurs early.

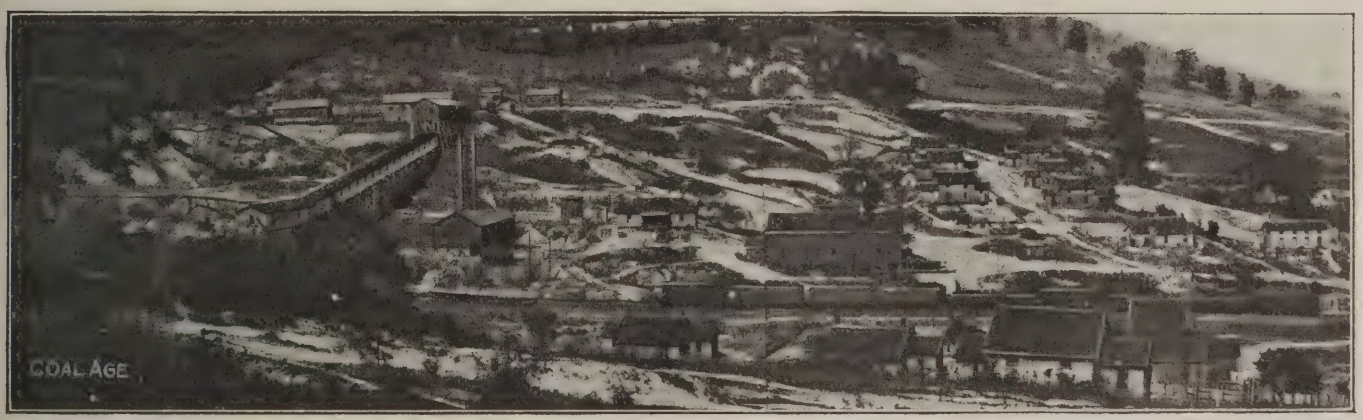
Pick mining gives less trouble with falls of roof, there are no wiremen, power-house employees or expensive salaried men; only a small equipment of mine cars is required, and these are not subjected to the unusual strain of motor haulage, and the mine-supply account is a small item. The coal is sold through a regular dealer and one of the firm or partners keeps the accounts.

There is a growing partiality among miners for pick mining and labor shortages are rarely felt in these small operations, especially if "solid shooting" is permitted as it is in many such cases. The delivery costs are small, and the net earnings correspondingly large but the proposition of tenfold production and tenfold profits looks extremely attractive. The larger mines, however, rarely work out in this direct proportion.

The object of this article is not so much to complain of the conditions existing in the coal-mining business, as to give the results of a radical change made in the underground organization of the employees of the Pittsvein Coal Co., so that many of the difficulties met with in larger mines are eliminated and the production costs brought down to a point more in competition with the smaller mines and their efficient labor.

The Disadvantage of Growth

The small mine has increased its tonnage, the haul has become so long that an electric motor has been installed together with a power house, the track relaid with heavier steel and heavier ties. The mine cars and track need constant attention. There is a complete tipple force, and instead of paying the drivers a little extra for track work we have regular track men. The stage is reached where the foreman is a foreman only and the superintendent is created.



Mining Plant and Town of Pittsvein Coal Co., at Flemington, W. Va.

Some of the headings pass through local dips and pumps and pumpmen are required. The cost per ton is considerably higher than in the small mine, shut-downs are expensive since much underground work needs doing, and the power house must be kept running. The expenses of monthly men are also high.

A reasonable economy is the installation of electric cutting machines to reduce the cost of the coal on board the mine cars at the working face. Most of the miners quit because they do not like machine-cut coal, and those that stay are continually complaining and "bucking" the mining machines. The tone of the mine is contention and dissatisfaction—it is difficult to get sufficient miners and those that are obtained are of the poorest class. The timbering is bad, the falls frequent, the rock expense high and accidents are numerous.

The production does not meet the expectation of the owners and the profit has gone entirely to the other side of the ledger. There are pump men, wire men, track men,

*Pittsvein Coal Co., Flemington, W. Va.

assistant foremen, boss drivers, rock men, timber men, carpenters, blacksmiths, trappers—each and every one out for his day's wages only, and determined to do nothing that is not compulsory. The trackmen will not fix a wire, nor open a ditch; the drivers will not clean a switch, the rock men will not set a timber and the timber men will not start a pump. That is, they will not unless the boss happens to be there and tells them to.

The boss' or the assistant's hands are full keeping in touch with these little things—he makes his rounds daily and finds that a "turn" is needed in the third left heading and a crosscut switch on the sixth right. He hunts up the trackmen and sends them to the third left with instructions to go thence to the sixth right. Any mining man knows what happens—the tool house must first be visited, a bite to eat, hunt the spikes, the bender, forget a hammer and there is always one who must fix his carbide lamp just as the rest are ready to start.

The worst of it is that the same thing happens on the return trip and continues *ad infinitum*.

Piles of spikes are left wherever a job is finished, insulators are abandoned in roof and rib, timbers are scattered over the mine; rails, switches, frogs are found any place. Each pile of wasted material acts as a silent instructor to all employees to continue to waste. All the men will pass over or by a place that needs fixing time and time again, leaving it for somebody else to repair. The first idle day there is work to do all over the entire mine and the shut-down will cost as much as a full day's run.

The drivers do not haul half the coal they ought, all the work is inefficient and the maintenance and repairs fall behind. These conditions might be an exageration but they pertain in part in all mines, and the bigger the mine the more pronounced. The cost of production goes up—up—up.

Revert to Simplicity

What is the logical relief? Get back to that simple organization, where a large mine is an aggregation of a number of small mines, where every employee sees the man in charge of his work several times daily, and the man in charge has a territory so small that he can keep track of every spike, rail, timber and tool and know every fall, every shot and every trip the drivers make.

He visits the working places several times a day, examines and directs as to timbers and roof, fixes a pump, opens a ditch or hangs a piece of wire. He has time to help with a fall, to help with a crown timber, and (most of all) to know and work with his men; to teach them and prevent accidents.

The mine at which this experiment in organization was made is in West Virginia, where the State Department of Mines is increasing its demands, restricting certain practices, and insisting that there is someone personally responsible for most of the accidents. The injured man should have had props in his working place, his roof should have been examined more frequently by the foreman or a safety prop should have been set. The injured man was not experienced enough to be expected to use the necessary precautions.

Entirely aside from the state law, these statements cause the foreman and superintendent some pangs of conscience. Could life be saved in the mine if more careful supervision was enforced—and can this supervision be given without prohibitive extra cost?

The local conditions at the mine in question are worse than the average, the roof is draw slate, heavy and treacherous, the local dips and drainage difficult, clay veins are frequent and labor is a little below the average in quality and experience. Assistant foremen were necessary for rather smaller tonnages than usual. Even with this aid it was almost impossible to visit the working places with the proper care and give the proper attention to the drivers and day men without a prohibitive cost.

These conditions vary greatly in different mines, some requiring more attention than others; but the difficulties constantly arising in this particular mine made an unusual amount of attention necessary, both on account of the irregularities in the working places, and the effort to prevent accidents from the dangerous roof.

Small Sections Were Created

In revising the organization the mine was divided into sections, each working 15 to 30 miners and an adequate number of drivers hauling to an independent motor side track. The foreman's assistants were disposed of, the track gang, pumpmen and brattice men discontinued; and each section given into the entire charge of an energetic practical coal miner, one who could lay a switch, string electric wires, had some ability in handling men and was a good timber man.

It is not difficult to pick out one such man in every 25 to 30 employees. His wages were based on hours, an increase being given over ordinary track rate so as to make the job worth working for. He can cover his territory carefully twice daily and still have ample time for other duties. He does a great deal of track work, timber work, and rock work himself.

This man's efficiency is based on the following points: Lack of accidents; cost of his tonnage at side track; salvage of used material of all kinds; conditions of track, timbering, brattices and drainage; enforcement of state mine law and company rules.

This small section is his own mine, his own responsibility and it is all close to his hand, with his tools and mine material convenient. He looks after his own pump, his own drainage and ventilation. He has authority to allow day time to a miner for helping clean a fall or build a brattice, and is usually present himself to help with the work.

He is busy, just as was the mine foreman of the small mine, but his work is compact and his job worth holding as he has taken a step above common labor. He gets help from a driver who has finished early, or from a loader out of coal; and in the larger sections he has one regular track man.

He knows every inch of his section, every prop, every wood rail, every bad track joint; he has in his mind all the little jobs that need attention and is in so close touch with all the men that these little jobs get done at odd times while the mine is running. Timbering rules and regulations are enforced and the drivers do not "soldier" the latter part of the day for a car or two they are expecting to get.

There is no time lost by the inside labor traveling diagonally across the entire mine and back. If a car is off the track, this individual is close at hand with a jack and the coal continues to come. If there is a fall on the heading he is not far away and drivers and miners alike are soon at work and the road cleared.

The personal interest exhibited by the men in their own sections and the rivalry between these sections are what produce the results. The work is done, and should the mine lie idle we are not faced with intolerable conditions and unbearable expense.

The section men are worth taking care of during shutdowns, they are the only expense incurred, and each will have some improvements to make in his own section, or they may combine and lay some heading track, or attend to some main drainage.

On the mine foreman rests the success of the system to its last degree or refinement. He has time in making his rounds of inspection to give every little detail of economy and safety his close attention; and he must inspire and maintain in the section men the desire to produce coal on an economical basis, to work for the benefit of the company, and that each man should endeavor to have his section in just a little better condition than his neighbors.

A Few Simple Rules Were Adopted

The normal tendency in mine organizations is to increase in complexity as the operation expands. The principle of the section method is to eliminate the complications and get back to simplicity. A large mine is only a combination of small ones feeding into a trunk line haulage road; and each mine (or section) is entirely independent with the policy and government of all administered by the mine foreman on a standard system of rules.



Tipple and Conveyor, Pittsvein Coal Co., Flemington, W. Va.

These rules need not be so numerous and complicated that a book form is necessary. In this particular mine, sixteen rules were selected with eight subdivisions, easily understood and remembered, covering the causes of accidents. They are simple instructions to the section men, and must be enforced.

In Addition to the State Mine Law the Following Rules Must Be Observed

(1) Make a written daily report to the office on the blank forms furnished, showing mine conditions.

(2) Place "Danger" boards at all abandoned places.

(3) A regular system of timbering must be adopted for each condition, suitable cap pieces being furnished with the props.

(4) Permanent brattices must be of incombustible material.

(5) The mine humidity must be 95 per cent.

(6) All electric wires must be securely hung, and free from "grounds," with connections carefully made. They must be boxed at all crossings. A "Danger" board must be placed where men are likely to come in contact with the wires. Coils of "live" wire must be marked with "Danger" and placed to one side.

(7) All haul roads must have a clearance between car and rib of 2½ ft.,—or whitewashed refuge holes every 60 ft.

(8) Dangerous slate on the haulroads must be secured or removed promptly upon discovery.

(9) The brakeman must always be at the rear of the trip before it starts.

(10) Drivers must not ride on the front end or between the loaded cars.

(11) At all times there must not be less than two experienced men on all pillar workings.

(12) Props in the rooms must clear the car by 12 in.

(13) There should not be less than three props and cap pieces ready for use, in all places requiring timbers regularly.

(14) Every working place not marked with a "Danger" sign must be visited twice daily. After an idle day the first visit must be made as promptly as possible in the morning.

(15) "Exit" arrows must be placed throughout the mine showing the way to the nearest opening.

(16) All employees must be instructed in the particular dangers incident to their work, and furnished a copy of the mine law and company rules; and attention called to the following safety rules:

(a) Employees must not work in a place in need of timbers, or known to be dangerous.

(b) Nobody is permitted to ride on loaded cars underground, except those whose duty requires them to do so.

(c) Men riding in an empty car should put their tools in another car.

(d) Remove your lamp from your hat while handling explosives.

(e) Examine your roof FIRST,—and do not enter after firing a shot until the smoke clears so that you can do so.

(f) Use a copper needle and keep an axe.

(g) Do not drill out a shot that fails—bore another hole.

(h) Miners must properly prop and secure their working places, and order the necessary timbers from the foreman or assistants at least one day in advance of their needs. Miners must keep not less than three props and cap pieces on hand ready for use and emergency at all times.

A suitable form is used on which the report of each section is rendered daily, countersigned by the foreman and kept on file in the office. All cases of violation of the rules are noted, recommendations made and material ordered, and the notation continues until relief is given. It is needless to say that, with these reports going to the office, there is rarely a repetition of any complaint.

There was a little difficulty experienced in getting men to take charge of the sections, as the State Department had adopted the policy of holding inquests after all fatal accidents, and the feeling among some of the men was that this system shifted the responsibility to some "under dog." One of the advantages of the system was to take undue responsibility off any one person. If the section men follow their rules, report any violation, make their recommendations and order the necessary material, they have done all they have any authority to do; and the responsibility rests higher up.

The Proper "Spirit" Was Important

In starting the system there was some trepidation on the part of the management as to getting it going in the proper "spirit." Great care was taken in the selection of the men. The spirit, or general tone, of the employees in any industry, is of greater importance than is generally supposed. There is a vast difference in costs when every employee is determined to shirk, and when every employee is endeavoring to help, and the difference increases directly with the number of employees. One section, the smallest, was left under the care of the foreman to serve as a model, but was found unnecessary for this purpose.

There was no standard system of timbering adopted, as the character of the roof varies considerably, and the most satisfactory method depends entirely upon the conditions. Verbal instructions are given in all cases to the

section men frequently after a consultation as to the most advantageous method for any particular case.

The practice in this region is to pay the miner for certain "dead" work which he performs, such as gobbing roof slate or clay-vein rock, pumping or bailing water, shooting up a roll in the pavement or cleaning a fall in his working place. It can easily be seen how this expense may be greatly increased unless care is exercised by the foreman.

Miners have been known to encourage a fall in their working place in order to get the work and allowance for cleaning it up. The amount of water bailing is rarely as arduous a task as the miner pretends, but the foreman finds it a hard matter to take the necessary time to determine just how much work the miner does.

It is in allowances of this kind that the section system has shown a great improvement in costs. Every little thing is under strict and detailed supervision, and even with this supervision the amount of actual work which the section man can get done himself is surprising. The reason of this is that his section is small, he loses no time traveling over thouands of feet of headings, he knows just exactly what needs doing and the tools and material are convenient.

He is commended if he collects a pile of scrap copper in his tool box or a pile of recovered timbers along the heading which under the old system nobody had time to get together. The spirit of waste is replaced by the proper care of all supplies. The actual cost of production was decreased in both labor and material. This decrease was considerable, and with it was the remarkable feeling of security in that the general conditions were improving and not on the decline.

The Main Causes of Accident Were Attacked First

The original object in starting the system was to reduce the accidents by insisting upon a better method of timbering and by a more careful and frequent examination of the roof in the working places. Fifty per cent. of all fatal accidents are caused by falls of roof and coal; explosions, mine cars and motors are the next most prominent. The question of explosions is entirely too extensive to put under the care of the section men, and is eliminated from this general system, being included only in the province of the foreman.

In carrying out the idea of simplicity, and rather than confuse the minds of many of the workmen with too numerous safety rules, the campaign was started on two points only, the roof and mine cars. A few hundred feet inside the pit mouth the workmen cannot fail to see an illuminated sign reading:

Examine Your Roof First
Do Not Enter Your Working Place
until Smoke Clears

He sees this same sign many times before he reaches his working place. It is further impressed upon his mind with the visit of the section man to inspect his roof and detect any weakness. There is a second visit of the section man later in the day.

Ample whitewashed refuge holes are provided along all haul roads, and the following sign is placed frequently:

Do Not Ride
on Loaded Cars

At the junction points of all haulroads used by drivers the following sign is placed:

Drivers Must
Stop
Look
Listen

The drivers are instructed not to ride on the front end or between the loaded cars, and they are not permitted to do so.

The constant drumming of these simple rules has the effect of starting each individual to thinking of the other dangerous practices in which he indulges, and by so doing a careful miner is finally produced; while a long list of safety rules would only serve to discourage him.

The men are taught in what way to be careful and are constantly reminded of dangerous practices and these are the integral parts of safety first. To pick out all the various causes of acidents and instruct each miner regarding them would be an impossible task and would be of no value unless the man himself had the inherent desire to protect himself.

This can only be brought about in many cases by making his lessons numerous and simple, and then his education along this line will continue voluntarily. The section system teaches the men the simplest and most important rules of care, and where necessary insists and commands that they be obeyed.

In the mine in question, accidents have greatly decreased. The output is more regular. Foreign holidays are not so seriously felt as there is a concentrated effort on the part of every section man in the early morning to get those men who are in the mine to load a large turn. There is less trouble with the miners "out of coal" on account of the failure of the machine to cut the place.

I am enthusiastic in my statement that the mine has been run with less friction, on a safer basis, and at a cheaper cost than under the old system of boss, assistant boss, driver boss and track boss.

Notes on the Coal Situation in Peru

Conservation of the coal properties of the republic was several regions certain lands containing coal were withdrawn from denouncement. The government's desire to develop the fuel production of the country is manifested in its willingness to facilitate the building of railways in the coal-bearing regions. Studies have been made of the districts of Hatunhuasi, Oroya to Huansyo, Sayan to Oyon, and Cheeras, in which districts large coal deposits exist. The government hopes eventually to interest foreign capital in the opening of these districts. The annual importation of foreign coal is valued at about $1,099,000, most of which comes from England, Germany (briquettes), and Australia—from the latter country in sailing vessels. American exporters of coal should be able to compete favorably with these countries after the opening of the Panama Canal.—*Daily Consular and Trade Reports.*

When scaling indicator diagrams, the pressure to be taken is that immediately at the end of the compression period, not at the end of the delivery, for it is invariably found that the pressure of the air falls off after the valves have opened.

Commutating-Pole Motors for Mine Locomotives

By R. E. Hellmund and W. A. Clark*

SYNOPSIS—A reply to a former paper printed in Coal Age, *this article vigorously advocates the installation of the commutating pole on mine locomotive motors.*

In the issue of Coal Age for May 9, 1914, A. R. Anderson attempts to show that the adoption of commutating-pole motors for mine locomotives is ill advised. Since our experience along this line stands in marked contrast with the conclusions arrived at by Mr. Anderson, it may be of interest to the readers of his paper to have the matter presented in a somewhat different light.

Under the heading, "Interpoles are not new," Mr. Anderson mentions the first record of the idea of commutating poles which he has been able to find, also some experiments made by Mr. Sprague along this line in 1885. Undoubtedly, the historical facts as given are correct, but

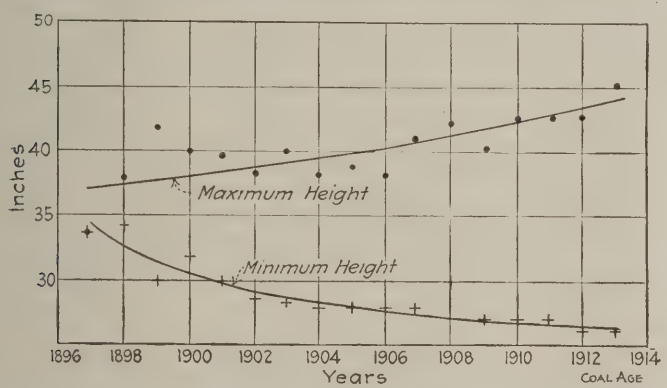


Fig. 1. Maximum and Minimum Height of Mining Locomotives

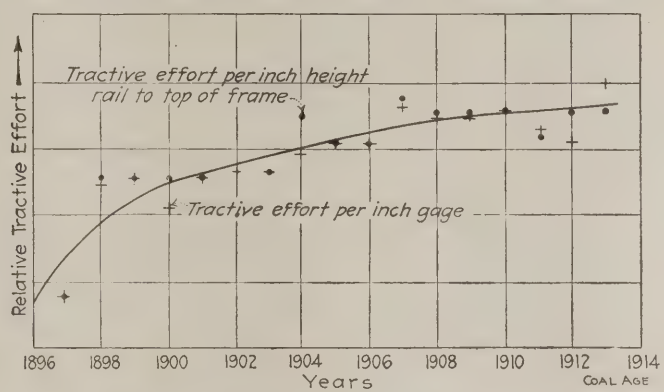


Fig. 2. Tractive Effort per Inch of Height and of Track Gage

they do not by any means furnish a complete history of the development of the commutating pole. Ever since the fundamental idea was first conceived it has been a number of times reinvented and numerous experiments have been conducted during the last 20 years by engineers in this country, as well as abroad, for the purpose of improving the commutation by means of interpoles or otherwise.

One of the writers took part in extensive investigations which were conducted by a German concern about 1899 for the purpose of finding means for improving the commutation of direct-current machines. The technical literature, as well as the patent records, of the various countries have numerous records of suggestions and attempts made to improve commutation.

We mention all of this merely because it is an almost indisputable proof that there existed a need for improvement on the old motor without commutating poles, or the many engineers of all countries would not have wasted their time in trying to find something better. The only reason why commutating poles were not adopted earlier than a few years ago, is because the laws of commutation were not well enough understood to enable the engineers to apply such devices economically. Ever since fairly reliable theories of interpole design have been worked out and published, the adoption of this contrivance has been almost universal.

We fully agree with Mr. Anderson that with liberal dimensions, fairly good commutation may be obtained with many machines which do not have to be reversed, and on which it is, therefore, possible to shift the brushes somewhat out of the neutral zone. In case of railway and mine locomotive motors, however, where the brushes have to be located in the neutral region because it is impracticable to shift them every time the motor is reversed, it is possible to obtain fair commutation, even with liberal dimensions, only under extremely favorable conditions.

For this and other reasons, to be mentioned later, it has become an indisputable historical fact that with the noncommutating-pole motors used for traction work, the consumption of carbons is from 3 to 10 times as large as with modern commutating-pole machines.

It is further a fact that with noncommutating-pole traction motors the commutator in many cases has to be renewed once or twice during the life of the machine on account of its having worn down. On the other hand, a replacement of the commutator for the same reason is practically unknown with the modern commutating-pole motor, although the life of these modern machines is considerably greater due to other improvements in motor design.

The Application of Interpoles

Under the heading, "With limited dimensions, use interpoles," Mr. Anderson states: "Another legitimate application of interpoles is found in motors where the dimensions for a given horsepower and speed are limited by the machine of which the motor is a part." Further on, he says, "In general, interpoles are desirable and properly applied in cases where the motor is subjected to overloads or where a large horsepower at a low speed is cramped into small dimensions."

We most heartily endorse these two statements because they give the most important reasons why we are advocating the use of commutating poles in motors for mine locomotives. To make ourselves perfectly clear, we will re-

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peat that we are advocating the use of commutating-pole motors in mine locomotives because satisfactory commutation cannot be obtained in such motors without them on account of the following facts:

1. The brushes must be located in the neutral zone and cannot be shifted to improve commutation on account of the practical operating conditions.

2. In mine locomotives the motor-space limitations are extreme, as will be discussed somewhat more in detail later.

3. The motor for mine locomotives is frequently subjected to overloads, as will be pointed out more in detail shortly.

Mr. Anderson discusses how it is possible to obtain cheaper machines by the use of commutating poles for certain sizes of motors, but he states that with the sizes usually employed in mine locomotives, the use of commutating poles will not give a cheaper design. We again fully agree with this statement and would add that in small motors such as are used for mine locomotives, it is a common occurrence that the use of commutating poles increases the cost of manufacture.

It should, therefore, be evident that the manufacturer furnishing commutating-pole motors in spite of their higher cost can have only one object in view, namely, to put out an improved product and to give his customers better service and satisfaction.

To the further statement that the commutation is but little improved under working conditions, we wish to take exception and refer back to the facts we previously gave regarding the decreased brush and commutator wear made possible by the use of interpoles. The statement that commutating poles may cause additional expense and trouble for the operator, we will discuss later.

The Coefficient of Adhesion

Under the heading, "A locomotive can only exert a certain pull," Mr. Anderson attempts to show that a properly designed mine locomotive cannot be overloaded. He states that the maximum load depends upon the coefficient of adhesion between the locomotive wheels and the rail, which latter statement is quite correct. He is wrong, however, in connecting a coefficient of adhesion of 20% to 25% with this discussion of maximum possible load, since it is a fact well known to every engineer connected with traction work that a coefficient of adhesion of 33% is not at all uncommon, and with sanded rails, the coefficient of 40% or possibly somewhat higher, may be obtained. Moreover, where the brakes are used to prevent slipping of the wheels, the motor load may correspond to a considerably higher adhesion. The only way to prevent the motor from overloads would, therefore, be to design it with a rated capacity corresponding to a coefficient of adhesion of at least 40 per cent.

Further on, Mr. Anderson states: "Since there is nothing to prevent the motor from being operated continuously at this maximum horsepower (he refers here to the horsepower dependent on the maximum coefficient of adhesion) while the motor is in operation, the motor equipment should be at least large enough to meet this condition." The incorrectness of this statement is self-evident because it is a commonly known fact that in practical operation train resistance for numerous reasons varies over wide limits.

The resistance of a given train is certainly greater going up hill than it is going down hill; it is larger on a curve than on a straight track; it takes more tractive effort to accelerate a train than it does to keep it in motion; all this is beyond doubt.

How is it possible then with such unavoidable variations that the motors continuously exert the maximum possible tractive effort? Another reason why the maximum possible motor load cannot be maintained continuously, or even for an hour, is because the coefficient of adhesion depends so thoroughly upon the varying conditions of the rails, that it is practically impossible to maintain its average anywhere near equal to the possible maximum.

The practice of rating the motors continuously, or even on a one hour basis equal to the possible maximum, of say, 40 per cent. adhesion just in order to make overloads impossible, would be wasteful not only in first cost, but also because a motor of such size would have a low efficiency and consequently high power consumption at the average load under actual operating conditions.

But Mr. Anderson proposes to go even farther and states: "The correct motor equipment for industrial haulage and especially mine haulage, must have a normal capacity, at least equal to, and preferably 10 per cent. to 15 per cent. greater than the maximum tractive effort which a locomotive can develop, etc." In other words, Mr. Anderson proposes to use motors with a normal rating 10 per cent. to 15 per cent. bigger than can be utilized at any time, and about 100 per cent. larger than is needed. A close study of the locomotives offered to the trade reveals the fact that none of them have a horsepower rating equivalent to a coefficient of adhesion of 44 per cent. to 46 per cent.

Customary Ratings of Motors

The same study will also show that it is common, uptodate practice to employ motors having a one-hour rating corresponding to a coefficient of adhesion of from 15 per cent. to 25 per cent. and a continuous rating, corresponding to less than half these values. This means that all locomotives at present available to the trade may be overloaded whenever the coefficient of adhesion is as high as 30 per cent. or 40 per cent., and it will be remembered that Mr. Anderson himself says "Interpoles are desirable and properly applied in cases where the motor is subject to overloads, etc."

Under the heading, "Sufficient space is usually available," the statement is made that sufficient space is available in practically all types of locomotives to permit of the design of good moncommutating-pole motors. While the conception of a good commutating motor is flexible and largely a question of opinion, it cannot be denied that the brush and commutator wear on practically all noncommutating-pole machines is from 3 to 10 times as large as with modern commutating-pole motors. And while the operator of mine locomotives may not be much interested in just how good the commutation of his motors may be, he is vitally interested when it comes to bearing the expense and suffering the delay caused by replacing carbons and commutators, or dealing with such other troubles as are liable to occur with noninterpole machines. These will be discussed later on.

But, even if it were a fact that fairly good commutation could be obtained in a frame of given dimensions, this would surely not be a sufficient reason for not build-

ing something better. It is undeniable that commutating-pole motors commutate better than non-commutating-pole motors. Fully 90 per cent. of all direct-current machines of 10 hp. and above are now being built with these poles for the purpose of improving the commutation.

With regard to the space limitations imposed upon the designer of mine locomotives by the existing conditions, we wish to state that in 16 years of experience in designing motors for all kinds of applications, we have not found a case where the space limitations were as exacting and extreme as in mine locomotives, where the motor is limited in width, breadth and height, as well.

The narrow gages used for mine locomotives limit the axial length of the motor to a few inches. The desirability of obtaining the maximum tractive effort from a given machine by using the smallest possible pinion, limits the gear-center distance and therefore the horizontal width of the motor while restricted head room limits the height of the motor.

which may spark under certain conditions, to a commutating-pole motor, which ordinarily will not spark.

Mr. Anderson states that the installing of commutating-pole motors is equivalent to installing so much additional and unnecessary apparatus, from which there is liability to breakdown and for which repairs must be carried in stock, etc. He further gives a view of the wiring of a noncommutating-pole motor and a complicated diagram of a commutating-pole motor.

Only Two Interpoles Are Needed

Instead of adding four poles, as shown in this drawing, it is quite sufficient except in large motors, to install two commutating poles and coils. The poles proper are pieces of flat rolled steel, bolted to the frame, and require no attention or repair. From Fig. 4, this is self-evident. The two commutating-pole coils—one of which is shown in this figure—are in structure similar to those for the main poles. It is well known that the trouble caused by modern field coils is practically *nil*, as com-

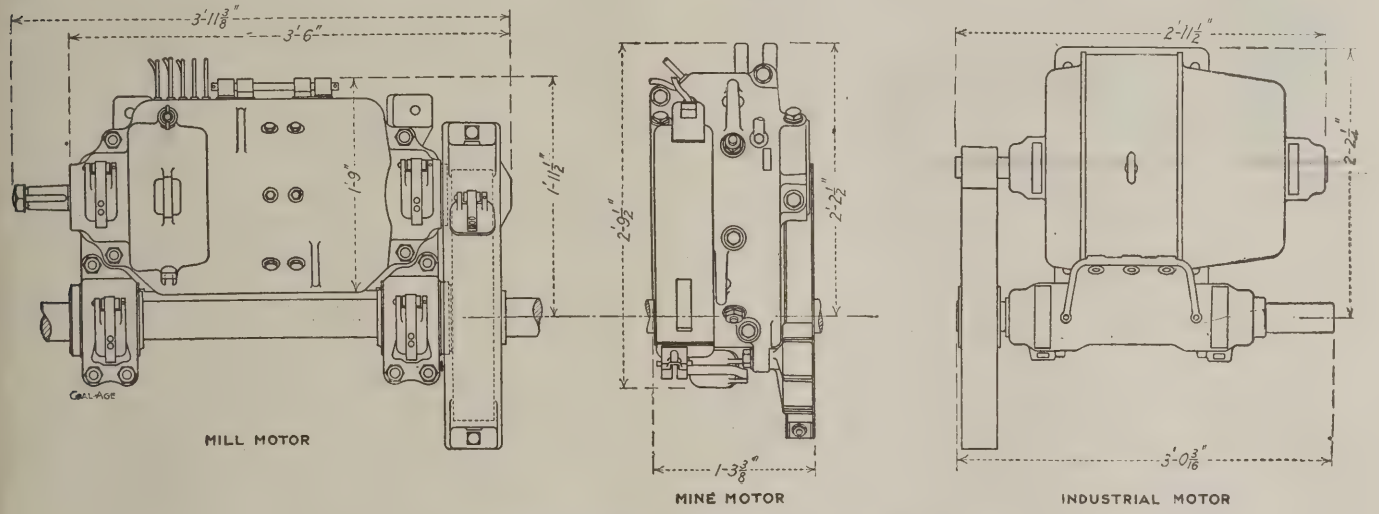


Fig. 3. Relative Sizes of Various Types of Motors

We give herewith two curves taken from a paper by G. M. Eaton, which demonstrates the fact that these conditions are becoming more and more exacting every day. One curve shows the minimum height allowed for mining locomotives over a period extending from 1896 to 1914. It will be seen that there has been a continuous decrease in minimum head room. The other curve shows the relative tractive efforts obtained per inch of height of locomotive as well as that per inch of gage. It will be seen from these curves that there exists a continuous demand for increasing the motor rating, crowded into a certain space.

Fig. 3 shows a mine-locomotive motor, a mill motor and an industrial motor all drawn to scale. These are all commutating-pole machines and have approximately the same nominal rating. This illustrates clearly how it has been necessary to condense machines for mine-locomotive service.

Under the heading, "Commutation Is Not Always to Blame," Mr. Anderson intimates that sparking and its destructive effect are not always due to motor design. While it is quite true that excessive vibrations and commutators out of round may cause sparking, we do not see why one should prefer a noncommutating-pole motor pared with that experienced with brushes, commutators and armatures of motors without commutating poles.

The installation of commutating poles means, therefore, the addition of a few extremely simple parts, which are not subject to wear and which practically never give trouble, for the purpose of eliminating marked wear, much trouble and the necessity for repair.

Fig. 5 shows a commutating-pole motor with all necessary wiring, as it is actually installed by the Westinghouse Electric & Mfg. Co. This is in marked contrast to the sketch given by Mr. Anderson, in an apparent attempt to make the connections look as complicated as possible.

A few other points may be of interest in connection with the question of commutating-pole, versus, noncommutating-pole motors.

The absence of interpoles and the consequent poor commutation often leads to other troubles. Bad commutation means, in most cases, a quick roughening of the commutator. A failure on the part of the operator to smooth this by sandpapering, or even turning, will result in vibration of the carbons. Thus, a replacement or repair of brush-holders is often made necessary by the absence of commutating poles.

Bad commutation and the consequent wearing and breaking of carbons also, frequent sandpapering of the commutator, all lead to the accumulation of carbon and copper dust inside of the motor. This forms a good conductor and is often the cause of insulation breakdowns and consequent burnouts of the various parts of the motor, meaning again, additional expense for repairs and operating delay caused by the absence of commutating poles.

Again, bad commutation means that the commutator, instead of assuming a polish, will blacken and cover all over with a film of carbon and copper. This leads to the breaking down of the insulation between the commutator segments, and an arc flashing over between the brush-holders. This arc, when once established, will sometimes

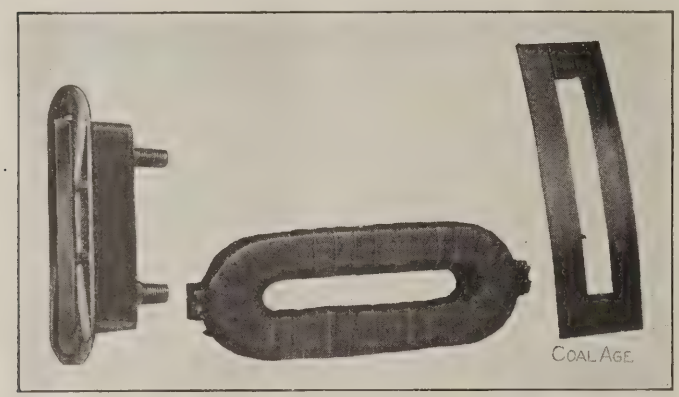


FIG. 4. THE THREE PARTS OF THE COMPLETE COMMUTATING POLE

burn holes into the commutator copper; sometimes, it will burn the insulation of the commutator V-ring, while at others, it will even burn the insulation of the armature and field coils in the neighborhood of the commutator, necessitating the replacement or rewinding of these parts with attendant operating delays.

The operation of the commutating-pole motor stands in marked contrast to all this. An interesting case, which has come to the writer's attention, and which is typical of the limited inspection with which a commutating-pole

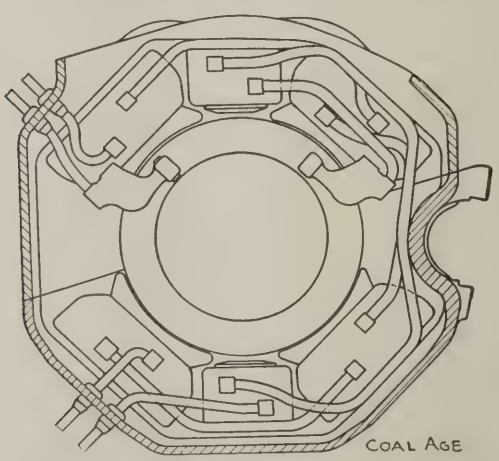


FIG. 5. CONNECTIONS FOR MOTOR WITH TWO INTERPOLES

motor may be operated, is the first locomotive furnished by the Westinghouse Electric & Mfg. Co., supplied with commutating-pole motors. In this case, it had not been necessary to open the motor during 18 months of service, nor even to remove the commutator cover to inspect the motor. After two years' and ten months' service, it had not been necessary to make any repairs or to even replace carbons.

Similar results have been obtained with most commutating-pole motors.

Special reference might here be made to the fact that commutating-pole motors have given so good results in connection with trolley-car and heavier traction work, that it is practically impossible nowadays to sell anything but this type of machine in this line.

In conclusion, therefore, it may be stated that those manufacturers who have spent large sums of money for developing commutating-pole motors to supersede their old lines of noncommutating-pole machines, have done so after carefully considering the merits of the case. And they have succeeded in giving to the trade a vastly improved product.

Don'ts for Superintendents

Don't fail to have safety gates at the top and at each lift of every shaft and heavy pitch slope wherein men are lowered and hoisted.

Don't fail to provide safety overwinding devices on all shafts where men are lowered and hoisted.

Don't fail to provide safety switches or blocks above all breakers to safeguard loaders.

Don't fail to have doors and stoppings constructed as required by the mine law.

Don't fail to provide every mine with a sufficient number of danger signals or signs.

Don't fail to see that all rules are observed for the handling of explosives.

Don't allow any person in a state of intoxication to go into any mine.

Don't fail to observe the mine law pertaining to ventilation so as to maintain healthful and safe conditions.

Don't fail to observe the law relating to sinking new shafts.

Don't fail to use every precaution to insure the safety of the workmen in all cases.

Don't fail to provide an efficient alarm or light to be attached to the front end of every trip pushed by a motor inside the mine.

"Too Busy To Read"

He is a familiar type—the fussy, fretful man who imagines that he is about the busiest fellow in town. He often dumps in the waste-basket unwrapped copies of business or technical magazines that contain valuable articles bearing directly on his problems. He fondly believes that he is too busy practicing to bother with what others are preaching.

The trouble with this type of man is that he has not learned that the real executive is the man who so plans his work as to leave a reasonable amount of time for reading and planning.

There are shoals and breakers ahead when the accumulation of new ideas ceases. The man who declares he has no time to read is unconsciously advertising his small caliber, his slavery to detail, his arrested development.—*Printer's Ink.*

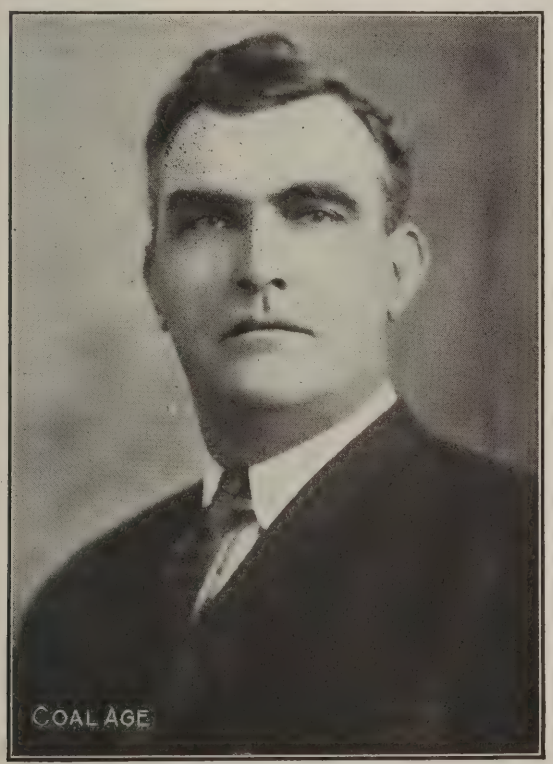
Note—Taken from Susquehanna Coal Co.'s book of instructions.

Who's Who in Coal Mining

Robert Marshall Irving

There is one race to which the coal industry is greatly indebted for many of its men, its ideas and traditions. Just as a duck takes to water as its natural element, the Scotchman takes to coal mining as his life's work. And, as a general rule, they don't remain at the digging game very long, for their proficiency usually brings advancement to positions of trust and authority.

Over in Ayrshire, Scotland, about the year 1870, Robert Marshall Irving had a son, who was named Robert Marshall, Jr. When the boy was 10 years of age, he began working in the mines in Ayrshire, and continued



R. M. Irving

at this employment until he was a young man of 20 with hard muscles and plenty of experience in digging coal from the bowels of old mother earth. Scotland isn't a very large country and Robert discovered that there were more people there to the square mile and fewer opportunities than there were in the newer world across the ocean. So, in 1890, he emigrated to America, landing in Blosburg, Ala.

Just as soon as he could get his overalls on, he started work in a mine in Jefferson County, later changing to another mine in Walker County, Ala. After two years of such employment he started north, landing in the Block coal field at Knightsville, Ind., in 1892.

After five more years of hard, earnest work in the Indiana mines, he secured a job as pitboss; this gave him a hold on the ladder that leads upward, and neither elements nor men have been able to shake him loose.

It wasn't very long after this when Mr. Irving was advanced to the position of mine superintendent, which job he held for nine years, resigning the place to accept employment as a district mine inspector in Indiana. The duties of this latter position occupied his attention for five more years, when his experience and ability were recognized through his advancement to the general superintendency of the Monon Coal Co., with headquarters at Terre Haute, Ind. He has served four years with his present company.

At the inauguration of the Mine Inspectors' Institute of America, held at Indianapolis, Ind., Mr. Irving was elected third vice-president of that organization. Like most men who have aspired to be something more than a miner, and yet who have not had the advantages of an early education, he has been compelled to gather his theoretical training at odd moments when the opportunity was afforded him. It is this kind of training that sticks best, for it is always gained through much personal sacrifice. Mr. Irving's night study enabled him to complete an entire correspondence course in mining, which training, added to his years of experience in all positions from miner to super, has rounded him into a coal official, whose opinions carry weight in the field of his employment.

War Makes Many U. S. Citizens

There has been a marked increase in the number of applications for first citizenship papers at the prothonotaries' offices in the anthracite region of Pennsylvania since the outbreak of the European war. None of the companies report the loss of many men by the return of foreign reservists, and some say that they never before had so many men on their payrolls.

There is probably no other labor center in the country where the population is so diverse as at the anthracite mines. One company states that its average payroll last year was 12,782 men. Of the men employed in the course of the year, 6284 were Russians, 5284 Americans or naturalized citizens, 2141 Poles, 1165 Tyroleans, 805 Austrians, 751 Lithuanians, 599 Italians, 522 Slavs, 247 Hungarians and 100 Greeks.

Men of all nationalities are registering with their consuls for a possible return later, but many of them are over military age, many have already been naturalized and as there is a normal increase in population in the anthracite regions, many of the bread winners would be loath to desert their families.

On the other hand, many of the English employees of the mines are going home on account of their better facilities for getting there, and there are a number of miners among them. It takes three years to get a miner's certificate, according to the state laws of Pennsylvania, so these men are more difficult to replace than miners' laborers.

While there is a fair amount of hard coal in storage at present, most of it is of the steam sizes, and there is little domestic coal on hand, so those who are filling their bins now may not be altogether unwise.

In order to reduce the skin effect in conductors carrying heavy alternating currents of high frequency, it is customary to use a specially constructed cable having a hemp center. This type of cable is also required in many long distance transmission lines in order to increase the diameter sufficiently to prevent corona effects due to extreme potentials.

Editorials

Foreign Inquiry for a Large Tonnage

As evidence of the increasing activity in the export business, an inquiry has been received at this office for quotations on a tonnage of not less than 10,000 per month over a period of from one to three years. Quite favorable terms are offered, thus removing one of the most objectionable features the American operators have so far reported in this new business. On the other hand, it is noted that analyses must accompany all bids, which would indicate that the question of quality will be a ruling factor in the situation. Indeed, it is already generally accepted in all quarters that it will require the highest-grade coals we produce to meet the exacting requirements of this prospective foreign trade.

We would be pleased to have any coal company interested in securing a share of the prospective foreign business, communicate with us, in order that we may turn over to them any inquiries or information we receive relative to foreign opportunities. A representative of COAL AGE is now on the way to South America.

The Economic Resources of the United States

The present European hostilities have furnished a good opportunity for investigations, both public and private, for the purpose of ascertaining our own national resources. These inquiries have been conducted with a view to extending American foreign commerce, learning how far, or how nearly, we may supply at home many of the commodities heretofore imported from the Old World, and also with a view to discovering just how nearly we are or might become a self-sustaining country in time of national peril or calamity.

The Bureau of Foreign and Domestic Commerce is in daily receipt of many letters from American manufacturers and producers making inquiry regarding possible markets abroad for their surplus products, also as to the ability of the United States to supply the raw materials necessary to their industries. The investigations necessay to the intelligent reply to these letters have revealed the fact that in many instances materials imported from abroad are of a kind and nature already found in this country, the production of which is, however, at the present time in its infancy. This is particularly true of many chemical industries, the basic materials for which are now being partially utilized, whereas a few years ago, they were utterly wasted.

The position of the United States is peculiarly fortunate in its ability to supply the three primary requirements of man, in the shape of food, shelter and clothing. This is clearly demonstrated by an inspection of the figures showing the country's production of these commodities relative to that of the world.

There is no question but that the people of this cohntry may be fed from food-stuffs of home production. The United States has an area of somewhat over 3½ million sq. miles under climatic conditions which are highly varied. This area is equal or nearly equal in extent to the whole of Europe, which supports a population five times as great as that of this country.

Agricultural development in Amrica has not progressed to the degree of perfection attained by the people across the sea, and we may, therefore, legitimately expect that our production will incrase greatly in the future.

Even in our present status, this country produces over 2½ billion bushels of indian corn, which is approximately two-thirds of the world's supply. For the current year the wheat crop is estimated at 911,000,000 bushels, or about one-fifth of the world's yield. This country annually produces approximately 1,000,000,000 bushels of oats, or 25 per cent. of the world's crop, also something like 197,000,000 gal. of cottonseed oil, the food value of which as a substitute for olive oil is gradually becoming more recognized.

America possesses 15 per cent. of the world's cattle, or 59,000,000 head; this is twice the number raised in Argentina, and one-half as many as are maintained in India. We also have 50,000,000 sheep, 60,000,000 hogs and 24,000,000 horses. On the other hand, we import 2,500,000 tons of sugar, or approximately 1½ times the amount produced in continental United States and its island possessions.

So far as textiles are concerned, the United States produces over 14,000,000 bales of cotton annually, or one-half the world's supply, a little less than 300,000,000 lb. of wool per year, this being supplemented by approximately 238 million lb. of foreign wool and importations of woolen goods to the value of $34,000,000.

As regards mineral production, the position of the United States is unquestionably preëminent. We produce 40 per cent. of the world's coal, 238,000,000 barrels of petroleum, or ⅔ of the world's output, 57,000,000 tons of iron ore, out of the world's production of 132,000,000 tons; and, during 1912, nearly one-half of the world's copper came from American mines. The world's annual production of gold is valued at $466,000,000, and of this total output in 1912, the United States furnished approximately 20 per cent., being exceeded only by South Africa. Twenty-eight per cent. or thereabouts of the world's silver, and 30 per cent. of its lead are produced in this country.

In the value of its manufactures, the United States excels the world, but the product of its mills is almost entirely consumed at home. Of manufactures to the value of $21,000,000,000 produced in the United States in 1909, only about 5 per cent. found its way to other countries, the foreign markets for iron and steel, cotton goods, chemicals and many other industrial products, being held by various European nations.

The above figures indicate clearly the strong position which this country holds in regard to those factors of

national wealth which render a people self-sustaining. They may, to a certain extent, be summarized as follows: With 7 per cent. of the world's land area, we have 6 per cent. of its population; we produce 68 per cent. of the world's supply of corn, 20 per cent. of its wheat, 50 per cent. of its cotton, 10 per cent. of its sugar, 35 per cent. of its tobacco, 15 per cent. of its cattle, 40 per cent. of its coal, 63 per cent. of its petroleum products, 55 per cent. of its copper, 44 per cent. of its iron ore, 20 per cent. of its gold; and we have farm products annually to the value of $9,751,000,000, while our various industries annually produce commodities to the value of $20,672,000,000. Our imports for the fiscal year 1914 were $1,849,000,000, while our exports during the same period were $2,365,000,000. These are 9 and 12 per cent., respectively, of the world's total. We have approximately 259,000 miles of railroad, or 38 per cent. of the railway mileage of the globe, and our aggregate weath is figured at $140,000,000,000.

While actual figures of production in themselves mean little or nothing, it is when seen in percentages of the world's total that they become truly significant. We may justifiably believe from the above, that this country could, should the necessity therefor arise, produce all of the necessities of life required by its people, and not a few of the luxuries as well.

Electricity, an Economical Factor in Mining

The aim of every mine manager is to reduce costs. The ever-increasing burdens being placed on the coal industry by legislative action, and through the demands of labor, render it necessary for mining companies to adopt measures of economy wherever such action is possible.

There is more and more evidence coming to hand that shows the considerable saving resulting from the adoption of electricity for power purposes. On p. 454, this issue, attention is called to the economies effected by a Western company through substituting electricity for steam.

We have before us data from still another mine where the same plan was carried out. In this latter case the mining company installed a plant, the total cost of which was $106,000. By the adoption of the scheme, the colliery fuel consumption has been reduced more than 2 per cent. Twenty-five horses have been dispensed with underground, and there has been a great reduction in labor, due to the substitution of mechanical for animal haulage.

Plenty of current is available underground for further extensions in the way of haulage, coal cutting, lighting, etc. And referring to the matter of lighting stations underground, if electricity is not actually more economical, there is no doubt but that it is far more convenient and much safer.

The management of the plant in question represents to us that the saving resulting from the adoption of electricity amounts to 18½ per cent. when expressed as interest on the capital outlay.

In speaking of the initial cost of such installations, we have in mind a plant which was put in at a small mine where the company did not feel able to invest in a complete or elaborate equipment. The entire installation was effected by the colliery staff. Old iron and steel winding and haulage ropes were used instead of copper cables. The surplus power of three-ventilating fan engines, and the sawmill engine was employed, so that only the dynamos, lamps and small lengths of branch cables were required to be purchased. This installation is referred to, not for any real value it possessed, but simply to show how the engineer may adapt himself and successfully apply whatever simple means he may have at hand.

Given the necessary initiative, the mining experience of the purely practical order may have its compensations in that it often compels the engineer to look at science in the light of its real application, and to understand more thoroughly the limits to which one may go when conditions or circumstances are quite unfavorable.

Rescue Work

The important work of rescue after a serious mine accident, should be standardized as much as possible. Conditions, of course, differ, so that hard-and-fast rules cannot be laid down; however, there should be the broadest possible exchange of ideas and experiences, so as to perfect as far as possible an effective service.

Many mistakes have been made in recovering mines after accidents. Lives have been sacrificed unnecessarily. Some points gathered from recent experience may well be repeated and emphasized!

Every corps going underground, for the purpose of rescuing entombed miners, should carry, aside from the ordinary outfit, additional apparatus to be used as a "salvator." When men are found overcome by gas, a salvator should be fixed on each one, and he should be brought back to the rescue base. If a team comes across two men, one injured and the other uninjured, the latter should be brought out first, and on the second trip, the men should take in a stretcher and upon it convey the injured man to a place of safety.

The European practice of establishing a base where doctors, inspectors, colliery officials, ambulance men with stretchers, and all others following the team and who are not provided with apparatus must stop, is a good plan. At such a base the team leaves a canary and all their spare gear. Those without apparatus on coming up must not advance beyond this point.

If, on returning to the base, the rescue team finds the bird alive, they can take out their mouth piece to speak, but if the canary is dead, everyone will know that the gas has backed up, and all will proceed to the shaft bottom or the surface, where they can secure another bird.

These suggestions may not seem so consequential to many, but it is the neglect of small details that has so often caused disaster. We would be glad to have any of our readers add further precautionary measures, suggested by their own experience.

Oil from Coal

The nations of the world are turning more and more to the use of oil for burning under boilers on the smaller battleships. Coal operators need not be alarmed at this tendency to replace coal, for the supply of oil suitable for power purposes in the world today is hardly adequate to satisfy the present urgent demand. It is probable, therefore, that the application of a little sense and science to the subect on the part of the coal industry will bring about the manufacture of all the oil needed from those coal seams which readily yield such a product.

Extracts from a Superintendent's Diary

Occasionally seven-passenger touring cars and sometimes larger ones loaded to capacity with pleasure seekers pass through our camp. We are not exactly on a main highway, but we are near enough to one to be considered accessible by any whose curiosity suggests a visit to a miner's village.

Honk, honk, we hear them coming long before they arrive, and at the first intimation of their approach, the small children (we are always well supplied with children) grab up their marbles from the streets and make for the sidewalks. They have long since learned that automobilists have little sympathy for kids who play on streets. As they pass by the staring children they inquire the way to my office and immediately on arrival one of the party comes blustering in and condescends to introduce himself, and then without further preliminaries, suggests that the party which he has the honor to represent would like to make a trip underground.

Of course, these requests generally have to be denied, but I always take special pains to explain fully that we are compelled to have very strict rules governing such matters, and then I suggest that with sufficient advance notice it is possible sometimes to arrange such trips, notwithstanding the fact that the company management views them with increasing disfavor because of the risks which must be assumed by all parties concerned under the most favorable conditions.

Disappointed in the main adventure, they do not tarry long, but as they retrace their way through the camp, they feel called upon to converse with some of the children and even some of the grownups, if any chance across their path.

Afterward, by comparing notes, the ones interviewed are able to decide just what the outside world thinks of us.

The picture is always the same, it is the picture of the yellow journals; miners toiling in darkness from sunrise until sunset, earning tremendous wages which they never receive because of the coal barons, who despoil them just as they despoil the starving, freezing dwellers of the city tenements.

I find that similar opinions are held by the vast majority of people, who have no personal knowledge of the mining industry.

My oldest boy, who is away at college, is always in hot water because he lets his temper get the best of him whenever any of his associates inadvertently comment on some reporter's story about a mine strike, or a mine explosion, which reflects discredit upon the mine management.

I have just returned from a vacation trip, and, while traveling about, heard coal-mining men discussed a good deal in Pullman smoking compartments, because as it happened, a group of them were trying to get control of a large tract of coal land in the state through which we were passing.

Sometimes I put in a good word for the "barons," but at other times when every other member of the party expressed such hostile views and came out with them so impulsively, I quite lost my nerve and took out my resentment in biting fiercely on my cigar.

If it were not for the frequent strikes that disrupt and terrorize the industry, it would make little difference to the average mining man as to just what the world at large thought of him, but it is becoming more and more evident that during such times public opinion has much to do with the final outcome and we are incredibly handicapped by the public's willingness to judge us by previously formed opinions which are so unjust to us, but which so closely agree with the statements issued by the strike leaders at every opportunity.

Recent Legal Decisions

Reservation of Coal in Deed—When land is conveyed under a deed which reserves to the seller all coal underlying the land, excepting that reserved by him in a previous deed to a third person, and it appears that in fact there was no reservation of coal under such earlier deed, the purchaser takes no interest in the coal, for lack of any definite description of the quantity intended to be conveyed.—(West Virginia Supreme Court of Appeals, Cummings vs. Hamrick, 82 South eastern Reporter, 44.)

Liability Under Montana Coal-Mining Code—A completed tunnel in a coal mine, used by a miner as a passageway, is not a "working place" within the meaning of the requirements of the Montana Coal-Mining Code that miners must inspect and keep safe their working places; the duty to inspect such a tunnel devolving upon the company's foreman. A miner did not assume the risk of being injured through fall of overhanging loose rock in a tunnel, by reason of the fact that he made a visual examination of the place and found it to be apparently safe. A coal company and its superintendent and assistant foreman are jointly liable for their negligent failure to make proper inspection and repairs to secure the reasonable safety of employees, if injury results to one of the employees as a direct consequence of such failure. (Montana Supreme Court, McInnes vs. Republic Coal Co., 140 Pacific Reporter 235.)

Liability for Injury to Miner—A mining company cannot be held responsible for injury to a miner, caused by a blast in an adjacent entry breaking through the intervening wall or rib, on the theory that the company failed to furnish a reasonably safe place for work, if the condition existed by reason of the fact that the miner or his coemployee in the adjacent entry, or both of them, drove their headings unduly wide. "This did not constitute an unsafe place within the common-law doctrine of the master's duty in respect to furnishing his servant a safe place in which to do his appointed work, for the reason that the work in which intestate and his coemployee were engaged created the place itself and the defective condition of which plaintiff complained." Nor can recovery against the employer be sustained on the theory of negligence in failing to discover the unsafe condition, if the condition was created by the blast which caused the injury. (Alabama Supreme Court, Sloss-Sheffield Steel & Iron Co. vs. White, 65 Southern Reporter 999.)

Effect of Mining Contract—Defendant lent money to plaintiff to develop a coal mine, and agreed to purchase the entire output under a contract which contained this clause: "The prices named in this contract are based on the present Michigan mining rates of $1.01 per ton, and shall be increased or reduced on all sizes of coal as said mining rate may advance or decline, during the life of this contract." At the date of the contract an agreement between the coal operators and the Miners' Union fixed the prices paid by the operators for various kinds of work, but later a new agreement was made. The former agreement fixed the pick mining scale "for 30 in. of coal and upwards" at $1.01 per ton, and the later agreement increased this item to $1.06. Defendant construed this as increasing the price five cents per ton on all sizes of coal and made payment accordingly. Plaintiff claimed that the new agreement with the miners involved an increase of 5.26 per cent. in the cost of producing all coal, and brought suit to recover the amount remaining due from defendant on that basis. Held that the contract between plaintiff and defendant must be construed as fixing the rate for mining 30 in. coal as the basis for any increase or decrease in the contract price of the coal, irrespective of other items connected with the cost of mining. Hence, plaintiff is not entitled to recover. (Michigan Supreme Court, Caledonia Coal Co. vs. Consolidated Coal Co., 148 Northwestern Reporter 187.)

Sociological Department

First Aid Meet at Valley View Park

Keen but friendly rivalry marked the efforts of 16 first-aid teams to capture the Captain William J. May cup in the 9th annual field-day contest of the Pennsylvania Coal Co. and the Hillside Coal & Iron Co., held at Valley View Park, near Wilkes-Barre, on Saturday, Sept. 12.

Captain May is regarded as the father of first-aid contests in the anthracite field. Nine years ago he conceived the idea of bringing the various first-aid corps of the collieries under his jurisdiction together in friendly contests, and in order to incite interest and increase proficiency among the various teams, he donated a loving cup. To retain permanent possession of this trophy it is necessary for one team to be credited with three victories.



EWEN BREAKER TEAM, WINNER OF CAPTAIN MAY CUP

Left to right: Harry Skinner, Tony Polis, Joseph Vanderberg, Wm. Scott, Wm. C. Davies, captain.



MEN WHO TOOK PART IN INDIVIDUAL CONTEST

Left to right: John O'Malley, Del Burdick, Thos. E. Ross, winner, Alex Graham, Moses Ballentine, Wm. Garigan.

The 16 teams which gathered this year at Valley View Park came from the various divisions of the company, Mayfield, Dunmore, Avoca, Forest City, North and South Pittston being represented. Three problems were given each team to work out and the team scoring the highest general average was declared the winner.

The Ewen breaker team, known as the Ewen outside team, won the cup this year with an average of 98, having made a perfect score in two of the problems. The Old Forge breaker team of the Avoca district was second with a general average of 96 and the Mayfield colliery team was third with an average of 93⅓.

Aside from the general events there was an individual contest in which six men participated, these being selected from the different districts. Handsome prizes were offered for their solution of a single problem. A gold watch was offered the winner, a gold chain went to the second best, a pair of cuff links to the third, a scarf pin to the fourth, a safety razor to the fifth and an umbrella to the sixth.

Besides working out the single problem, each contestant in this event was taken before the judges and for a period of five minutes was quizzed along various lines of first-aid work. The success of the contestant depended as much on this mental examination as it did on the field work, and after much delay, Thomas Ross, representing the North Pittston district, was declared the winner, with an average of 95. John O'Malley, of Mayfield, was second, and Moses Ballentine, of Avoca, third.

The judges were highly complimentary of the work displayed in the individual contests and also spoke in flattering terms of the efforts of the various teams, one of the judges remarking that he had seen some exhibitions during the day which would challenge the very best efforts of a highly proficient doctor or surgeon.

Event No. 1 was for three men only. Problem: "Show two methods of performing artificial respiration, one with arms broken or burned. Show how to use control of arterial bleeding from all parts of body by the use of the triangle and roller bandages. Use of roller bandage optional." Time limit, 10 minutes.

Even No. 2 was for four men. Problem: "Wound extending from front of right ear to middle of top of head on a line with the ears; fracture of left lower jaw; wound of left groin, and upper front part of thigh. Bad sprain and constusion of right ankle with extensive swelling." Time limit 10 minutes.

The third event was for full teams. Problem: Fracture of middle of index finger of left hand. Fracture of middle upper right arm. Compound fracture at middle of left thigh. Both eyes injured by shot. In addition, the man is unable to use right leg. If asked to move his leg, it is seen that he is entirely helpless. Treat for this condition as you think best." Time limit, 15 minutes.

The judges awarded marks as follows to the 16 teams in the three events, the average of which decided the winner:



No. 5 Shaft, No. 6 Colliery Team and Subject



Erie Colliery Team, Mayfield District.

Team	District	Event No. 1	Event No. 2	Event No. 3	Aver.
Ewen Breaker.....	South Pittston	94	100	100	98
Old Forge Breaker..	Avoca	88	100	100	96
Erie Colliery.....	Mayfield	97	88	95	93⅓
No. 2 Shaft.....	Dunmore	92	95	90	92⅓
No. 9 Breaker.....	North Pittston	97	84	95	92
Coray Slope.....	Avoca	97	88	90	91⅔
No. 10 Shaft.....	North Pittston	89	100	85	91⅓
Forest City Breaker	Forest City	90	89	95	91⅓
No. 1 Head.....	North Pittston	98	90	85	91
Old Forge No. 1....	Avoca	94	86	90	90
No. 2 Shaft.....	South Pittston	95	88	87	90
Old Forge No. 2.....	Avoca	82	100	85	89
No. 5 Shaft.....	South Pittston	95	90	75	86⅔
No. 1 Shaft.....	Dunmore	89	81	90	86⅓
No. 7 Shaft.....	North Pittston	95	78	82	85
New County and Gray Slope.....	Forest City	88	89	75	84

In the Individual contest, there was one representative from each of the six districts and the problem solved was as follows: "Fracture of lower jaw both sides, and wound 3 in. long, running across back of neck. Wound on top of left shoulder and extending across chest to upper end of breast bone. Apply a dressing with triangle to a downward dislocation of right shoulder."

The result of this event follows:

Individual	District	Percentage
Thomas Ross.....	North Pittston	95
John O'Malley.....	Mayfield	94
Moses Ballentine.....	Avoca	92
Alex Graham.....	South Pittston	80
W. G. Garigan.....	Dunmore	79
Delbert Burdick.....	Forest City	77

Following the contests, Dr. H. J. Mahon distributed the prizes.

Dr. F. F. Arndt was director of the contests. The other officials follow: Judges: Drs. W. G. Fulton, F. J. Bishop, B. B. Wormser and W. A. Peck. Timekeeper, F. C. Weichel. Recorder, F. D. Conover. Managers, Frank H. Coughlin, W. P. Jennings, Davis Girvin and H. T. Mullen.

Members of the different teams which took part were as follows:

No. 2 shaft Mt. Dunmore—William Bulger, captain; Matthew Richards, Andrew Callo, William Tweksbury, John Wallace, John Kline, subject.

Shaft No. 5, No. 6 colliery, Inkerman—Peter Hollihan, captain; John Purcell, Patrick Flaherty, William Lynch, Bernard Corcoran, Richard English, subject.

Ewen Breaker, Port Griffith, outside—William Davis, captain; Joseph Banbenburg, Harry Skiner, Anthony Polis, William Scott, Daniel Mullery, subject.

Colliery No. 10, Hughestown—Michael Noone, captain; William Hart, Thomas Walsh, Harry Toole, Michael Quinn, Thomas Maloney, subject.

Mayfield colliery—John O'Malley, captain; James McDonald, George Mahalcki, George Kehoe, Clement Farrell; Jeremiah Gallagher, subject.

Shaft No. 1, at colliery No. 9, Hughestown—Edward Quinn, captain; George Heimarch, James Flynn, Frank Scheiber, Charles Lahey, Edward McCloskey, subject.

Outside No. 9 breaker, Hughestown—Thomas Ross, captain; John Miller, Louis Heal, Harold Herbert, Arch Eshelman; Max Melcher, subject.

Leadville shaft, North Pittston—Alexander Tait, captain; James Scott, Patrick Walsh, Martin McGarry, John Cooper; James Toner, subject.

Old Forge breaker—Moses Ballentine, captain; Michael Quinn, Thomas Cranston, Harry Newton, William Bennett; George Robinson, subject.

Shaft No. 2, Old Forge—Henry Odgar, captain; William Odgar, Edward Slattery, Edward Finley, Joseph Shively; Max Stack, subject.

Shaft No. 1, Old Forge—John Lewis, captain; Frank Joyce, John Joyce, William Garrett, Charles Sherrer, Oscar Stetler, subject.

Shaft No. 1, Dunmore—Julius Thomous, captain; Thomas White, John Merrick, John Sagan, John Lakas, John Lock, subject.

Corey Slope, Old Forge—Frank Young, captain; William Tigue, William Major, Charles Boose, Edward Harrison, Walter Goldworthy, subject.

Forest City colliery, outside—James Johnson, captain; Earl Pancaust, David Evans, George Holmes, John Stork, David Williams, subject.

Gray slope, Forest City—John Jones, captain; Walter Johnson, David Simonson, George Carpenter, Robert Davis, Joseph Swallon, subject.

South Pittston No. 4—Bernard McDowell, captain; Robert Shelby, Daniel Brennan, Ben Howard, John Owens, Fred Jenning, subject.



The Four Judges

Left to right: Doctors B. B. Wormser, F. J. Bishop, W. A. Peck, W. G. Fulton.

Discussion By Readers

Keeping Rooms on Sights

Letter No. 2—Referring to the inquiry by Mine Foreman, COAL AGE, Aug. 22, p. 317, in regard to keeping rooms on sight, permit me to say that the only satisfactory system that I have ever seen used is to run a whitewashed line up the room on sight, as there suggested.

It is very little work to put in these whitewashed lines and extend them as the room advances. If any falls of rock or timber occur, at least a part of the line will be left remaining so that it can be extended when required. Where tracks are laid up the rooms, I consider that it is preferable to put the whitewashed lines over one of the rails. This rail should be at a fixed distance from the rib, depending somewhat on the system of mining, so that the miner will know that the rail which comes under the whitewashed line is such a distance from his rib. By using this system the rooms can be "kept on sight" and as the foreman watches the width of the rooms the pillars can be kept within a foot of their standard width.

In establishing the whitewashed line, for the first time, the engineers will set the sights the same as for ordinary sight driving; that is to say, by putting two plugs in the roof about three feet apart. In extending the whitewashed line, one man will go to the face with one end of the chalk line, while another man stands behind the sights and holds the other end of the line. The light in the face shows when the line has the proper course. The line should then be tightened and snapped against the roof. This leaves a faint mark, which should immediately be run over with a whitewash brush.

In extending the line again, all that is necessary to be done is to secure two points on the whitewashed line and use the chalk line, drawing it through these points and snapping it against the roof, as in the first instance. If this method is followed carefully the rooms and pillars will be kept a uniform width throughout, and it will only take a short time to educate the miner in this system.

J. F. MENZIES, Manager,
Carbon Hill Coal Co.

Carbonado, Wash.

Letter No. 3—I was much interested in the inquiry in reference to driving rooms on sights, COAL AGE, Aug. 22, p. 317. Having had some experience along that line myself, I wish to say that we found it difficult to keep sights when these were placed in the roof. For this reason, we decided to set permanent stringers across the mouth of each room, about 4 ft. apart. When this was done, we got the engineer to put the room sights on these stringers and have had no trouble since from the sights being lost.

In our mine, the butt entries run N 66° E, and the rooms are turned off these entries at 90 deg. As the face cleats in the coal run nearly north and south, this makes a long corner at the face of the rooms. The sight line is kept about 2½ ft. from the straight rib.

I make a practice of sighting to the face of every working place once each week. If the face in any room is found to be off line, it is stopped at once, and the miner is ordered to take a skip off the rib sufficient to allow of the free passage of the sight line. This practice soon cures a careless miner, because the stopping of the face, cuts off his turn and he is unable to load the same number of cars, which considerably reduces his earnings.

Permit me to suggest that if Mine Foreman, from Kentucky, would provide himself and his assistants with a set of plumb bobs and check up the rooms in the mine once or twice a week, imposing a suitable penalty on those miners who disregard the sights, I believe he would have no further trouble with the holing through of one room into another.

D. W. SEIGHMAN, Fireboss,
McKeefrey C. & C. Co.

Martin, Penn.

Problems in Rescue Apparatus

Letter No. 3—If the quotations of Mr. Elmer, COAL AGE, Aug. 22, p. 314, from an "eminent physiologist, in England," are to be taken as correct, it would mean that we will have to revise very considerably our ideas relative to rescue apparatus. These statements, also, seem to contradict what we have been taught very generally, in respect to the relative amounts of oxygen consumed and carbon dioxide produced in the act of breathing.

Authorities state that atmospheric air consists, by volume, of 79.1 parts nitrogen and 20.9 parts oxygen, with very small percentages of carbon dioxide. Numerous high authorities also state that the average of analyses of air expired from the lungs shows nitrogen, 79 parts; oxygen, 15.5 to 17 parts; and carbon dioxide 4 to 5.5 parts. I find it difficult to harmonize these generally accepted data, with the statements made by correspondent on p. 314. He states:

> The amount of carbonic acid (carbon dioxide) breathed out is the same as the amount of oxygen taken in when a man is oxidizing carbohydrate food, etc.

Again he states:

> If a man is oxidizing fat or protein, which is the chief constituent of meat, he will not expire quite as much carbonic acid (carbon dioxide) as he inspires oxygen. . . . At the most, less than one-third of the oxygen would be turned into water, etc.

Referring to the first of these statements, I drew attention, in a previous letter, COAL AGE, Vol. 5, p. 1062, that of the 120 liters per hr., supplied to the wearer of an apparatus, apparently only 50 liters are consumed in the production of carbon dioxide, the same volume of which is absorbed by the apparatus; and it was explained there, in answer to my inquiry, that the remaining 70 liters of oxygen supplied per hour combined with the hydrogen of numerous hydrocarbons present in the body, to produce water, much of which, as we know, drains from the apparatus. Certainly, this proves that more

oxygen is inhaled than carbon dioxide expired, in the act of breathing. The second statement of correspondent, also, bears out this conclusion.

It is natural to believe, from these data, that, while a portion of the oxygen inhaled is converted into carbon dioxide, another portion goes to form water, and still a considerable portion is exhaled unchanged.

W. H. Moore.

Nanaimo, B. C., Canada.

The Reverse or Counter-Current Theory

Since writing my last letter (Coal Age, Sept. 5, p. 398) in reply to an editorial reference to this subject, I have received my copy of Coal Age for Aug. 22, and read with interest the article of Samuel Dean, p. 294. I notice that Mr. Dean refers to Mr. Verner's theory as the "Counter-Current Theory," and I desire to offer a few criticisms of his statements and conclusions.

In the synopsis, at the head of this article, it would have been well if it had been stated which of John Verner's conclusions had been "accepted" by the British Experimental Station. This would have given point to the argument and have made the article more specific in regard to the application of this theory to the solution of mine explosions. One is left wholly in the dark, however, in regard to what particular points or phases of the theory were regarded as acceptable by the British experimenters.

Again, it may be assumed from Mr. Dean's article that he attempts therein to prove that "there is an inrush of air, as well as an outrush, probably throughout the duration of all explosive phenomena." I have quoted this sweeping assertion from the synopsis at the head of the article. Had the word "all" been omitted, the statement might have been passed by without comment, although it must be admitted that the word "probably" somewhat modifies the assertion. The statement covering, as it does, *all* the phenomena attending an explosion is quite too broad for general acceptation.

Mr. Dean begins his argument abruptly by stating his conclusion that the experiment made for him by Doctor Wheeler, at the Eskmeals Testing Station, proved that the counter-current theory was quite correct. While some may agree with him in this view, to a certain extent, many will take exception to his conclusions, after considering the conditions surrounding the experiment.

The testing gallery used for this purpose was 39 in. in diameter and 400 ft. long and closed at one end. A cannon was placed 50 ft. from the closed end, charged with 1½ lb. of black powder and stemmed with 8 in. of dry clay. A mixture consisting of 70 per cent. coal dust and 30 per cent. incombustible fuller's earth was strewn along the gallery, a half-pound of dust being used per lineal foot. This dust extended from the cannon to within 20 ft. of the mouth of the gallery, or, say a distance of about 350 ft.

Anyone familiar with coal mining can judge how closely the arrangement in this experiment reproduced the actual conditions existing in a coal mine. In the first place, there was no current of air or ventilation in the tube. Again, there was a dead space of 50 ft. behind the cannon, and, as a result, when the cannon was discharged, the initial velocity of the flame caused an outward blast of dust; but, as soon as the air space behind the cannon was rendered partly vacuous by the outward rush of the blast from the cannon, there was naturally a counteraction that caused an inrush of air, bringing a fresh supply of oxygen into the tube. This gave rise to the first pulsation.

It is not so certain what caused the other pulsations, though it is not improbable that they show the ignition and explosion of more dust, following the first inrush of fresh air. It must be quite clear to any studious mind that there was not sufficient air in the tube for the complete combustion of the dust, which fact caused the flame to die out before reaching the mouth of the tube, leaving much dust that would be available for a second explosion of equal or even greater force than the blast from the cannon.

In my opinion, it is exceedingly improbable that the same result would have been obtained had the cannon been placed in the dead end of the tube. The old saying that "nature abhors a vacuum" is clearly exemplified by the inrush of the air following each blast.

Turning now from the Eskmeals experiments made for Mr. Dean, to those made at Altofts, in the larger and longer gallery, it is interesting to note that the interval between each of the photographs taken, at that time, was about $^1/_{22}$ of a second. These photographs are reproduced on plate 5 of the report of the Committee on British Coal-Dust Experiments, and will prove both interesting and instructive, in this connection. The total time occupied by the flame in traversing the tube was estimated to have been $^1/_5$ of a second; and it was stated that the subsequent combustion occupied about a second more.

It is worthy of note that in not a single one of these pictures is there any evidence of a reverse or counter-current. In my opinion, this is wholly explained from the fact that the conditions in the Altofts experiment were practically the same as those existing in the mine. In the Altofts experiment there was a ventilating current passing through the tube, corresponding to the air current in mine airways, which was not the case in the Eskmeals experiment. I believe that the ventilating current made it impossible for a reverse current to be set up, because of the sufficiency of the supply of oxygen for the combustion of the dust. The commencement of the vacuum or condensation stage of every explosion is clearly shown in Fig. 24, p. 30, of the British report to which I have referred.

The experiment made for Mr. Dean at Eskmeals would seem to support the theory of Donald Stuart; but the experiment to which I have referred at Altofts goes a long way toward proving its fallacy. The fact observed in every colliery explosion, that the flame of the explosion is mainly confined to the top or upper portion of the roadways, is clearly demonstrated by facts, since men are seldom burned below the knees and often not below the waist. The force of the explosion, however, is distributed over the whole sectional area of the roadway. In some mines, this may be attributed to the extra fineness of the coal dust lodged on the timbering; or, in gaseous mines, to the presence of small percentages of gas in the air close to the roof of the roadway.

James Ashworth,
Mining Engineer.

Vancouver, B. C., Canada.

Heating of Coal

In reading the editorial entitled The Storage Problem, COAL AGE, Aug. 22, p. 306, my attention was attracted to the following paragraph:

> In fact, that oxidation is not the important cause of heating is evidenced by the fact that coal is slow to become heated; yet all the deterioration in the earlier stages is due to oxidation. Later the coal becomes dried out in the sun and when it is moistened the heat of hydration probably causes it to fire, though other causes are possible.

I am unable to agree with some of these statements. In the first place, the deterioration, in the earlier stages of coal storage is not, by any means, due entirely to oxidation. Much of the deterioration observed in the coal, in respect to its calorific power, is undoubtedly due to the loss of heat units, which it experiences by the liberation of its methane. The deterioration in the heat value of the coal, from this cause, has been recently confirmed by the experiments of Parr and Baker, at the Experiment Station of the University of Illinois (Bulletin No. 32, 1909).

While it is true that oxidation is continually taking place in the coal, during the period of storage, this oxidation is not accompanied by a proportionate evolution of carbon dioxide, which points to the fact as probable that most of the oxygen absorbed by the coal enters into chemical combination with the resinous bodies contained therein; and, if this be true, there is a less production of heat in this combination than would result in the production of carbon dioxide by other forms of chemical reactions.

In the second place, since coal is a very poor conductor of heat, the sun's rays have little effect falling on the surface of the coal to impart heat to its mass. It is a significant fact that heating in coal piles never starts nearer the surface of the pile than 3 or 4 ft. For this reason, the drying of the coal stored in piles must be ascribed to other causes than the heat of the sun. As a matter of fact, continued observations on coal piles show that the coal on the interior of the pile is always damp and, consequently, can never become dehydrated so as to afford opportunity for further hydration to occur in the pile.

It is more probable that the heating, in the later stages of coal storage, may be ascribed to the absorption of oxygen, as carbon dioxide is then liberated in larger measure, accompanied by the evolution of much heat. It has been definitely proven that the production of carbon dioxide increases as the temperature rises, until the action eventually becomes autogenous or self-sustaining and the coal catches fire.

J. B. DE HART.

Coleman, Alta., Canada.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Water Feeders—Water, like gas, not only permeates the softer and more porous rocks, but completely fills the interfoliations of the strata and all cracks and crevices, which form natural channels or underground waterways by which the water flows or drains into the mine. A fault or dislocation of the strata is almost invariably a natural channel that offers little resistance to the flow of water or gas.

A copious flow of water from a fault or from a particularly wet stratum in the rocks or from a crevice in the formations is termed a "feeder." The flow of water from such feeders is variable, being generally greater in wet than in dry seasons of the year. The flow from a water feeder may also be increased by the disturbance of the roof stratum, owing to the rapid development of the mine, particularly when an impervious roof is overlaid with watery strata, or the mine workings are extended beneath rivers, lakes or other bodies of water on the surface.

DITCHING

All mine roads and most passageways should be ditched on one or both sides of the entry or passage, in order to provide suitably for the natural drainage of the roadbed or floor. The lack of proper ditching of mine roads is the cause of much trouble and expense in the maintenance of the tracks, and, in many cases, is the unsuspected cause of the reduction in the daily output of a mine.

It may not, however, be always advisable to ditch a roadway laid on a hard **clay bottom.** The track should then be ballasted with rock or cinders. The disturbing of a clay bottom in a mine passageway often starts trouble from a continued and increasing tendency of the floor to heave. This tendency is more pronounced in some mines and localities than in others. Experience is always the best guide in practice.

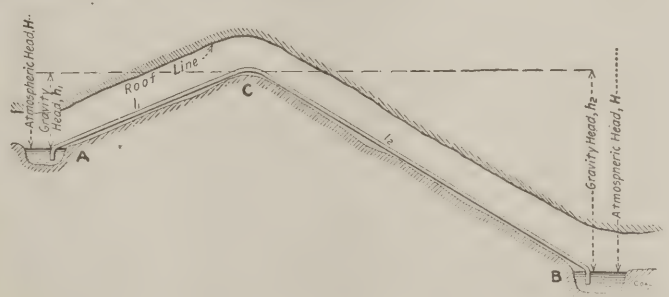
The flow of water in ditches is treated elsewhere; but this is unimportant in its relation to mine drainage, the matter of chief concern in mining work being to dig the ditches and to keep them clear of obstructions that would impede the flow of the water through them.

SIPHONING

The application of the principle of the siphon to mine drainage is of the greatest importance in respect to economy of operation. While ditching is an effective means of drainage in practically level seams or on roads of uniform grade, the process is not practicable when hills and swamps succeed one another in the development of the mine. This necessity for deep ditching is obvious when crossing a slight rise or "roll" in the seam; but the expense, which is often prohibitive, is avoided (when the fall is greater than the rise), by the use of a siphon or pipe line laid over the rise. In this case, it is necessary to collect the water in a sump or basin provided for the purpose, beyond the rise, which will enable the complete submergence of the mouth of the pipe in this basin, this being important in order to prevent air from entering the pipe.

The Coal Age Pocket Book

Principle of the Siphon—The action of the siphon depends on the difference in weight between two columns of water that would otherwise be in equilibrium. The two water columns are contained in the long and short legs, respectively, of a bent pipe, as illustrated in the accompanying figure, which shows a siphon pipe laid in a mine entry and connecting an upper basin A with a lower basin B, the two basins being separated by a rise of gronnd C that prevents the natural flow of water from A into B. The pipe being air-tight, the greater weight of water in the long leg CB overbalances the lesser weight in the short leg AC, and the water flows from A to B by gravity.



IDEAL SIPHON PIPE LINE IN MINE

Conditions and Requirements—It is of the utmost importance for the successful working of a siphon, that all the pipe joints shall be air-tight and that the ends of the pipe should both be submerged to such a depth below the surface of the water, in each basin, as to prevent the entrance of air to the pipe. The submergence required is naturally greater at the intake than at the discharge end of the pipe, owing to the flow of water, in the one case assisting and in the other opposing the entrance of air.

Effective Head of a Siphon—As indicated in the figure, the atmospheric pressure or head (H) is the same at each end of the pipe. The gravity head (h_1) or the vertical rise of the intake end is always less than the gravity head (h_2), which is the vertical fall of the discharge end. The former opposes, while the latter assists the flow of water in the siphon. These gravity heads are often spoken of as the **"suction head"** (h_1) and the **discharge head** (h_2), respectively. Since the atmospheric head (H) is the same at each end of the pipe, this may be disregarded when considering the pipe as a whole; and the effective head of the siphon is therefore the difference between the gravity heads (h_2—h_1).

Inquiries of General Interest

Drawbar Pull on Incline

I would like to ask what will be the drawbar pull, in hauling a loaded trip of 100 cars up a 4-per-cent. grade, under ordinary mining conditions. Each car weighs 1550 lb., and carries 1½ tons (3000 lb.) of coal. Also, what should be the size of the connecting links and of the rope to haul this load, under these conditions?

CHARTER SUBSCRIBER.

Heilwood, Penn.

The weight of the loaded trip, in this case, is

$$L = 100\ (1550 + 3000) = 455{,}000\ lb.$$

On small inclinations, say on grades of less than 10 per cent., the weight of the trip may be taken as the normal pressure of the load on the incline, in which case the coefficient of rolling friction, that in general mining practice may be assumed as $f = 0.025$, is added to the percentage of grade expressed as a decimal and the sum multiplied by the weight of the loaded trip, to obtain the drawbar pull; thus,

$P = 455{,}000\ (0.04 + 0.025) = 39{,}575$, say 30,000 *lb.*

Then, taking the drawbar pull as 30,000 lb. or 15 tons, the diameter (d) of round Swede iron, for an open link, may be calculated thus,

$$d = \sqrt{\frac{P}{6}} = \sqrt{\frac{15}{6}} = \sqrt{2.5} = 1.58\ in.$$

This formula assumes an average strength of Swede iron of 60,000 lb. per sq.in., and allows a factor of safety of about 7.5, for a steady pull; or somewhat less than 4, allowing for shock.

In order to determine the size of rope required to haul this trip, it is generally necessary to know the length of the incline, as the load on the rope is increased by its own weight and friction on the incline. But, in this case, the additional load due to the weight and friction of the rope, has been more than covered by taking the load as 30,000 lb. For example, assuming for trial that the rope weighs 2 lb. per lineal foot and the incline is 1000 ft. long, the total weight of the rope would be $2 \times 1000 = 2000$ lb., which would make the total load resting on the incline 455,000 + 2000 = 457,000 lb.; and the load on the rope, at the top of the incline, is then $457{,}000 \times 0.065 = 29{,}705$ lb.

Wire-rope tables give the breaking load of a 6-strand, 7-wire, cast-steel haulage rope 1 in. in diameter, as 37 tons. Calling the safe working load L, in tons, and the factor of safety f, the breaking load is fL; and since the breaking load of a rope is proportional to the square of its diameter d,

$$d^2 : 1^2 :: fL : 37$$

and

$$d = \sqrt{\frac{fL}{37}}$$

The rope constants for 7-wire haulage ropes are as follows: Swede iron, 16; cast steel, 32; extra strong cast steel, 37; plow steel, 42. The constants for 19-wire hoisting ropes of the same grades are 17, 34, 39 and 44, respectively.

Therefore, taking the total load on the rope as 30,000 lb., and assuming a factor of safety, in this case, of 5, the diameter of a 6-strand, 7-wire haulage rope required for this haulage is

$$d = \sqrt{\frac{fL}{37}} = \sqrt{\frac{5 \times 15}{37}} = \sqrt{2.03} = 1.42,\ say\ 1.5\ in.$$

Anemometer Readings

I would very much appreciate an answer, through the columns of COAL AGE, to the following question:

What causes an anemometer to revolve faster when the dial is facing the air current, than when the air strikes the back of the instrument? When the dial faces the current, the instrument registers 1000 ft. per min., and when the back of the instrument is toward the air current, the registry is only 900 ft. per min.

D. W. SEIGHMAN, Fireboss,
McKeefrey C. & C. Co.

Martin, Penn.

In the use of the anemometer, in practice, it should be held at arm's length toward the wind, and in such position that the air strikes the back of the instrument. No obstruction is then offered to the air before it reaches the blades. It is important to hold the instrument so that the blades revolve in a plane normal to the air.

Every precaution must be taken to avoid the disturbance and deflection of the air before it strikes the instrument. To do this, the observer should face the side of the entry, so that his body will offer the least resistance to the air current. Holding the instrument, as stated, at arm's length toward the wind, the air striking its back, and holding his watch in the other hand, the observer touches the spring that throws the dial hand into gear, again releasing the dial, at the end of the time of observation, one or more minutes.

There are several things that may cause the disturbance and deflection of the air current before it reaches the instrument. In the first place, the body of the observer holding the instrument interferes seriously with the air travel, disturbing and deflecting the air before it reaches the instrument. However, when the face of the dial is toward the air, a still greater effect is produced by the outward radial deflection of the air striking this face. The dial deflects the air outward, radially, thereby increasing the pressure on the ends of the blades, thus giving to the vane a greater speed and producing a higher reading than would otherwise be registered.

This same question was answered some time ago in COAL AGE, Vol. 4, p. 871; but, owing to its importance, we are glad to explain the difficulty again. An instructive article in regard to the use of the anemometer will also be found, in the same volume, p. 655.

Examination Questions

Miscellaneous Questions

(Answered by request)

Ques.—What is meant by permissible explosives, and why are they termed thus?

Ans.—A permissible explosive, as defined by the Federal Bureau of Mines (Miner's Circular No. 6, p. 8), is any explosive similar in all respects to the sample that passed certain tests made by the U. S. Bureau of Mines and when used in accordance with the conditions prescribed by that bureau. The conditions and use prescribed by the Bureau are as follows:

1. That the explosive shall be, in all respects, similar to the sample submitted for test.

2. That the detonator used to explode the charge shall consist by weight of 90 parts of mercury fulminate and 10 parts of potassium chlorate, or their equivalents.

3. That the explosive, if frozen, shall be thoroughly thawed in a safe and suitable manner, before use.

4. That a charge shall be used not to exceed 1½ lb. (680 grams), which shall be properly tamped with clay or other noncombustible stemming.

Ques.—What are the advantages and disadvantages of the longwall retreating system of mining coal?

Ans.—The longwall retreating system of mining permits the relatively safe extraction of the coal in a seam overlaid with bad roof, or in seams of exceptional thickness or lying at a great depth below the surface. The system also possesses the advantage of reducing the expense for maintaining roadways in the mine, because these are all driven in solid coal. Also, less timber is required than in the advancing system.

The retreating system of longwall has the disadvantage of yielding slower returns on the capital invested, although this is partially offset by the reduced cost of production that results in most cases. Mining is generally safer in the retreating system than in the advancing system of longwall.

Ques.—What is the declination of the magnetic needle, in surveying, for Montana?

Ans.—The declination of the magnetic needle varies from 15 deg. E., in the southeast corner of the state, to about 22 deg. E., in the northwest corner. For central Montana, the present declination is about 19 deg. E.

Ques.—Is there any rule for determining the slant of timbers in pitching seams? Say, in a seam pitching 30 deg., at what slant should a timber be set?

Ans.—To withstand the roof pressure in a pitching seam, timbers should be set normal in the seam or perpendicular to the roof and floor; but, owing to the sliding movement of the roof down the pitch when the coal is extracted, all post timbers in pitching seams are "underset" or inclined slightly up the pitch, the amount varying with the inclination and thickness of the seam and depending also on conditions in the seam that affect the slipping tendency of the roof. No rule can be given but the underset of a post must be guided by experience, in any given locality.

Ques. 47—For what purpose is the air exhausted from the bulb of an incandescent lamp?

Ans.—The exhaustion of the air from the bulb of the lamp prevents the oxidation and destruction of the filament.

Ques.—How would you proceed to clear a shaft that is filled nearly to the top with carbonic acid gas?

Ans.—Assuming the shaft in question is being sunk, much of the gas may be bailed out with large buckets. This, however, is a slow process, and where the shaft generates large quantities of this gas, it is advisable to install a powerful blower that will exhaust the gas from the bottom of the shaft. The method sometimes employed, of pouring several barrels of water into the shaft, can only be used with success in a shallow shaft, and possesses the disadvantage that the water must be bailed out again. In sinking, under these conditions, a shaft should be equipped with air tubes and a suitable blower arranged to exhaust the air and gas.

Ques.—If 20,000 cu.ft. of air is passing per minute through a circular airway, 10 ft. in diameter, how many cubic feet per minute will the same pressure pass through an airway of the same length and 6 ft. in diameter, other conditions being the same?

Ans.—For circular airways of equal length and for the same pressure per square foot, the quantity of air circulated will vary as the square root of the fifth power of the diameter of the airway. In other words, under the given conditions, the quantity ratio is equal to the square root of the fifth power of the diameter ratio. Hence, in this case, calling the required quantity of air x,

$$\frac{x}{20{,}000} \sqrt{\left(\frac{6}{10}\right)^5} = \sqrt{0.6^5} = \sqrt{0.07776} = 0.2788+$$

$$x = 20{,}000 \times 0.2788 = 5576 \text{ cu.ft. per min.}$$

Ques.—An airway, 7000 ft. long and 6x8 ft. in section, is passing 20,000 cu.ft. of air per min. under a given pressure. What will be the sectional dimensions of this airway when enlarged in the same rectangular form, so as to pass 60,000 cu.ft. per min., under the same pressure?

Ans.—If enlarged in the same rectangular form, the cross-section of the enlarged airway will be similar to that of the original airway. For similar airways and for the same pressure producing circulation, like dimensions of the cross-section will vary as the fifth root of the square of the quantity of air in circulation. In other words, the ratio of change, for either the height or the width of the airway, will be equal to the fifth root of the square of the quantity ratio, which is, in this case,

$$\sqrt[5]{\left(\frac{60{,}000}{20{,}000}\right)^2} = \sqrt[5]{3^2} = \sqrt[5]{9} = 1.55$$

Therefore, the width of the enlarged airway will be $8 \times 1.55 = 12.4$ ft.; and the height $6 \times 1.55 = 9.3$ ft., making the required section of the enlarged airway 9.3 $\times$ 12.4 ft., in order to pass 60,000 cu.ft. of air per min., under the original pressure.

Coal and Coke News

Harrisburg, Penn.

Preparations are being made at Philadelphia harbor to ship 100,000 tons of coal to Greece, consigned to foreign buyers. Part of this order, which it is understood was secured by the Consolidation Coal Co., and the Pocahontas Fuel Co., will be filled from Virginia coal mines. In addition to the large sale of coal to Greece, it was reported, on Sept. 12, that J. H. Weaver & Co., of Philadelphia, had made a contract with the Navy Department at Washington for 200,000 tons of coal, mined exclusively in Pennsylvania, which will be shipped immediately from the Philadlephia port for use of American war vessels in the Mediterranean and Asiatic squadrons.

Berwind-White Coal Mining Co. and other big bituminous coal-producing operators, it is also understood, are receiving 'queries" from foreign sources. These shipments of coal are regarded by operators only as preliminary to the enormous possibilities for the port of Philadelphia in the coal export trade that has been brought on by the European conflict.

Other shipments are already moving from Philadelphia on actual foreign orders, and operators have announced at the mines that concerns are shipping by the hundreds of tons to Brazil, Argentine and other South American countries. These countries, before the war, bought annually $55,000,000 of a total purchase of $60,000,000 a year from England. Now they are turning to the United States, and the big coal operators are wondering whether they can hold the trade when peace is restored.

In recent years, very little coal for the navy has gone through the Philadelphia port, as but little Pennsylvania coal was taken. The contract awarded to J. H. Weaver & Co. clearly shows that Pennsylvania coal is of the standard required by the Navy Department. Operators throughout the state are expressing considerable glee over the recognition by the government of the merits of the Pennsylvania fuel. All of this order, it is understood, will be supplied from mines in Cambria County, and it is the belief among operators that the state has reëstablished permanent relations with the Navy Department.

During the last week, six vessels were chartered to take Pennsylvania coal to South American ports and three to Piereaus, Greece. The European source of supply has been cut off, and recent dispatches from London indicate that coal is not being exported from Wales except in small quantities to Italy. These conditions, it is pointed out, give Pennsylvania and the other coal-producing states of the Atlantic coast an opportunity to not only meet this new South American demand, but at the same time to establish for the producers and dealers of Pennsylvania a permanent market for coal in other parts of the world.

Because of the fact that the English, French and Germans in South America have the system of interlocking directorates to a most effective degree, it was authoritatively pointed out that this might make it difficult for American companies to hold the coal trade when peace reigns again. The same set of men that are directors of the companies in South America needing the coal are directors of the mines abroad producing the fuel and directors of the steamship companies delivering it. But coal men of this country see no reason why they should not enter the South American field and retain a large part of it. They point to statistics which they say inspired them to make the fight. Of the $25,000,000 worth of coal imported into Argentina in 1912, $23,500,000 worth was from England, $381,000 worth from Germany and $783,000 worth from this country. In Brazil, the value of the coal imports for the same year was $18,500,000, of which $15,500,000 was from England and $2,700,000 from the United States. In Uruguay, where the coal imports amount to about $3,000,000, the conditions are about the same. In Chili, the coal imports in 1912 were $11,000,000 in value, of which $7,000,000 was from England, $278,000 from Germany, $503,000 from this country and the rest from Australia.

The United States now turns out from her mines practically 40 per cent. of the coal output of the world. American coal, it is pointed out, holds high rank, that of certain of the greater mining sections lying within easy reach of tidewater being considered equal to Cardiff coal for steaming purposes, and generally acceptable wherever thoroughly and impartially tested. The fact that the steamships plying between Europe and the United States bought last year approximately $25,000,000 worth of American coal for their own use on the ocean is an evidence that it compared favorably, at least, with the fuels of Europe.

Pennsylvania's Mineral Production

The reports of the mineral production made to Richard H. Hice, state geologist of Pennsylvania, show the production of 1913 was by far the greatest of record, exceeding the previous highest record by over $55,000,000.

In 1911, the total value of the mineral production of Pennsylvania ,excluding pig iron, coke and derived products, was $414,426,962. In 1912, this total value was $445,790,022, and in 1913 the total rose to $500,923,357, or almost one-fourth of the entire output of the United States.

Since the first records of the mineral production of the United States were made, Pennsylvania has stood at the top of the list and occupies a unique position in that respect, inasmuch as it greatly surpasses any other state. This production is almost equal to the combined output of Illinois, West Virginia, Ohio and California, the four next states as regards the value of their mineral wealth.

While Pennsylvania holds this unique position as a mineral producer on account of the enormous value of its coal output, which, in 1913, was $388,220,933, yet it must not be overlooked that if the entire coal output of the United States is disregarded, Pennsylvania is still the ranking state, exceeding California, which would be the second.

The anthracite and bituminous coal produced in 1913 was almost equal in value to the entire mineral production of West Virginia, Illinois and Ohio, the second, third and fourth producing states. The production of anthracite coal in 1913 was the highest on record, 81,818,680 long tons, exceeding the previous high-record mark by slightly more than 1,000,000 tons. The value at the mines was $195,181,127, exceeding the value of the production of 1912 by almost $17,500,000, and that of 1911 by $20,000,000.

The production of bituminous coal rose to an average of 700,000 tons for each day the mines were in operation. The total value of this production was $193,069,806, or $1.11 per net ton, the highest average price received for bituminous coal in the state for 30 years.

The total quantity of petroleum produced in Pennsylvania in 1913 was 7,927,137 barrels. The value of this oil was $19,716,148. There was a marked increase in the value of natural gas produced, the total value for the year being $21,695,845. The production of gasoline from natural gas is quite a new business, yet in 1913 gasoline was produced, which otherwise would have been lost, to the value of $405,186.

PENNSYLVANIA

Anthracite

Minersville—As a result of a brisk demand for anthracite coal, caused by the European war and the early cool weather, the Lehigh Valley Coal Co., on Sept. 11, ordered the immediate resumption of work at the Blackwood colliery. Work was suspended at that colliery in the middle of the summer, and it was not expected that the condition of the coal trade would warrant resumption of work until the middle of winter. Blackwood colliery produces a particularly good grade of anthracite. Six hundred men and boys will be given work.

Tamaqua—Orders were issued on Sept. 11, by the Lehigh Coal & Navigation Co., calling for resumption of the large washery at Hauto, Sept. 16. Coaldale washery will resume Oct. 1, and others throughout the Panther Creek Valley as soon as repairs can be made.

Scranton—Gas from a broken main of the Scranton Gas & Water Co., on Prospect Ave., recently leaked through the crevices in the ground and made its way into the workings of the National colliery of the Lackawanna Coal Co. This was discovered when miners with naked lights entered the vicinity and caused the gas to ignite. The break in the main evidently occurred in the morning after the fire boss had made his rounds.

Judge E. C. Newcomb recently issued an order restraining the Clearview Coal Co. from mining within 100 ft. of the line

of the No. 40 school building in North Scranton, so that the property may be saved.

Throop—The button strike of the Pancoast colliery has been called off. This affected approximately 1500 men there employed. The strike was caused by 17 mine workers at the Pancoast colliery who got in arrears as members of the union and were suspended under the rules. The rest of the workers refused to work with the 17 delinquents.

Bituminous

Kittanning—The Queenstown Coal Co., which has been engaged in opening its mines near Kittanning, is now ready to begin the shipment of coal.

Irwin—Notices have been received here recently by the unnaturalized Austrians, commanding them to return home for military duty, since their services are needed by their country. It is said that the Austrian government has the correct address of every reservist in this country. The men are given notice where they shall report and what regiment to join. Those in this immediate vicinity are instructed to go to a point near Lemberg.

Connellsville—The present rate of coke production is approximately 267,000 tons per week. Divided between the furnace and merchant interests the proportion being approximately 169,000 and 98,000 tons, respectively. No new transactions in contract furnace coke have been reported, and practically no business of this sort is in sight. On the other hand, with a single exception, no furnaces are likely to go out of blast in the near future.

Thomas D. Williams, mine inspector of the Sixth Bituminous District, recently caused the arrest of a superintendent who failed to provide two passageways from the operation under his charge, as provided by law. He has also brought action against two foremen who neglected to provide shelter spaces at 15-ft. intervals along haulageways. Furthermore he has prosecuted two miners who were accused of substituting open lights for the safety lamps supplied to them by the company.

Windber—First-Aid Instructor Allan S. Snyder of the Berwind-White Coal Mining Co., has announced a first-aid meeting will be held early in October by teams composed of the employes of that company. There is much rivalry between the miners of the various operations of this company in this section, and one of the biggest meets ever held by the company will result.

Blandburg—Langill & Edmundston, coal operators in Reade Township, on Sept. 9, secured an award of $11,686.86 from the Pennsylvania R.R. Co. on a charge of discrimination. They allege that the Pennsylvania R.R. Co. would not construct a siding to their mines and that partiality was shown in the awarding of coal cars. The case was the first of its kind tried in Cambria County. The plaintiffs asked for damages in the sum of $100,000.

Monongahela—After being closed down for more than five months undergoing repairs which have made it one of the greatest mines in the country the Mongah mine of the Pittsburgh Coal Co. was opened on Sept. 8. This mine when running full employs between 400 and 500 men. Since the mine closed down in April, the company has made improvements which by the time they are completed will cost in the neighborhood of $100,000. This does not include the $35,000, which was appropriated for the changing of the electrical power system.

California—Admitting that he had been guilty of violating the bituminous mining laws, Peter Brown, employed as a motorman in the Vesta No. 4 mine, was held for court recently. The information was made by Charles P. Byrne of the 21st Bituminous district, and accused Brown of having ridden on a loaded coal car when he was not motorman of the trip at various times within the past two years.

WEST VIRGINIA

Charleston—According to State Mine Inspector, Earl Henry, while the immediate effect of the European war has been to depress the West Virginia coal industry, the ultimate effect will be to help it materially. At present the inability of shippers to secure ocean-going vessels to handle coal for export has hampered a large possible movement, and the immediate industrial effect in this country, in the shape of lessened business, has also served to injure the coal trade. However, it is stated that with labor difficulties settled, prospects are excellent for the trade in West Virginia just now.

Eccles.—The bodies of two more victims of the April disaster have been recovered, in a portion of the mine which was flooded shortly after the explosion. This brings the number of bodies recovered up to 175. The mine is now operating with several hundred men at work, but as there are some portions which have not yet been fully cleaned up, it is possible that still other bodies will be found as work progresses.

Princeton—The coal traffic on the Virginian Ry. is becoming heavier and heavier each day. The train crews are running on full time, and the prospects are that the demand for coal from the Virginian section will continue to grow.

Clarksburg—Despite the reported business depression prevailing in commercial and industrial circles throughout the country, it is significant that the coal output in the Clarksburg district has materially increased. Before European hostilities were commenced the coal mines contiguous to this city were working only about two or three days each week. Within the last three weeks, however, the operations of the Consolidation Coal Co. have been working full time, while the same is true of the independent companies.

Bluefield—During the last fortnight, mining companies in the Pocahontas field have received numerous inquiries for coal from every part of the world. Particularly insistent are the demands from the great shipping ports of South America, the Straits Settlements, Japan and India and the ports of the Mediterranean. The price, according to the heads of some of the larger companies, is a secondary consideration, most inquiries bearing the agreement to pay the same prices, as have been paid for Welsh steam coals, which are ordinarily much higher than Pocahontas coals. It is stated that at all mining plants work is being conducted on full time and that thousands of men are needed for the Pocahontas region.

KENTUCKY

Lexington—The Kinkead Coal Co., of Lexington, has been awarded the contract for furnishing the Kentucky University at Lexington its coal supply for the current school year. Hywel Davies, business agent of the university, who is well known in the coal trade, received the bids and awarded the contract.

Louisville—Coal operators are much interested in plans for testing the Kentucky workmen's compensation law, which is now before the circuit court at Frankfort. The new system takes effect Jan. 1, and it is hoped that a decision will have been received from the court of appeals by that time, upholding the validity of the measure. Owing to the low rates offered for insurance under the law by the state, the stock insurance companies are opposing the measure strongly.

OHIO

Columbus—The Alma-Thacker Fuel Co., of Columbus, which was recently reorganized from the Pomeroy Fuel company has started to develop a tract of 2400 acres of coal land in Pike County, Kentucky. The property lies near the West Virginia line and the operating offices will be at Matewan, W. Va.

J. M. Roan, chief mine inspector of Ohio, is authority for the statement that hundreds of miners' children in the eastern Ohio district have been unable to attend school because of lack of clothing. A relief fund has been started.

Pomeroy—The Essex Coal Co. of Columbus will open another mine in the Pomeroy Bend district early in the spring. This mine, which will have a capacity of 1000 tons daily, will be a mile from the mine opened during the present year. It is located on a spur of the Kanawha & Michigan and will have modern equipment.

Wellsville—The four mines located near Wellsville, Ohio, which have been idle for more than four months, resumed operations recently.

Congo—Operations at Mine No. 301 of the Sunday Creek Co. were resumed recently after being idle for almost a year. The mine caught fire Oct. 31, 1913, and was sealed up under the orders of the Ohio Mine Inspector. Recently it was reopened and the fire was found to be extinguished. No. 302, which adjoins it was kept in operation all the time.

Cincinnati—The Otto Marmet Coal & Mining Co., of West Virginia, has filed a libel in the United States District Court here, as owner of the steamboat "Sallie Marmet," against the dredgeboat "Northern No. 2," owned by the Fieger-Austin Dredging Co., for damages alleged to have been sustained by two coal boats, loaded, in a collision which occurred on Sept. 1. About 21,000 bushels of Kanawha coal were lost, it is alleged, the total damages being fixed at $4500, for which it is asked that the dredge be sold. The dredge, which is engaged in government work on the Ohio, has been attached pursuant to the suit.

Cleveland—Operators with headquarters here have launched a vigorous protest against the proposal to tax freight bills three per cent. to afford revenues for the government,

pointing out that there is a vast movement of coal now going on, upon which prices were fixed by prior contracts made, of course, without reference to any such tax. It is declared that the trade cannot stand this burden, which would fall wholly upon the shippers. Congress has been approached on the subject through the Ohio delegation

Bellaire—It has been reported that one of the large coal mines in eastern Ohio would shortly make a proposition to its men to resume operations at the Pittsburgh scale for mine-run coal. It is said, also, that a number of Belmont County operators are considering posting notices at their mines, offering the men a referendum vote on the acceptance of the Pittsburgh scale, and offering employment to all who care to go back to work on those terms.

ILLINOIS

Lewiston—It is stated that within a short time coal will in all probability be mined on a large scale north of Lewiston, and the opening of this operation should add several hundred people to that town's population. It is alleged that John Skinner of Astoria, president of the Farmers' Bank, is backing this new enterprise.

OKLAHOMA

Bartlesville—It is believed by certain parties that coal in considerable quantities underlies the land south of Caney, and it is said that this territory will be developed. Already it is reported that a large acreage between Caney and Wann has been purchased, the parties so doing negotiating for other large tracts. Development of the property will begin as soon as some additional lands are secured.

COLORADO

Denver—The Policy Committee of the United Mine Workers of America recently called a convention of miners to meet in Trinidad, Sept. 15, to act on the truce terms submitted by President Wilson for ending the Colorado coal strike. Representatives of the mine operators also called a conference to consider and reply to the President's proposals.

FOREIGN NEWS

Toronto, Canada—The coal mining industry of Nova Scotia is more active than usual, orders having increased owing to the war. The output of the Acadia Coal Co. of New Glasgow for August was 30,470 tons, an increase of over 3000 tons over July and sales totalled 29,500 tons, an increase of 5000 tons. The output for August of the Intercolonial Coal Co. was 20,000 tons.

Cardiff, Wales—It is said that the British Admiralty has sent a representative to Cardiff to inform all shippers of high-grade Admiralty coal that the Government demands first option on all shipments. A certain number of cargoes have already been taken over under this order and are being laden for government account in vessels chartered by the Admiralty on time limits. The price paid is said to be $5.30 per long ton, and shippers are being indemnified against private claims for breach of contract. The chartering terms are $3.27 per gross registered ton per month for vessels up to 2200 tons and $3.03 for larger craft.

TRADE CATALOGS

Wolf Safety Lamp Co. of America, Inc., 47-49 West St., New York. Catalog. "Wolf safety lamps." Illustrated, 40 pp., 8x10 in.

The American Concentrator Co., Springfield, Ohio. "New Century Disintegrating and Washing Screen." Eleven pages, 6x9 in.; illustrated.

The Jeffrey Manufacturing Co., Columbus, Ohio. Bulletin No. 126. "Jeffrey Fans for Mine Ventilation." Thirty-one pages, 6x9 in.; illustrated.

Ingersoll-Rand Co., 11 Broadway, New York. Form No. 3024. Ingersoll-Rogler valves for air compressing cylinders. Illustrated, 28 pp., 6x9 in. Form No. 3030. Class ER-1 Ingersoll-Rogler air compressors. Illustrated, 20 pp., 6x9 in.

PERSONALS

H. J. Heywood, manager for the W. A. Gosline Coal Co., of Toledo, has been elected president of the National Coal Trade Golf Association, which was organized at the Country Club at Evanston, Ill., during the second annual national tournament of the coal trade golfers held there recently.

W. K. Field, president of the Pittsburgh Coal Co., has returned home from a visit to Europe of several weeks for recreation and on business.

John P. White and William J. Green, international president and secretary-treasurer, respectively, of the United Mine Workers of America, expect to tour the anthracite regions of Pennsylvania during the present month. Unless something unforeseen happens in the affairs of the union, Messrs. White and Green will remain in Scranton for several days addressing mass meetings in the city and vicinity.

R. Y. Muir, inspector of the 8th District in the Department of Mines of West Virginia, has resigned his position to take effect, Sept. 30, and accepted a similar position with the New River & Pocahontas Consolidated Coal Co., with headquarters at Berwind. John I. Absalom, of Montgomery, has been appointed as inspector to fill the vacancy made by Mr. Muir's resignation. He will begin his work Oct. 1.

OBITUARY

Thomas Lomax, one of the owners of the Lomax Bros. mine, near McArthur, Ohio, was instantly killed recently by a fall of slate in the mine. A shot blew away the supports and the roof fell.

James R. Black, aged 55 years, of Forward Township, Allegheny County, Penn., a prominent coal operator, died recently at the Memorial Hospital in Monongahela, death coming as the result of cancer of the liver and stomach. The remains were taken to Rices Landing for interment.

Lewis A. Powelson, assistant general agent of the Lehigh & Wilkes-Barre Coal Co., died recently after an illness of several months. Mr. Powelson was a native of New Brunswick, N. J., and at the time of his death was about 70 years of age. He became identified with the coal trade some 45 years ago, entering the employ of the Wilkes-Barre Coal & Iron Co., in its New York office in 1868 or 1869.

Charles Henninger, an assistant foreman at the Colbert colliery, at Shamokin, Pennsylvania, was instantly killed on Sept. 10, when he fell down a manway, a distance of 150 ft. He was "chasing gas" when he was overcome and stumbling pitched headforemost to the bottom of the manway, which was almost perpendicular. His neck was broken. A widow and six small children survive. His body was discovered by his brother, who was working in the same section of the mine.

CONSTRUCTION NEWS

Pineville, Ky.—The Continental Coal Corporation is planning to install a gasoline or acetylene lighting system in its commissary at Arjay, Ky., and is now getting prices on the equipment. F. M. Meadows, purchasing agent, is located at Straight Creek, Ky.

Chattanooga, Tenn.—The Chattanooga Gas & Coal Products Co. will let contracts in the immediate future, it is announced for the construction of its plant, which will manufacture coke and other products of coal. The chamber of commerce is furnishing the site, it is reported, and has secured an agreement from the company to begin work on the plant by Sept. 30.

New Orleans, La.—To facilitate the loading of coal from Alabama fields onto vessels at New Orleans, it is officially announced that the Illinois Central R.R. and the Southern Ry. will each erect tipples at New Orleans. The appropriations for the work have not been officially announced, although it is the general belief that it will require quite an amount of money to arrange facilities for the proper handling of the coal. Both the Illinois Central and the Southern have direct lines from the Birmingham fields to New Orleans, and it is presumed that they are taking this step in the face of the fact that as soon as work on Lock No. 17 is completed that Alabama can put coal into New Orleans by water. The tipples will be of structural steel, equipped with belt conveyers on which the coal will be dumped, thus discharging the entire car into the vessel with one operation.

Logansport, Penn.—The Allegheny River Mining Co., of which Dwight C. Morgan is president, and Fred Norman chief engineer, recently awarded the contract for a large tipple for the Nicholson No. 1 mine, to the Link Belt Co., of Philadelphia. This installation will be located on an exten-

sion of the Pittsburgh and Shawmut Ry., from Kittaning to Freeport. The coal will come from the mines in trips of 30 to 40 cars, will be dumped into hoppers and by means of feeders will be delivered to two inclined apron conveyors, the top section of which will travel horizontally for some distance to afford ample picking surface. From these conveyors the coal is delivered to shaking screens, where it will be sized and from there it goes to bins and is delivered to the railroad cars. The entire outfit will be of steel construction, of the latest design and as nearly fireproof as possible.

NEW INCORPORATIONS

Novinger, Mo.—The Davis Creek Coal Co. has been incorporated with a capital of $75,000 to develop coal land.

Indianapolis, Ind.—The S. W. Little Coal Co., of Vanderburg County, has decreased its capital from $300,000 to $150,000.

Pineville, Ky.—The Martin's Ford Coal Co. has filed amended articles of incorporation, increasing its capitalization from $40,000 to $60,000.

Red Ash, Va.—The Raven Collieries Co. has been incorporated with a capital of $15,000 to $50,000 for the purpose of coal mining. The officers are C. M. Rudder, Jr., president; J. S. Kahle, secretary, both of Bluefield, W. Va.

Jellico, Tenn.—The Jellico Coal & R.R. Co. has been incorporated with an authorized capital stock of $1,000,000. The firm has purchased 15,000 acres of coal and timber land in Kentucky and Tennessee, and will lease to corporations for development. It will also construct a standard gage railroad to connect the Queen and Crescent route south of Pine Knot with the Southern and the Louisville & Nashville railways.

INDUSTRIAL NEWS

New York, N. Y.—The Mashek Engineering Co., 90 West St., N. Y., recently sold to the Maryland Steel Co., two 22 tons per hour capacity briquette presses. These will be shipped and installed immediately.

Birmingham, Ala.—The Birmingham Fuel & Iron Co. reports closing a contract with the Louisiana Railway & Navigation Co. for 50,000 tons of steam coal for delivery over the next 12 months. This contract has for many years been with Western Kentucky operators.

Harrisburg, Penn.—The shipments of anthracite over the leading coal roads during the month of August reached the total of 5,483,743 tons, as compared with $5,369,900 tons in August of last year. For the eight months ended Aug. 31, the total shipments amounted to 43,821,389 tons.

Cincinnati, Ohio—Former Governor Judson Harmon and Rufus B. Smith, receivers for the Cincinnati, Hamilton & Dayton R.R. Co., have applied to the courts for permission to issue $3,000,000 recevers' certificates to purchase new equipment in the line of locomotives and coal cars.

Fayetteville, W. Va.—The number of freight cars loaded with coal and run into Clifton Forge during the past week, shows an increase over the corresponding period of last year. The total number amounted to 4291, the average for each day during the week being 613. During the same week of last year the average was 457.

Knoxville, Tenn.—Officials of the United Mine Workers of America, District No. 19, recently in a conference with coal operators representing Eastern Kentucky, renewed the wage scale on the terms that previously prevailed. A similar conference was scheduled for Oswego with the operators of the Jellico District.

Louisville, Ky.—The towboat Enterprise, belonging to the Monongahela River Consolidated Coal & Coke Co., struck an obstruction in the Ohio River, Sept. 11, and sank opposite 35th St. Capt. G. W. Shaw, manager of the Monongahela at Louisville, said that arrangements would be made to float the boat at once. It is one of the largest operating in the river trade.

Washington, D. C.—Hearings before the Interstate Commerce Commission's investigation into allegations that coal roads have established embargos resulting in discriminations against shippers will begin before commissioner Daniels at Chicago, Jan. 20, 1915. Shippers and carriers have been invited to forward suggestions as to the points to be covered and will be given an opportunity to be heard.

Pittsburgh, Penn.—A deal has just been completed, whereby Joseph L. Styber, of Pittsburgh, Penn., and Charles L. Wather, of Woodlawn, Penn., have sold to John C. Shirer, of Columbus, Ohio, vice-president of the National Coal & Fuel Supply Co., of Columbus, 1280 acres of coal land in the Buchanan County, West Virginia, district for $52,000 cash. The coal is the Pocahontas vein and the property lies near Grundy, the county seat of Buchanan County.

Columbus, Ohio—It is believed that a conference of railroad and traffic managers will be held in Columbus the latter part of September to reach a conclusion as to what increased freight rates on interstate shipments, if any, shall be made by railroad companies in Ohio. Since the five per cent. increase allowed by the Interstate Commerce Commission there is considerable difficulty in apportioning the increase. Coal rates may be affected slightly.

Washington, D. C.—In order to take advantage of the demand which will be made upon it by foreign nations during the European war, the Consolidation Coal Co. has arranged to operate 207 offices in various cities in Europe. Two representatives have been chosen to go abroad to arrange for the opening of these offices. The letters passport asked for and secured for these gentlemen were sent by the ambassadors of Great Britain, Spain, France, Italy and Portugal.

Columbus, Ohio—The hearing on the application of B. F. Nigh, secretary of the Michigan-Indiana-Ohio Coal Association, for a change in the reweighing rules, pending before the Ohio Public Utilities Commission set for Sept. 25, has been postponed upon the request of the Baltimore & Ohio R.R. officials. This was agreed to by Mr. Nigh. The request for the postponement was based on the fact that there is an effort being made to agree on uniform reweighing rules for the entire eatsrn part of the country.

Washington, D. C.—Officials of the weather bureau and students of sun spots at the United States Naval Observatory are attributing the present cold weather to the extremely large spots now present upon the sun. The records indicate that these appear in regular cycles, and corresponding meteorological reports indicate that when these spots are present in great size the weather becomes either warmer or cooler. There are, however, variations more or less decided due to local terrestrial conditions from this rule.

Connellsville, Penn.—The iron trade is not at present encouraging to the coke makers of the Connellsville region. It is stated that coke producers are keeping down the size of their output and from present indications a further curtailment, though a slight one will take place in view of the present slackness in the demand. While stacks have been blown out, stock coke has been accumulating and although several furnaces are scheduled to blow in shortly, attention is directed to the fact that they may not use Connellsville coke as fuel.

New York, N. Y.—The conditions prevailing in Europe at the present time have practically caused the suspension of transportation between the continent and the United States. The materials necessary for the manufacture of brattice cloth, as well as the cloth itself in the manufactured state have been held up, and the stocks in this country have suffered heavy drains on account of everyone wanting to stock up before the supply in this country had been sold out. There are, however, some stocks still remaining in most of the widths and in the regular qualities.

Norfolk, Va.—The coal mines of West Virginia are now largely supplying Europe with fuel through the ports of Norfolk and Newport News. Ten vessels all flying the flags of foreign nations recently arrived and anchored off the coal piers at Lambert's Point and Sewals Point awaiting an opportunity to get under the chutes to take on cargoes. Among the recent arrivals for coal are the Italian steamer, "Anada"; the Greek steamer, "Engenies"; the British steamers, "Etaline" and "Leslie," and the Norwegian steamer, "Bygland." All of these ships have or will be loaded with coal for English, French and Grecian ports.

Pensacola, Fla.—Captain Barrow of the coast steamer "Tawang Tarpon," recently arrived in Pensacola and reported sighting a cruiser anchored some miles out from Pensacola. While the vessel had no flags flying, it is believed that it was a German cruiser waiting for coal that left Pensacola a few days ago. The Hamburg-American (German) steamer "Navarre" recently left Pensacola for Pernambuco with 6000 tons of coal which was paid for in gold, but instead of going to Pernambuco headed toward the cruiser, and it is believed delivered her the coal. The "Navarre" has since then made several trips with coal, which is believed to be for the cruisers standing out from Pensacola.

Coal Trade Reviews

General Review

Anthracite slowing down to a more normal basis but an active winter anticipated. Bituminous showing indications of heaviness in all directions. Export business relieves the tension at some points. Domestic grades steadying up while the steam sizes are in excess supply and weak.

The customary month-end rush for coal, supplemented by some record breaking low temperatures, precipitated an active situation in the anthracite trade over the first part of the current month. The market has now steadied down to a more normal basis, but full time operations are the rule at the collieries and there are few sales at concessions on the regular circular. There is accumulating evidence of postponed summer buying on the part of domestic consumers so that the season is opening with less than the usual supplies on hand. The Lake movement to the Northwest is also considerably less than requirements and it is possible that rail shipments may have to be resorted to before spring. The winter outlook in hard coal has seldom been more favorable.

There are unmistakable evidences of adverse developments in the bituminous trade. Coal is now being released in markets where there were recently strong indications of a shortage. Though scarcely perceptible at some points, the slowing down is general in all directions. Heavy export shipments at a few of the Atlantic Coast ports is the only development of a constructive nature and this, of course, does not help the markets suffering from the restricted consumption among steam users. This foreign business is notably heavy at Hampton Roads and from the amount of chartering there are no indications of any let up. But in other lines the inquiry for both current and future shipments has disappeared almost entirely and operators are frankly regretting their cautious position when orders were recently plentiful.

The curtailment in general manufacturing in the Pittsburgh district, supplemented by an abnormally lean season in Lake trade has created a dull situation there; demand is even further reduced and quoted prices are purely nominal. With the Canadian markets at a complete standstill and no prospects of any improvement in sight the outlook is not encouraging.

Steam grades are uniformly heavy throughout Ohio whereas the domestic sizes are in short supply. An increased demand from the Northwest has developed which, together with a stocking movement among householders, has resulted in a heavy demand for the screened grades. On the other hand, general manufacturing and steam consumption is far below normal and the problem of finding a disposal for the excessive production of these sizes, occasioned by the large output of domestic coals, is becoming increasingly difficult. The market on the steam sizes is approaching demoralization.

The Southern market is also feeling the effects of the slowing up in manufacturing, shipments being confined closely to contracts and some demurrage coal beginning to appear. However mines are on a fair running schedule and there is considerable business being negotiated with South America which is creating an optomistic feeling in trade circles.

The general discrepancy in the demand between steam and domestic coals has reached its highest development in the Middle Western field. While the domestics are steady to firm the steam grades are under heavy pressure and threatening to touch new low levels.

ATLANTIC SEABOARD

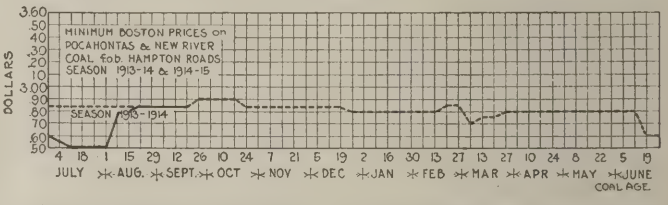
BOSTON

A dull period in Hampton Roads coals coastwise, although export demand holds up fairly well. Georges Creek also slackens some but prices show no change. Anthracite passes through a mid-month dullness.

Bituminous—The strong market predicted a month ago is slow in developing. Coastwise the movement has slackened again and were it not for the active export trade the market here would be a precarious situation. The off-shore demand is holding out well and prices are firm at $2.85@3 for Pocahontas and New River at Hampton Roads. The lower figure is still the ruling price for cargoes to New England but there is almost an entire absence of inquiry for both the present and the near future.

Inquiry at the distributing points for inland delivery continues light also. Few of the large consumers are making any heavy draft on their supplies and it is hard to see any buying power ahead for some time. In almost every direction there has been a marked let-up in bituminous, and shippers who declined orders a few weeks ago are repenting of their extreme caution.

That the Georges Creek coals are sharing the dullness to some extent appears in renewed shipments to Philadelphia and New York for coastwise loading. In other words, the over-sea business is not now absorbing the entire output and coal will be available for requisitions here that looked for a time as if they might be neglected.



Aside from short periods of car shortage the Pennsylvania operators seem to be enjoying a fair volume of business. There is a lull for the moment but the opinion is that present price levels will be maintained on the grades that have regular established markets.

Water Freights have eased off to the range that prevailed prior to Aug. 1, 60@65c. Hampton Roads to Boston on fair sized tonnage. The flurried inquiry of a few weeks ago seems to have entirely disappeared, and vessels are as much a drug on the market as at any time in the early season.

Anthracite—The early September demand seems to have been met with no difficulty and just now there is a hiatus in hard coal shipments for a week or so until the last of the month business starts in. The companies are well supplied with orders for loading after Sept. 20, but meanwhile there is a dull period that was hardly looked for. A few days of cool weather would accomplish a lot for the present market. Stove size, however, seems in no better supply.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.90@1.50	$1.25@1.65	$1.67@1.77	
Philadelphia*.....	2.15@2.80	2.50@2.90	2.92@3.02	
New York*.....	2.40@3.10	2.80@3.20	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.85@2.95
Boston†.....	.....	.....	.....	3.63@3.78
Providence†.....	.....	.....	.....	3.68@3.78

* F.o.b. †On cars.

NEW YORK

Bituminous quiet but steady. Expected improvement fails to materialize but the market is well maintained. Anthracite has slowed down materially as compared with the month-end rush. Full circular price prevails and mines running up to maximum capacity.

Bituminous—The bituminous market continues quiet and there is little demand for spot coal, but on the other hand there is no accumulation of consequence and there is an absence of demurrage coal at the piers to be sacrificed at low prices. There is a fair movement on contract shipments. While it is difficult to estimate the amount of tonnage moving on this class of business, it is probably safe to say that contractors are taking perhaps 75 to 80% of the normal.

In some quarters an increase in price and a stiffening of the market has been looked for on account of the demand for export coal. In view of the fact that the English mines are getting out a practically normal tonnage, and the further fact that there are now plenty of bottoms available, there has been a decided easing off in the demand in this direction; this undoubtedly has a depressing effect on the market here which is tributary to Pennsylvania coals.

In fact the loss of bunker business in New York Harbor, on account of the tieing up of shipping, has been so heavy that it will much more than offset any additional off-shore trade that may have been gained.

Car supply is still good and it is generally conceded that we will not have any great shortage in the immediate future. There is, therefore, no reason to expect any great inflation of prices on soft coal this fall and those who have their tonnages contracted are fortunate under the conditions.

There has been practically no change in prices of coal at tidewater or along the line for Eastern movement and we continue nominal quotations of last week as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55 @2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The anthracite situation is somewhat weaker. The war scare, together with the fact that a great many dealers wished to take advantage of the last advance of ten cents, created heavy buying during the latter part of August which was abnormal for that time of the year. The orders in some quarters were up to the winter demand and it would naturally follow that the business at this time would be a little lighter. The conditions are, however, by no means discouraging as anthracite coal is moving in practically all sizes at about circular prices and the mines are all operating on full time. It must be remembered that each day now brings us nearer to the October demand which is always heavy, being, as a rule, about the best month in the anthracite year. The weather is open and the movement of coal is in no way hampered either at the mines or along the line.

Stove size continues in heavy demand and few shippers will accept orders for it unless accompanied by a proportion of egg or chestnut. Of the three sizes, egg is a little heavy. The movement of pea to rail points has improved materially and with the advent of any cold weather this size will unquestionably be in strong demand in the New York market.

The retail trade locally is in fair volume, but inasmuch as this market is considerably nearer the mines than the more distant points in the East, North, and West, there has not been the urgent demand here that has existed along the line; New England and Western points figure on two to three weeks for delivery.

The demand for steam sizes in the better grades continues good, whereas the inferior coals are still a drug on the market, although there is probably less accumulation at tidewater than for some time.

The market is now quotable about as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.15@5.35	5.30	5.00@5.30
Stove	5.35	5.35@5.45	5.30	5.30@5.40
Chestnut	5.60	5.45@5.60	5.55	5.30@5.55
Pea	3.55	3.45@3.55	3.50	3.40@3.50
Buckwheat	2.80	2.65@2.80	2.50@2.75	2.10@2.75
Rice	2.30	2.15@2.30	2.00@2.25	1.50@2.25
Barley	1.80	1.70@1.80	1.75	1.45@1.75

PHILADELPHIA

Cool weather increasing anthracite deliveries, both wholesale and retail. Prices well maintained on all sizes. Unusually heavy business anticipated this winter.

Anthracite—The cool weather has had the effect of stimulating the anthracite trade. Householders with empty bins found the evenings rather uncomfortable, owing to a temperature as low as 40°, and a visit to the coal dealers was the result. It is undoubtedly a fact that domestic consumers postponed purchases this year, as many dealers claim that the demand during the spring months was not as heavy as in previous years. The fall and winter business is, therefore, likely to show a substantial increase over the corresponding period of last year. Prices on all sizes are well maintained, with the exception of special prices to move coal that is likely to incur demurrage.

Tidewater business continues good. While the orders are not coming in with such rapidity as to cause any unusual delay in filling, at the same time the volume of business about keeps the large fleet of barges moving from this port. Prices rule about as follows:

	Circular	Individual
Broken	$4.75	$4.75
Egg	5.00	5.00
Stove	5.00	5.10
Chestnut	5.25	5.00 @ 5.10

BALTIMORE

Some improvement is noted. Exports are still increasing. Demand generally stronger and price list a little stiffer.

There is less inclination to let go of coal at sacrifice figures, and it is gradually developing that there is more inquiry. The price list shows a slight improvement. West Virginia gas slack, that recently sold as low as 45c. in spots, is now generally commanding ten cents or better. Gas three-quarter is holding firm at from 85 to 90c., and steam coals of West Virginia are selling around 95c. and $1 at the mines. Pennsylvania low-grade coals were still procurable at about $1, with medium grades calling for from $1.10 to $1.20 and best coals at $1.35.

The export business keeps increasing. Considerable coal is being loaded here for South America and Mediterranean ports. The charter list for the next two weeks loading also assures a continuance of this trade on an extensive scale. While two or three large firms continue to ship the bulk of this business, several smaller ones are known to be negotiating for European or South American connections.

The Anthracite Trade is also showing signs of awakening. While ordering is not yet extensive, cool weather has stimulated interest and small-lot orders are noted. Supply of some sizes is limited. The mines cannot supply all orders in full for the present.

In the coastwise trade there has been an inclination to tighten rates under a slightly increased movement to south Atlantic and gulf ports. The rates in some cases are ten to twenty cents over those quoted several weeks ago. Northerly rates have held about the same for the past few weks.

HAMPTON ROADS

Export shipments continue heavy, with a good coastwise movement. Government taking coal for use of fleet. Prices firm and there is about a normal supply of coal on hand.

The movement of coal from Tidewater still continues to show up exceedingly well, large shipments of both export and coastwise being made. Shipments during the week have not been so heavy to the South American markets, although some have moved to Brazil and the Argentine. Prices are remaining firm, and while it is understood that $3 is being asked by some of the suppliers, it is not believed that many sales are being made at this figure, and it is more than probable that $2.85 to $2.90 is the prevailing rate.

Export shipments for the week have gone to Port Said, St. Lucia, Port of Spain, Cristobal, Santiago, Buenos Aires, St. Thomas, Havana, Genoa, Piraeus, Naples, Para, Manaos, Georgetown, Gothenburg and Kingston. It is understood that the shipment moving to Port Said, Egypt, is for Dutch vessels trading there which have been using Welsh coal; war conditions have made it difficult for them to secure this grade now.

The accumulation of coal at the various railway yards is slightly above normal, but there is quite a large amount of tonnage in port and about due which will greatly reduce this.

LAKE MARKETS

PITTSBURGH

Demand decreased slightly and no stimuli given by the heavier exports from other districts. Mining operations at not over 60% of capacity, and prices as generally cut as before.

The Pittsburgh district has felt no favorable effects from the larger export trade being done by Pocahontas and other districts, while on the other hand it is suffering from the war through a curtailment in the domestic demand. Industrial operations have all slowed down and promise to decrease further. All hopes of an improvement in the Lake trade have naturally been abandoned, for the next development will naturally be curtailment of shipments as the end of the season approaches. Domestic demand has not opened up to any extent, and with line demand decreased generally and Lake shipments poor the Pittsburgh district as a whole has lost ground.

Prices are cut as badly as ever, mine-run selling down nearly to $1, with slack at 50@60c. Operations are at not over 60% of capacity, against about 65% for two or three weeks past. Circular prices, purely nominal, remain: Slack, 50c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Much complaint from the bituminous trade. Overstocks and poor manufacturing conditions cut down sales. Canadian buying less than in this country. Anthracite becoming more active. Tonnage scarce in the Lake trade.

Bituminous—Few shippers are expressing satisfaction with their trade. There is too much coal in the hands of the consumers and consumption is relatively light. The mines are running irregular, keeping production down to avoid car service. The Canadian market is growing worse from week

to week. Many shippers are now exacting prepayment for everything sold there, and with money so scarce and heavy contributions for war purposes now being made, it looks as though the Canadian market will be tied up for a long time. This is a serious matter for Buffalo. Interest is now centered on the trade of South America, but there are many obstacles in this direction.

There is a special dullness in the slack coal trade at present, sizes remaining as usual. Quotations are $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley sizes are about 25c. lower than Pittsburgh, with slack about on a par with it.

Anthracite—The fall trade is setting in fairly strong and the movement is expected to be up to normal. In some sections there was coal carried over last winter, and in others some special buying has been done on account of war conditions, but otherwise the trade promises to be normal. Sellers of independent anthracite report that they can dispose of all their coal at full circular prices, and they look for it to go above circular as soon as the demand becomes stronger. There is complaint on the part of anthracite shippers in the Lake trade that they are not able to get as much as they require. One leading shipper reports that he has not enough on hand to satisfy his Lake trade alone. The demand is general, but the shippers do not relish a shortage on the far side of Lake Michigan, to be satisfied on an all-rail rate Shipments by Lake for the week were 90,000 tons, of which 64,000 tons cleared for Lake Michigan, a specially large proportion for any time of the year.

TORONTO

Domestic coals showing a steady improvement. Steam grades are weak.

With the setting in of cool weather, the market for domestic coal shows increased activity, and the demand for steam fuel is fair, though by no means up to normal, as manufacturing remains quiet. Supplies are coming forward freely, large consignments being received by water in preparation for the approaching close of navigation. Quotations are as follows: Retail, anthracite, egg, stove and nut, $7.75; grate, $7.50; pea, $6.50; bituminous steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale, f.o.b. cars, three-quarter lump, $3.83; screenings, $2.89.

TOLEDO

Domestic coal in better demand but steam fuel continues inactive. Lake shipping much better than earlier in the season. Car shortage has begun to threaten the Toledo market.

The coal situation is showing little change although there is some natural improvement as the season advances. Steam coal is weak and the demand light. Domestic grades are picking up in demand although prices remain unchanged. The Lake shipping is more active than earlier in the season but is lighter than it would be if the ore demand was not so curtailed; there is little movement of ore as compared to normal seasons.

The country demand has been good. The Pittsburgh No. 8 field is still closed down and at present there is little prospect that the operators and miners will get together. The car shortage is beginning to apper although as yet there is little difficulty in securing an adequate supply but now that the grain movement has begun in earnest some trouble is anticipated.

COLUMBUS

Good demand for domestic grades and lake business active. Steam sizes weak. Some coal sold for freight charges.

With a good demand for all domestic grades and a considerable tonnage going to the Northwest, the local trade has been fairly active. The worst feature of the market is the weakness in the steam grades, which is accounted for by the fact that manufacturing is at a low ebb. The general tone of the market is fairly satisfactory, however, and future prospects are favorable.

Domestic Trade is steady in every section. Dealers are busy taking care of their customers and there is a preference shown for the fancy grades. Pocahontas and re-screened varieties are selling well and there is also a good market for anthracite. Domestic prices are ruling firm and dealers' stocks are only fair; most of the buying is for immediate delivery.

The Lake Trade is active and a considerable tonnage is moving toward the Northwest. Boats are being chartered for the remainder of the navigation season. Docks in the upper Lake ports are in good shape generally and some movement to the interior has been started.

Steam Business is slow in every section. Requisitions for manufacturing plants are not large and railroads are using only a limited amount. Many of the steam users are buying on the open market at extremely low prices. Railroad fuel contracts are still hanging fire.

Production in Ohio mining districts which have signed the wage agreement, is steadily growing larger. In the Hocking Valley the output is estimated at 85 to 90% of normal and the same is true of the output from the Pomeroy Bend district. In the Crooksville district a considerable tonnage has been produced. Massillon is also busy.

The small sizes are weak; nut, pea and slack was sold during the past week as low as 25c. In some cases cars have been taken for freight charges. This state of affairs is due to the large Lake production coupled with the slow steam demand.

Prices prevailing in Ohio are:

	Hocking Valley	Pomeroy	Kanawha
Re-screened lump	$1.70	$1.75	$1.65
Inch and a quarter lump	1.60	1.60	1.55
Three-quarter inch	1.40	1.45	1.40
Nut	1.30	1.50	1.20
Mine-run	1.15	1.20	1.10
Nut, pea and slack	0.35	0.40	0.35
Coarse slack	0.25	0.30	0.25

CLEVELAND

Coal receipts heavy, particularly of the fine sizes, which have dropped 5c. a ton under the pressure. The Lake business too light to keep available tonnage busy, boats taking short cargoes to avoid laying up.

Although the retail demand is good, Pocahontas coarse coal was off at the opening of the week. Where $3.85 had been asked on prepared sizes the week before, the price was down to $3.60. Mine-run held up $2.75 and slack was offered at $2.40. Hocking has been sold as low as Fairmount because the mines have produced much more slack than they can possibly store. Mines are not permitted to use railroad cars for storage as formerly. Coarse coals were also easier with the return of warm weather. Last week cooler weather slightly increased the demand for all grades of coal, but natural gas is being produced here in such large quantities that people are getting to rely upon it more and more.

The Lake Trade is not much better than it was. While there has been improvement in some quarters the gain has been slight. The outlook in the Lake business is not promising so far as large shipping is concerned except in hard coal, the Lake markets having been neglected for Eastern and Canadian trade.

Prices for current shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.60				
Lump, 6 in.			$2.45		
Egg	3.60				
Egg, 6 in.			2.10		
Lump, 1¼ in.		2.40	2.20		
Lump, ¾ in.		2.30	2.10	2.00	2.05
Mine run	2.75	2.15	2.00	1.90	1.95
Slack	2.40	1.55@1.60	1.55	1.50@1.55	1.50

CINCINNATI

Increasing domestic demand and decreasing steam consumption have created a difficult situation. Transportation facilities are unusually good for the season.

Unseasonably cool weather, together with the fact that most of the domestic consumers have now begun the storage of their winter supplies, has resulted in this demand increasing greatly. On the other hand, depressed conditions prevail in numerous manufacturing trades on account of the war. This has resulted in an unprecedentedly low consumption of slack for this season, which, with the large demand for domestic coal, places the trade in a most difficult position. Prices are naturally much demoralized, nut and slack being offered at ridiculous figures, with no takers.

COKE

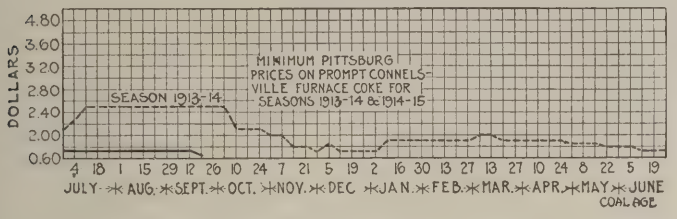
CONNELLSVILLE

There is no market for coke at all,outside of occasional small lots of prompt furnace coke sold at concessions from previous quotations. It is rumored that as low as $1.50 has been done, but such rumors are not verified, and we quote prompt furnace at $1.65@1.70, or 5c. below the former quotation, quoting contract at $1.75@1.90, these quotations being purely nominal. Foundry remains quotable nominally at $2.25@2.35 for prompt and $2.35@2.50 for contract, at ovens.

Operators have no hopes of effecting sales at this time, the furnaces in operation being well covered and receiving ample shipments on contracts, resulting in occasional orders for suspensions.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Sept. 5 at

267,870 tons, an increase of 8187 tons, and shipments at 270,310 tons, an increase of 6197 tons. The figures are evidently exceptional since the general trend is towards decreased consumption of coke through the iron and steel industry slowing down.



BUFFALO

The demand for commercial coke is not improved. Shippers dislike to discuss the market, as it has so long been against them. Those who handle crushed coke find a better demand for it, but that would be natural, as it is a competitor of anthracite and will sell more readily from now on during the cold season. Iron ore receipts by lake are good, but the price of best 72-hr. Connellsville foundry is $4.25, with stock coke $3.30.

BIRMINGHAM

Unlike the coal market, coke has been little affected by the war. The demand for foundry coke is still small, and there is practically nothing doing in furnace grades.

ST. LOUIS

There still continues to be a small tonnage of byproduct domestic coke moving in from the East, with practically no new inquiries on foundry coke. Local gas house is moving fairly good, but not in the tonnage that has been anticipated.

CHICAGO

The market continues quiet prices being as follows: Connellsville, $4.90; Wise County, $4.75; byproduct, egg, stove and nut, $4.85; gas house, $4.25.

SOUTHERN

BIRMINGHAM

Business good and mines are working on fair schedules. Some South American orders have already been closed and more are pending.

Both orders and shipments of lump coal show an improvement over last week, although retail dealers, as a rule, are not laying in as large stocks as has been the custom in the past. Many of the operators are running only about four days a week but others are running full and are well supplied with orders.

As a result of the war, the steam business has improved to a large extent, heavy shipments being made to all Southern ports in view of the possible South American trade, and the increased demand from tramp steamers and others. Negotiations are still under way for the arrangement of bottoms and finances for the South American trade, and while matters have not been definitely settled, it is understood that the prospects are good.

Announcement is already made of the sale of two cargoes of coal by the Roden Coal Co. to be shipped to the Eastern coast of South America, one cargo to go from Mobile and other from Pensacola. That permanent trade relations will be established between the Birmingham district and South America, is freely predicted.

LOUISVILLE

Market heavy, due to slowing up of industrial consumption. Current business confined entirely to contracts. Demurrage coal beginning to appear.

The local coal market is demoralized. There is a big accuumulation of steam coal, caused by the rapid slowing up of industrial operations, while the demand for domestic fuel has been less than expected. The retailers seem to be well stocked up, and the consuming demand has not yet been brisk enough to require any additional orders.

For this reason, current business is slow, though the operators are shipping rather freely on business booked some time ago for September delivery, while October orders are also satisfactory. Some of the coal companies are selling for immediate delivery on a basis of the advanced prices quoted Sept. 1, but others are shading these quotations considerably and making other inducements in order to get the business. Reports from other large cities in this section indicate that the supply of steam grades is excessive in those markets as well as locally.

Shipments from the Jenkins and McRoberts plants of the Consolidation Coal Co. were heavier the past week than for a long time. European war has stimulated the Eastern Kentucky market to some extent.

Eastern Kentucky nut and slack are selling at 50 to 60c. for good grades; No. 2 run-of-mine is being offered at 80 to 90c.; straight run-of-mine at $1.10@1.20, block coal at $1.70 to $1.80, all f.o.b. the mines. Demurrage coal is being sold in Louisville at prices considerably under these figures. Western Kentucky grades are in about the same condition as the Eastern coals, and quotations run from 25 to 50c. a ton less, depending on the grade.

MIDDLE WESTERN

INDIANAPOLIS

Slight improvement in the general situation. Mines continue on same running schedules. Prices satisfactory, except on slack.

Prices have stayed at a comparatively low level for several months, and the indications are for an advance. The war, improved financial situation, colder weather and the expected larger movement of grain are all bullish factors. The only marked improvement now is in the demand for domestic grades, although there is a slight betterment in the steam sizes.

Prices are fair on all grades, but slack, which has a range of 45c. to 65c, No. 4 suffering the least depression. Mines continue to make better than half time. Operators have been considering again the possibilities of storing accumulating slack. The transportation situation is easy at present, but operators believe there will be a tightening up in October when corn begins to move. Retailers have not changed prices this month and seem content to have a fair movement to consumers' bins. The first spurt of the larger domestic buying is over, and the lessened demand for the time will give mines a chance to clean up on slack. The low prices for the latter tend to keep quotations on lump and other grades at a stiff level.

There are scattering reports of industrial improvement, especially at railroad shops and the big steel manufacturing plants at Gary are running at the top notch of the year. The August and early September movement of Eastern coals into winter storage has made holes in retailers' stocks, which they are again filling up before prices are enhanced.

ST. LOUIS

Domestic grades holding strong but steam market is threatening to establish a new low level. Railroads choked with steam coals.

The market continues good for high-grade domestic sizes, but is lagging on washed coal and steam. In fact, the steam market is about as low now as it has been in the past three years, and there are indications that it will establish some lew low records, as far as Nos. 4 and 5 washed and screenings are concerned. Screenings from the Carterville field are down to 30c., and No. 4 washed has touched as low as 25c. On the other hand, lump and egg are still strong at from $1.75 to $1.85 and in some cases $2. This unusual situation is due to the fact that the operators are unable to move their steam sizes, and the railroads refuse to give them more equipment.

The outlook continues excellent in the domestic market. In the Standard market screenings are down to 20c., and 2-in. lump is going at $1 although an effort is being made on the part of some operators to get it to $1.10; 6-in. lump is in good demand at from $1.25 to $1.35, while 3x6 egg is held at $1. The Standard market is not in the healthy condition that it should be at this time, but colder weather may bring about better results.

Anthracite still continues to move fairly good, with no demand for smokeless.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.30	$1.00@1.10	$1.15
3-in. lump	.....	....	1.40	.....	.....
6-in. lump	$1.75@2.00	....	1.50	1.25@1.35	1.35
Lump and egg	1.85@2.15	$2.25	.....	.....	1.15
No. 1 nut	1.25@1.50	....	.....	0.75@0.80	.....
Screenings	0.70@0.75	....	0.80@0.85	0.20@0.25	0.35
Mine-run	1.05@1.10	....	.....	0.75@0.80	.....
No. 1 washed nut	1.60@1.75	2.25	1.50	....	.....
No. 2 washed nut	1.25@1.40	....	1.35	....	.....
No. 3 washed nut	1.10@1.20	....	.....	....	.....
No. 4 washed nut	0.95@1.05	....	.....	....	.....
No. 5 washed nut	0.30@0.40	....	.....	....	.....

CHICAGO

Prices on domestic coals increasing. The anthracite market is improving in all departments.

There have been advances in practically all the domestic coals but on the other hand there have been sharp recessions on certain of the steam sizes.

The demand for Carterville coal has been somewhat uneven. Some of the operators have sold up on their advanced circular price of $1.75 for the lump, egg and No. 1 washed. The demand has been so heavy that some have even withdrawn from the market temporarily. There is a slightly better demand for Indiana steam coal from some of the factories which seem to be expanding a little day by day. A decided increase in the demand for Indiana domestic grades has been noted.

The anthracite market is showing a progressive improvement. Both the dock and the all-rail trade have been active in all sizes. The smokeless coal market quieted down within the last week. The better grades of smokeless coal are selling at the circular price of $1.40 for mine-run; off-grade coals are not offered for less than $1.25 and in some cases for $1.30 or $1.35. The Hocking situation has been abnormal. The advance to $1.60 a ton has not retarded business in any degree.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.22@2.32	$2.65@2.80	$2.27	
Steam lump	1.87@1.92		1.97	
Egg		2.65@2.80		$3.30@3.45
Mine run	1.87	2.15@2.25	1.87	4.05@4.30
Screenings	1.07@1.12	1.45@1.55	1.07@1.12	

Harrisburg quotations are: Domestic lump and egg, $2.65 @2.80; steam lump, $2.15@2.20; mine run, $2.15@2.25; screenings, $1.45@1.55; No. 1 nut, $2.65@2.80; No. 2 nut, $2.30@2.40.

Prices for Carterville coal are: Lump and egg, $2.65@ 2.80 No. 1 washed, $2.80; No. 2 washed, $2.30@2.40.

KANSAS CITY

Wholesale and retail trade show little change though colder weather has stimulated the domestic demand. Prices are unchanged.

The price situation continues the main subject of interest. The expected increase of Sept. 15 now seems to have been postponed indefinitely; some say the present level will be maintained all winter but others are of the opinion that 25c. will be added Dec. 1, and 25c. a month thereafter. This is the first fall for several years that the price has not advanced Sept. 1.

The pronounced cold snap recently has forced many into the market and there is a chance that prices will advance, Oct. 1.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for August and the first eight months of this year and last year were as follows:

	August		8 Months	
	1914	1913	1914	1913
Phila. & Reading	904,643	855,343	7,768,256	8,616,490
Lehigh Valley	1,079,172	1,035,934	8,260,472	8,640,052
Cent. R.R. N.J.	637,467	656,154	5,735,445	6,067,368
Del. Lack. & West.	819,848	862,602	6,245,125	6,523,639
Del. & Hudson	619,062	603,876	4,706,619	4,698,004
Pennsylvania	497,579	469,875	4,121,427	4,076,893
Erie	734,350	686,985	5,441,578	5,449,938
Ont. & Western	191,622	199,131	1,542,467	1,697,222
Total	5,483,743	5,369,900	43,821,389	45,709,606

VIRGINIAN RAILWAY CO.

Shipments over this road for June and July, with details of leading operators were as follows in short tons:

Shipper	June	July
Knw., Glen Jean & E. R.R.	32,920	24,084
E. E. White[1]	26,073	29,424
Gulf Smokeless	21,869	22,294
Loup Creek Colliery	20,717	19,139
Slab Fork	19,811	20,544
New River Collieires	19,244	8,906
Pemberton Coal & Coke	17,253	18,212
E. E. White[2]	16,253	18,788
MasAlpin	14,324	14,906
Windin Gulf Colliery	13,278	14,268
Long Branch	12,454	10,545
Bailey Wood	11,707	11,544

[1]From Glen White. [2]From Stotesbury.

Gross shipments totaled 286,354 tons as compared with 321,626 for July, 1913, and 321,181 tons for June of the current year.

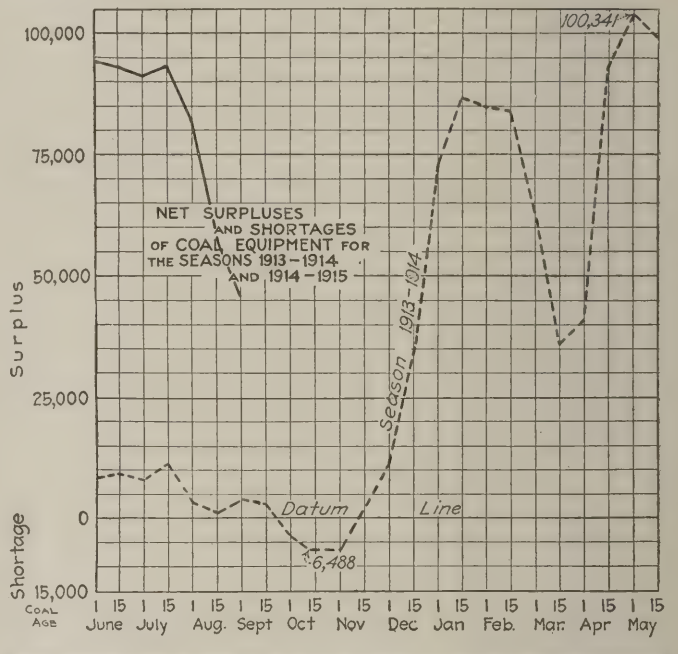
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Sept. 1, as follows:

	Surplus	Shortage	Net*
New England Lines	1,288	0	**1,288**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	11,343	0	**11,343**
Ohio; Indiana; Michigan; Western Pennsylvania	18,394	0	**18,394**
West Virginia, Virginia, North & South Carolina	3,176	0	**3,176**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	2,779	0	**2,779**
Iowa, Illinois, Wis., Minn.; North & South Dakota	4,078	3	**4,075**
Montana, Wyoming, Nebraska	665	0	**665**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,848	46	**1,802**
Texas, Louisiana, New Mexico	241	13	**228**
Oregon, Idaho, California, Arizona	2,329	4	**2,325**
Canadian Lines	0	0	**0**
Total	46,141	66	**46,075**

	May 1	May 15	June 1	June 15	July 1	July 15	Aug. 1	Aug. 15
Surplus	100,370	99,664	94,770	93,520	91,280	93,509	82,284	56,560
Shortage	29	313	7	49	430	292	110	496
Net*	**92,115**	**100,341**	**99,351**	**94,763**	**90,850**	**93,217**	**82,174**	**56,064**

***Bold face** type indicates a surplus.



FOREIGN MARKETS

ENGLAND

Trade quiet and slowly readjusting itself to the changed conditions. General reduction in war, insurance and freight rates.

The London coal trade is quiet. The prevailing hot weather keeps the consumption low. Supplies are coming in slowly, and the dislocation of the railway traffic has been pronounced. Manufacturing qualities are moving freely, and the export trade is reported better. Small nuts and slacks have been plentiful, and prices are weakening. Colliery quotations for house coals are still withheld.

One by one the barriers which held up the coal trade at the beginning of the war have been removed, and although the conditions prevailing previous to the outbreak cannot quite be renewed, everything possible to facilitate trade is being done. The reduction in war risks, insurance rates, and also in freight rates have further improved the situation; indeed, so low have the latter fallen that some shipowners have threatened to lay up ships.

To deal with the markets separately: Newcastle continues to show improvement in both prompt and forward business; the pits also are working slightly better. At Cardiff, too, matters are progressing much more favorably, and the demand in some cases has caused a slight increase in prices. In the Midlands trade is still quiet, though in the Yorkshire market a better inquiry is to be noticed. The market in the East of Scotland shows briskness, whilst that in the West has also improved.

The moratorium has been extended to October 4.

War risks insurance rates have been reduced from three to two guineas per cent. on cargo shipments. A reduction of a half per cent. in the premium on hulls has also been conceded.—"The Colliery Guardian."

COAL AGE

Vol. 6 NEW YORK, SEPTEMBER 26, 1914 No. 13

The Mainspring

By Berton Braley

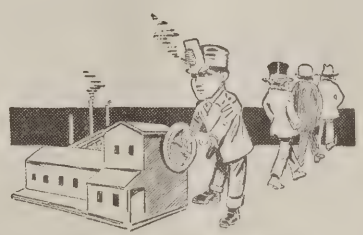
Written expressly for Coal Age

Pitboss an' foreman an' owner an' supe
Sure are a strong an' a heavyweight group,
Swellin' around with a satisfied smile,
Bossin' us miners an' livin' in style;
Still, when you're dealin' with figgers an' facts,
Gettin' right down to the simple brass tacks,
None of these big guns is makin' much flash
Side of the feller who deals out the cash.



A Heavyweight Group

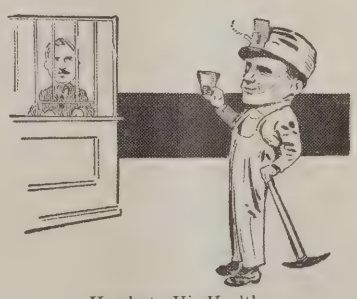
Down in the mine where it's dusty an' dark,
Life ain't no picnic, no regular lark,
Danger is lurkin' all over the place,
There is a plenty of risks we must face.
What do we do it for—pleasure or fun?
No, sir, we work for the sake of the mon,
So when it's payday we all make a dash
Up to the feller who deals out the cash.



They Might Quit the Job

Foremen an' supers an' pitbosses, too,
Might quit the job, but we'd worry it through,
Managers leave an' directors resign,
Still we would manage to handle the mine,
But—if that feller who deals out our pay
Quits doin' business a week or a day,
Down shuts the mine with a clang an' a crash,
Work all depends on the guy with the cash!

So here's to his health, may he never grow pale,
But always have plenty of strength an' of kale,
The bosses an' foremen we mebbe might spare
But the guy with the payroll we foster with care,
We hope he will sit there right tight in his cage
An' slip us each payday a boost in our wage,
We love an' respect him—we never will clash,
With that there fine feller who deals out the cash!



Here's to His Health

The Fushun Coal Field in Southern Manchuria

SYNOPSIS—Some brief notes and a number of views of operations in this interesting district. The seam worked is 120 ft. thick. The pillar and stall system is used and sand filling is being tried.

The Fushun operations are situated about 20 miles east of Mukden, on a branch about 32 miles long from the South Manchurian Ry. There are in all five collieries called the Oyama, Togo, Laohutai, Yangpaipu and Chienchichai. They are all modern plants in every respect, those at Oyama and Togo being particularly up-to-date. The total production from all five mines aggregates over 7000 tons per day, and there are about 20,000 Chinese laborers employed, together with 1500 Japanese laborers and 500 officials of the same nationality.



THE OYAMA PIT ON THE LEFT AND THE TOGO PIT ON THE RIGHT

The coal in this locality was first worked about 600 years ago by the Koreans, who used the fuel for burning earthenware. On the Chinese occupation of the district, mining was entirely suspended. During the Russo-Japanese war the latter government took possession of the property and worked it on a small scale until the end of March, 1907, when both the mine and railway were transferred to the South Manchurian Ry. Co. On acquiring control of the property, this concern instituted an aggresive development propaganda at the Chienchinchai, Yangpaipu and Laohutai collieries, incidentally installing a great deal of machinery.

The coal measures belong to the Tertiary, the coal bearing rocks being mostly shales and clay, often carrying numerous fossil leaves. The seams extend east and west for a distance of nearly 10 miles along the strike and have a northerly dip, varying from 22 to 35 deg. Two seams have so far been discovered, but only the upper one has been developed as yet, the lower being of much inferior quality. The seam worked is 120 ft. thick and has many thin partings.

The coal is of excellent quality, particularly adapted to gas making and locomotive uses. The following is an average analysis: Water, 7 per cent.; volatile matter, 40 per cent.; fixed carbon, 48 per cent.; ash, 4 per cent.; sulphur, 0.8 per cent.

Mining operations so far have been conducted on the



VIEW OF THE COAL COMPANY'S PUBLIC HALL

pillar-and-stall system. Tests are now being made to test the practicability of sand filling. Stripping will also be used shortly, the local engineers crediting this country for turning their attention to this method.

An interesting feature is the great depth to which the



Residence of Vice-President N. Sakaguchi

shafts are sunk, one being 1160 ft. deep. As a rule, the shafts are of circular section, about 21 ft. in diameter and lined with brick throughout most of their length.

Co-operation between Operating Department and Office

By H. H. Warner*

It is a known fact that in any business there has to be coöperation between the various departments, if such business is successfully operated, and the coal-mining business is no exception. In quite a few instances, they lack coöperation between the operating department and the office which handles the details. If we trace this non-coöperation back, it will be found, as a general thing, to result from the failure of the mine manager or the one in charge to get the operating reports into the office in a satisfactory manner.

Of course, the accountant in charge can figure out this work in a way that will make a report which is nearly correct covering the operation, but nearly correct is not what the average coal company wants. In this business especially, every minute detail should be taken care of in a way that would be a positive record, and this can only be done by the mine manager or mine superintendent personally seeing that the requisitions for supplies, materials, time books, yardage books, etc., are absolutely correct before they enter the office to be recorded.

*Chicago, Ill.

At a well operated plant, you will find the mine manager or superintendent taking more or less interest in the various office details, and keeping in touch with all the reports that the accountant turns out, and also an interest in their value. By so doing, he sees where his accountant is going wrong on any one subject, and can at once explain the particular proposition, so that in the future it can be handled correctly.

The last statement pertains mostly to the handling of supplies, material and cost reports. Summing this co-operative plan up means nothing more or less than that the accountant in charge of the office detail at the mine should act as an assistant to the mine manager or superintendent in charge; there are quite a number of mine superintendents today who were at one time mine accountants, and they received their training through co-operating with their superior, who was either mine superintendent or manager.

The mine clerk or accountant's leisure time will be well spent if he devotes it to studying and investigating the operating department, and by so doing he will find that within a short time he will be able to handle more or less of the operating work with considerable intelligence, and that is the first stepping-stone to his success if he expects to stay in the mining business.

He must study mine management in order to coöperate with the operating department. In return, the mine manager or superintendent should study the office work, and, as before stated, should acquaint himself with the value of its detail if he expects to gain the main point—coöperation. By gaining this point, it will not only be a great help to him, but also to the company.

The Western Kentucky Coal Field and Its Relation to the Panama Trade

By A. Blair, Jr.*

Among the great mass of data published, speculating upon the possibilities of the American coal operators in the Panama coal trade, it is rather remarkable that the western Kentucky field has been almost completely neglected. This field comprises an area of approximately 4000 square miles. By water transportation via the Ohio River, it is some 600 miles closer to Colon than the West Virginia field; in fact, the western Kentucky district has a distinct advantage in this respect over any of the Eastern coal fields.

In recent issues of Coal Age the possibilities of water transportation via the Ohio River from the West Virginia fields were mentioned with the comment that this would prove "another great factor" in favor of these fuels. Some remarks were also made on the eastern Kentucky field, but the western districts were apparently ignored.

Of course it is understood that water transportation from any of these interior fields is contingent upon the development of a permanent year-around waterway down the Ohio River. The government engineers are now working on this phase of the problem, and it is only a question of time until a channel with a minimum depth of 9 ft. will be available.

As regards the western Kentucky field itself, water

*Superintendent, Pittsburg Coal Co., Henderson, Ky.

transportation is not an entirely new feature in that district. Previous to the advent of the railroad much coal was supplied river steamers and considerable shipped by these boats to mills and factories scattered along the river. But with the advent of rail transportation these river mines were gradually driven out of their markets. Most of these operations were confined to the banks of the Green River, which traverses practically through the center of the field and has excellent natural loading facilities; this river is navigable the year round. On the Ohio River the government engineers propose making a 12-ft. channel from Louisville, Ky., down, a depth which it will be impossible to obtain above that point. In a channel of this size a thoroughly sea-going barge may be used, thus doing away with the heavy additional charge of reloading at the gulf ports. It is thus clear that this field will enjoy a distinct advantage over other districts, in this respect at least.

The western Kentucky field consists, essentially, of the southern extremity of the Great Central Basin, which traverses western Indiana and almost the whole of Illinois. The principal seams being worked at the present time are known locally as the Nos. 9 and 11, from which about 8 million tons are being extracted per annum. There is also a lower seam of comparatively high-grade coal, which is exceptionally uniform in occurrence and quality over a wide territory. Owing to its great depth and comparative inaccessibility, it has not been extensively developed as yet.

This seam, known as No. 1, analyzes roughly about as follows: Volatile matter, 17.21; fixed carbon, 74.31; ash, 7.60; sulphur, 0.88. The seam is quite persistent over the greater part of the field, and seems to be comparatively free from faults or other geological disturbances. About the only important development in this section was done previous to the Civil War, and these plants were all destroyed by the union soldiers and have never been rebuilt.

There are other respects in which this district has an advantage over other fields as, for instance, in the labor supply. It is one of the richest farming districts in the country, and as is well known, such sections are always a strong attraction to good men. This is exemplified by the prevailing conditions in the field, no labor troubles or strikes of consequence having occurred in years.

In view of these substantial advantages, which this section has over other competitive districts, it should prove a large, if not the predominating factor, in the Panama coal trade, at least as regards the inland fields. The consummation of the river improvements, coincident with the completion of the Panama Canal and the consequent development of this new market, is regarded as particularly propitious. The district is already being investigated by powerful money interests, and will, no doubt, be the scene of a rapid development in the course of the next few years.

Discussion by F. R. Wadleigh

The eastern Kentucky coals cannot reach tidewater on freight rates that will enable them to compete. The western Kentucky field, while accessible by water to Gulf ports, has not the quality of coal required and could only reach a limited market.

Although the No. 1 seam may be a high-grade coal, covering a wide territory, Mr. Blair himself states that it is not extensively developed, "owing to its great depth and comparative inaccessibility." How much coal is being mined from this seam and on what data does he base his analysis and his statement that the coal "seems to be comparatively free from faults or other geological disturbances?"

The U. S. Geological Survey reports state that most of the workable coal in the western Kentucky field is confined to the Nos. 9 and 11 beds, No. 9 bed being about 300 ft. below the surface and No. 11 about 40 to 100 ft. higher. There is also a No. 12 bed mined in a few places, and Nos. 6 and 5 (so called) furnish a small amount of coal.

The analysis given of this No. 1 coal by Mr. Blair is entirely different from that of other Kentucky fuels, resembling greatly Pocahontas, although higher in ash. We have been unable to find in the Kentucky state reports any coal analysis like it. More knowledge about this seam of coal is desirable, as its large development, if feasible, would put an entirely different aspect on the possibilities of the western Kentucky district. However, it is not believed that the labor-supply question will give this field much advantage over its competitors; the output of coal per man per year in Kentucky is lower than the average for the country.

It is difficult to see why the western Kentucky field should be either "a large" or a "predominating factor in the Panama coal trade, at least as regards the inland fields." It has not at present sufficient tonnage of coals of the necessary quality, nor can these be placed at Colon at a lower price than the Eastern tidewater fuels, after the adjustment of water freight rates on the latter, due to the opening of the canal, takes place

The extent of the coal markets opened to United States fuels by the Panama Canal has been greatly exaggerated, and there will be the strongest kind of competition for this business by higher-grade coals than any in western Kentucky.

Electric Cables in Mine Shafts

Mining men recently discussed the question of aluminum vs. copper as a conductor for electric current in mine shafts. It was pointed out that aluminum is stronger than copper, but its conductivity is just about one-half, so that things are evened up. One authority stated that two 0.15 cables in a shaft are better than a single 0.3 cable; the bigger the cable, the stronger the armoring required. Continuity of current supply is the most important factor to be taken into consideration when installing shaft cables.

One engineer suggested that single-core, single-armored cables, put in wrought-iron pipes, take up the least room in a shaft, and the weight of such cables is such that they may be easily handled. The wires and the insulation are in compression instead of tension and less likely to develop faults. Another engineer preferred two separate cables, so proportioned that with one out of use the plant may be kept running till the damaged cable has been repaired. This arrangement serves two important functions—reduction of weight on supports and security of supply. A colliery manager stated that for mechanical strength, the paper-insulated, lead-covered and armored cable is unequaled, and is well suited for either shafts or roads in mines. In the case of twin or multicore cables,

the mechanical strength, as far as the resistance or crushing is concerned, is considerably increased by using sector-shaped conductors.

An electrical engineer told of a case where the shaft cables caught fire. They were bitumen cables and were in the upcast shaft. Coal was hoisted in that shaft for a considerable time before the main shaft was put into operation and much coal dust accumulated around the cables and cleats. There was also a certain amount of moisture in the shaft. One night he was informed that the cables were on fire, although they had no indications on the switchboard; the ground detector did not show anything and no fuses were blown out. They extinguished the fire with water and wet bags thrown around the casing.

They discovered that the fire was from the outside and not from the inside. The ultimate conclusion was that the fire had been caused by electrolysis, and it probably started in a poultice-like mass which had accumulated at the iron bolts. This had evidently set up heat sufficient to cause the casing to start burning.

This experience teaches a lesson relative to the use of wood in a mine shaft. It suggests plainly that all inflammable material should be kept clear of shaft cables.

Shale-Dust Grinding Machines at English Collieries

By Samuel Dean*

A shale-dust grinding plant is now becoming part of the general equipment at collieries in Great Britain. Figs. 1 and 2 show the Robey plant in use at many collieries, including Altofts and Bentley. There are two sizes, the smaller one for dealing with 8 to 10 cwt. per hour, and the larger 15 to 20 cwt. per hour, the effective hp. required being 14 and 20, respectively.

*Victor-American Fuel Co., Delagua, Colo.

The machine is self contained, the crusher being in such a position that the product falls direct into the granulator. Two separate drives are required. Screens fitted round the granulator can be adjusted to give the correct fineness of dust. The latter is of the revolving type mounted in ring-oiled bearings. There is a hopper under the machine fitted with a door for emptying the shale dust into cars or sacks. The cost of a plant capable of grinding 15 cwt. per hour complete is about $800.

American Mills Used at British Collieries

Ninety per cent. of the shale dust produced will pass through a 100-mesh screen. A number of Griffin mills are being installed and can be seen at collieries in South Wales, and at Denaby and Cadeby Main collieries, in

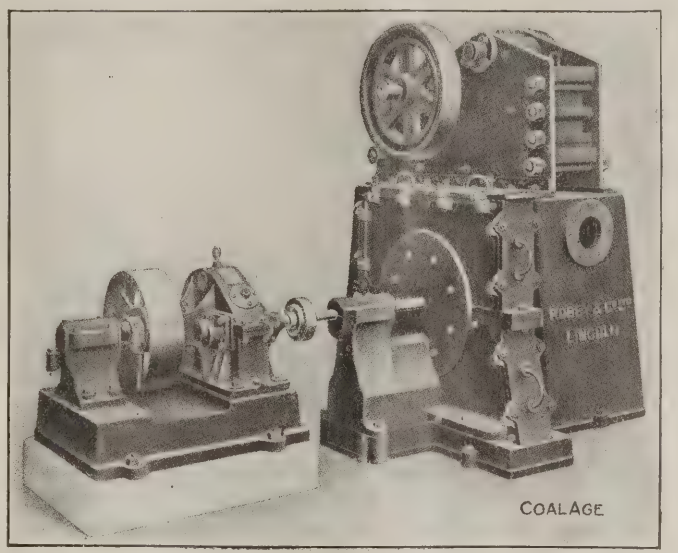


Fig. 1. Robey Pulverizer Plant with Intermediate Gear to Reduce Belt Speed

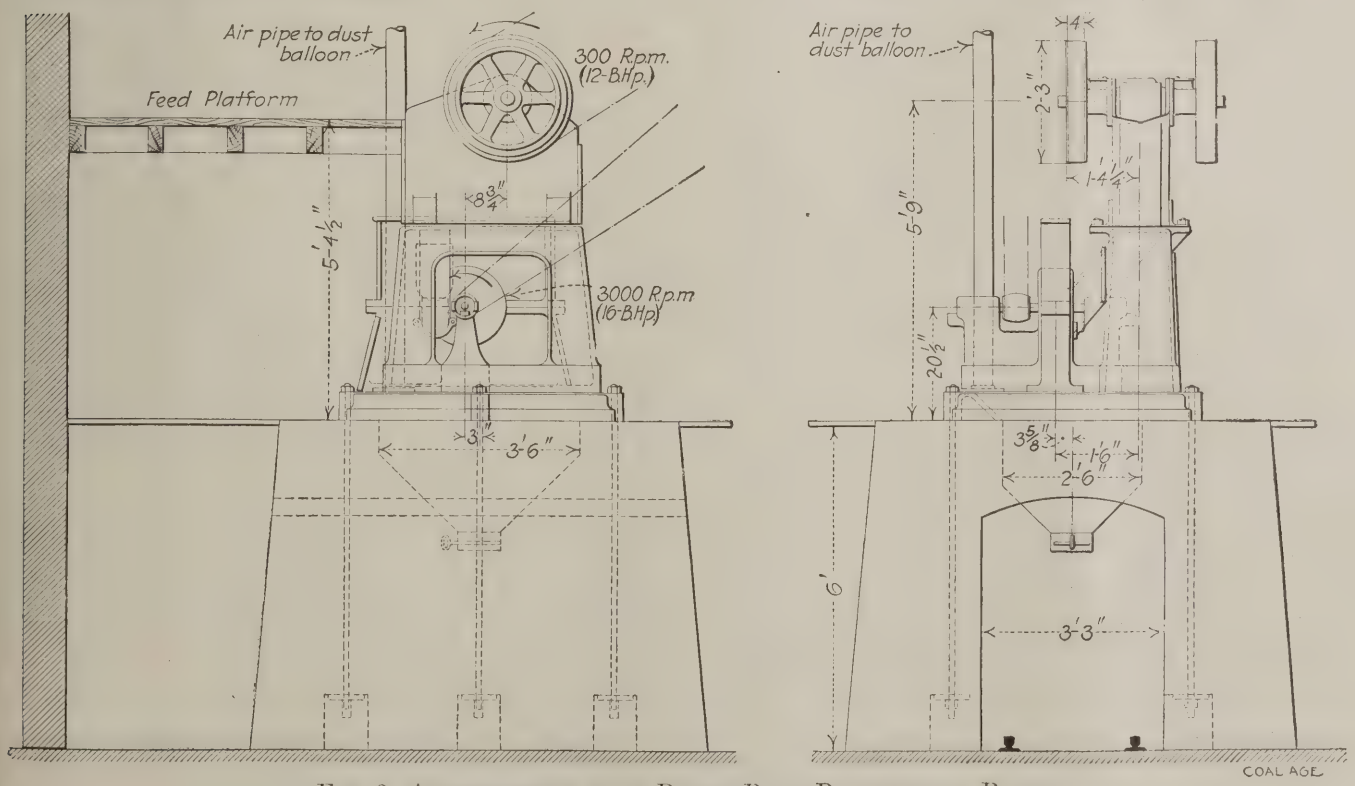


Fig. 2. Arrangement of a Robey Rock-Pulverizing Plant

Yorkshire. The Griffin mill is built in two sizes by the Bradley Pulverizer Co., of Boston, Mass., and produces a fine floury dust, about 90 per cent. passing through a 180-mesh sieve (180 holes per linear inch). The larger mill produces two tons of shale dust per hour, 55-60 b.hp. being required. The smaller or 30-in. mill produces one ton per hour and requires 25 to 30 b.hp.

The Griffin mill is well known and is in use in all parts of the world, being used largely for grinding the raw materials from which portland cement is made. The grinding is accomplished by means of a roller running

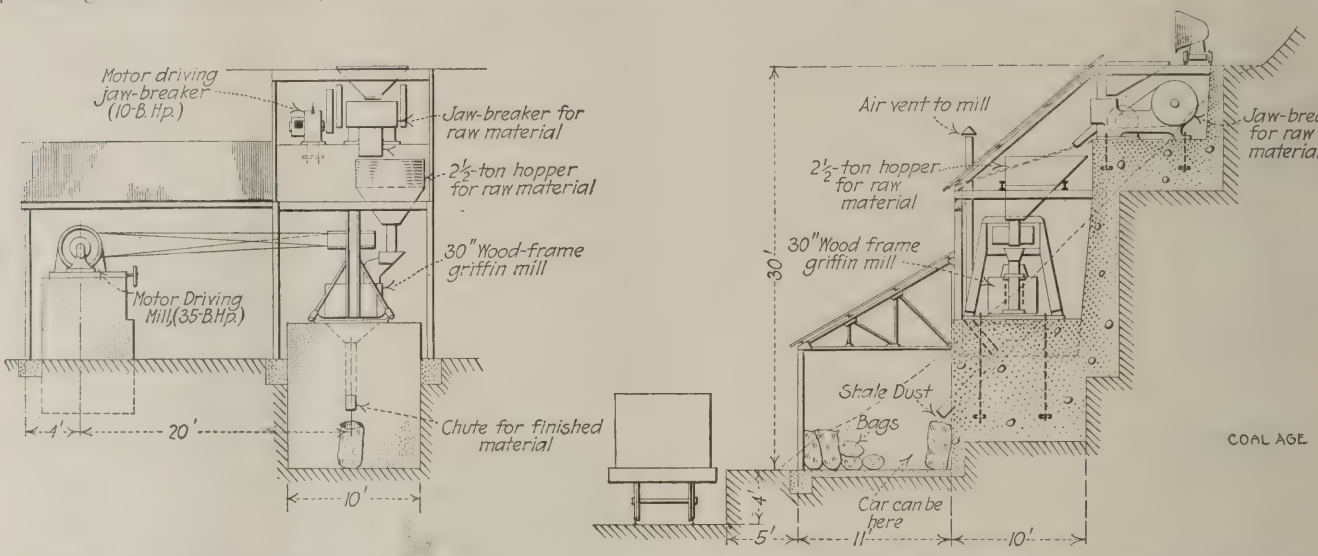


Fig. 3. A 30-In. Griffin Mill for Grinding Rock into Dust as Installed in British Collieries

within and against the inner surface of a die ring, being held in contact with it by centrifugal force. A 30-in. mill costs about $2000 and a 40 in. about $4000.

Coming Meeting of American Institute of Mining Engineers

The Pittsburgh meeting of the A. I. M. E. will be held Oct. 8, 9 and 10. The headquarters in Pittsburgh will be at the Hotel Schenley. There will be no formal program on Thursday morning, the first day of the convention. In the afternoon, however, a number of papers will be read, among which will be "Investigations of Coal-Dust Explosions," by G. S. Rice, and "The Appraisal of Coal Lands for Taxation," by H. M. Chance.

Thursday evening there will be an informal reception preceding an illustrated lecture on "Ancient Methods of Iron Manufacture in China," by T. T. Read. This will be followed by moving pictures of safety methods in mining, provided by the U. S. Bureau of Mines.

On Friday, at 9:30 a.m., the following papers on coal and coke will be read: "Coal-Dust Explosion Investigations," by J. Taffanel; "Coal-Mine Explosions Caused by Gas or Dust," by H. N. Eavenson; "The Pittsburgh Coal Field in Western Pennsylvania," by H. A. Kuhn; "The Book Cliffs Coal Fields, Utah," by R. S. Lewis; "An Aërial Tramway for Mining Cliff Coal," by A. E. Gibson; "Tin and Coal Deposits of the Fu Chuan District, China," by M. B. Yung; "The Manufacture of Coke," by J. P. K. Miller.

On Friday afternoon excursions will be made to the Homestead Steel Works of the Carnegie Steel Co., or McKeesport plant of the National Tube Co., Experimental Mine, Bruceton, and the Harbison-Walker brick factories. Definite arrangements for these excursions will be announced at the meeting.

At 7:30 p.m., a subscription banquet will be held at the Hotel Schenley, the cost of which will be $3 per plate. Ladies are urged to be present. Business suits will be worn by men.

Following are some of the papers which will be read at the Saturday morning session, beginning 9:30: "A Test of Centrifugal Motor-Driven Mine Pumps," by S. S. Rumsey and W. F. Schwedes; "Gasoline Locomotives in Relation to the Health of Miners," by O. P. Hood; "Shot-Firing in Coal Mines by Electric Circuit from the Surface," by G. S. Rice and H. H. Clark. There will also be a general discussion on the use of electricity in mines, under the direction of the Committee on the Use of Electricity in Mines.

Electrifying the Anthracite Mines

The substitution of electricity for the direct use of both steam and compressed air in the anthracite mines of Pennsylvania is foreseen as a possibility in a paper read before the Engineers' Society of Northeastern Pennsylvania. The data for this "Historical Review of the Use of Electricity in the Mining and Preparation of Anthracite Coal in the State of Pennsylvania" was gathered this summer by a committee of electrical engineers, of which H. M. Warren, of the Delaware, Lackawanna & Western R.R. Co., was chairman.

In the summary of apparatus in service, the authors stated that the grand total of electric generating capacity and power purchased for use at the mines is given as 79,811 kw., which is approximately equal to 105,400 hp. The horsepower produced by steam at the mines is given as 531,289 in the last annual report of the Bureau of Mines of Pennsylvania. As 91,010 of this is used for electricity, this leaves 440,279 hp. produced by steam for direct use. Thus almost a fourth as many horsepower are transmitted electrically at the mines as are produced by steam for direct use.

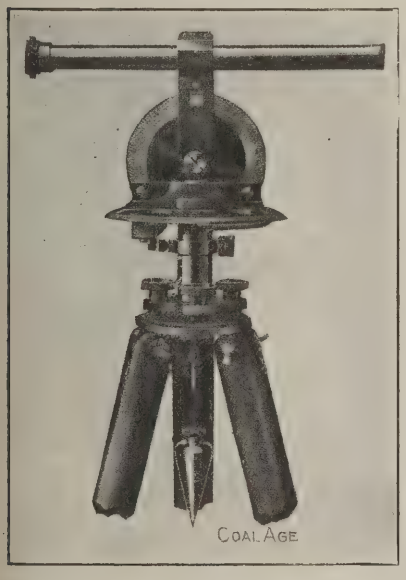
The introduction of electricity in any great quantity into the mines is not more than two decades old. The first electrical installation was made in 1887 by the Pennsylvania company. In 1889 the Thomson-Houston Co. installed a locomotive and a generating station in the Erie colliery of the Hillside Coal & Iron Co. It is interesting to note that this locomotive was in service until 1911, or for a period of 22 years of continuous operation. The first electric pump installed was in 1890, and it has been in continuous operation ever since. From 1891 to the present year plant after plant has been installed in the mines and a gradual evolution has taken place.

Today there are 169 miles of wooden pole lines above ground and 754 miles of trolley wire below ground in the anthracite mines. There are 951 electric locomotives using an estimated amount of over 60,000 hp. The other electrically operated equipment consumes 19,170 hp. for breakers and miscellaneous machinery, 23,280 hp. for electric hoists, 38,500 hp. for electrically driven pumps, 2920 hp. for coal-cutting machines, 3650 for lighting and about 100 hp. for heating. There are now five breakers equipped with individual motor drives, and others are under course of construction.

An Improved Sighting Compass

There has recently been placed on the market by the Davis Instrument Manufacturing Company, Inc., Baltimore, Md., a simple improved sighting compass designed particularly for mining work.

As shown in the accompanying figure, this compass has both a vertical and a horizontal limb. The vertical circle reads to half-degrees, while the horizontal limb is graduated to read single minutes, by the assistance of a vernier. The instrument with its tripod weighs only 8 lb. As shown in the figure, the instrument is supplied with leveling screws and a shifting head that enables it to be quickly set up and adjusted for the giving of sights.



DAVIS SIGHTING COMPASS FOR MINING WORK

The distinct advantage possessed by this instrument over the usual form of sighting compass is the sighting tube, which has the appearance of a telescope although containing no lenses. The tube is equipped with adjustable crosshairs that insure accuracy in sighting.

Another important improvement is the provision made for sighting in a vertical plane, which enables the instrument to be used on steep pitches, with great accuracy. While this compass is designed for the use of mine superintendents and foremen in extending the sights given by the engineer or surveyor, it is also a convenient leveling instrument for the use of builders. When desired, an extra spirit level is mounted on the sighting tube, for the purpose of giving level sights, although this addition is unnecessary in the use of the vertical circle.

Illinois near the Head in Mineral Production

Illinois was third among the states of the Union in 1913 in the value of its mineral production, according to figures of the United States Geological Survey, compiled in coöperation with the Illinois State Survey. The state owes its prominence as a mining state chiefly to its importance as a producer of coal and petroleum and to the development of its clay-working industries.

In coal production Illinois is exceeded only by Pennsylvania and West Virginia, and in the production of petroleum only by California and Oklahoma. In the manufacture of clay products Illinois ranks fourth.

The value of the mineral production of Illinois in 1913 was $131,825,221, of which the coal mines contributed $70,313,605, or 53 per cent.; the petroleum wells $30,971,910, or 23 per cent.; and the brickyards, tile works, and potteries, $15,195,874, or 12 per cent.

In 1912, the value of the total mineral production was $123,068,867, including $70,294,338 for coal, $24,332,605 for petroleum and $15,210,990 for clay products. The total increase of $8,756,354 in 1913 over 1912 was therefore principally in oil production.

These figures do not take into account the manufacture of pig iron nor the manufacture of coke, the raw materials for which are imported from the Lake Superior region and West Virginia, respectively. In the manufacture of pig iron Illinois stands third, being exceeded by Pennsylvania and Ohio. If the value of these products in 1913 were added, the total value of the mineral products of the state would be increased by nearly $55,000,000.

Another important mineral industry of Illinois is the manufacture of portland cement, this product in 1913 having the value of $4,784,696, an increase of $1,340,611 over the previous year.

The quantity of natural gas produced in Illinois when compared with the output of the other fuels is insignificant; nevertheless in 1913 the value of this fuel was $574,015. Coal, petroleum and natural gas had a combined value in 1913 of $101,859,530, an increase of more than $6,500,000 over 1912.

Coal Mining in Alsace-Lorraine

The Alsace-Lorraine district, which has been the scene of more or less important battles in the European war, is quite an important coal producer. The output in 1913 aggregated 3,795,932 tons as compared with 3,538,722 tons in 1912. The coke production experienced a slight decline from 94,595 tons in 1912 and 91,745 tons in 1913.

About half of the entire production is consumed locally, and by far the larger part of the remainder is shipped to south Germany and the Rhine Provinces. Other consumers are Switzerland, France, Luxemburg, Austria and Italy.

Recent Developments in Byproduct Coke Practice

By William Blauvelt*

SYNOPSIS—Some notes on recent improvements in byproduct-oven construction, with particular reference to the Semet-Solvay process. Some figures on the enormous losses resulting from the use of beehive ovens are given. Comments and suggestions as to methods of coking are also included.

In 1913 the tonnage of byproduct coke amounted to 12,714,700 tons, or more than 27 per cent. of the total coke produced in the country. This is an increase of about 1,600,000 tons over 1912, and it is probably not far from the truth to say that by the close of the current year the production will be at the rate of 14,000,000 tons per year. Compared with 1910, this means a growth of 100 per cent. in four years.

From the U. S. Geological Survey reports it appears that the average value of the coke and byproducts obtained per byproduct oven in 1912 was $11,265, as compared with $1019 as the average yield per beehive oven. The total value of the byproducts recovered was over $16,000,000. If these had been recovered from the coal used in making coke in beehive ovens, they would have been worth approximately $80,000,000—at the prices ruling in that year. The average yield of coke from byproduct ovens was 75.3 per cent. and in beehive ovens 64.7 per cent., a difference in favor of retort ovens of 10.6 points, or 16.4 per cent. If this yield had been obtained from the beehive ovens, it would have added to the wealth of the country 5,390,000 tons of coke, if the same coals had been coked in byproduct ovens, in addition to the above value of the byproducts. This loss is equivalent to the absolute destruction of about 6,800,000 tons of our coal supply during the year.

I have given these figures as suggestive of the importance of the byproduct oven in the conservation of natural resources. In this connection it is interesting to note that recent work in some byproduct ovens is showing conclusively that the high-volatile coals of the Connellsville and Klondyke districts make byproduct coke quite equal to the best coke that can be made in beehive ovens from the same coals.

The map, Fig. 1, shows the distribution of the byproduct coke plants in the United States. There are 42 of these plants. The map shows that in almost every case the byproduct ovens are located at the point of consumption rather than at the coal mines, as distinguished from the almost universal practice with regard to beehive plants. In the five coke-producing states of the South, the percentage of byproduct coke is much larger than in the country as a whole. With the completion of present construction nearly half of the coke made in the South will be byproduct coke. This point is worthy of consideration in connection with the work the Southern states are doing in the conservation of their resources.

One of the most notable improvements which has been made in the industry since its introduction into this country is the increase in output per oven unit and per man employed. When the first ovens were brought over from Europe they had a capacity of 4.4 tons of coal per day, and one crew of men was capable of handling about 25 ovens. This gave a capacity of 110 tons of coal per day with a unit crew.

Today the most modern ovens have a capacity of 20 tons of coal per day, and improved organization and modern machinery permit practically the same crew to handle from 50 to 60 of these ovens, thereby coking from 1000 to 1200 tons, instead of the original 110 tons. I know of none of the other metallurgical industries which has shown a larger growth in tonnage efficiency in the same time. This is a conservation of labor well worth considering along with the conservation of our coal supply. Progress in this respect has been distinctly greater in America than in Europe.

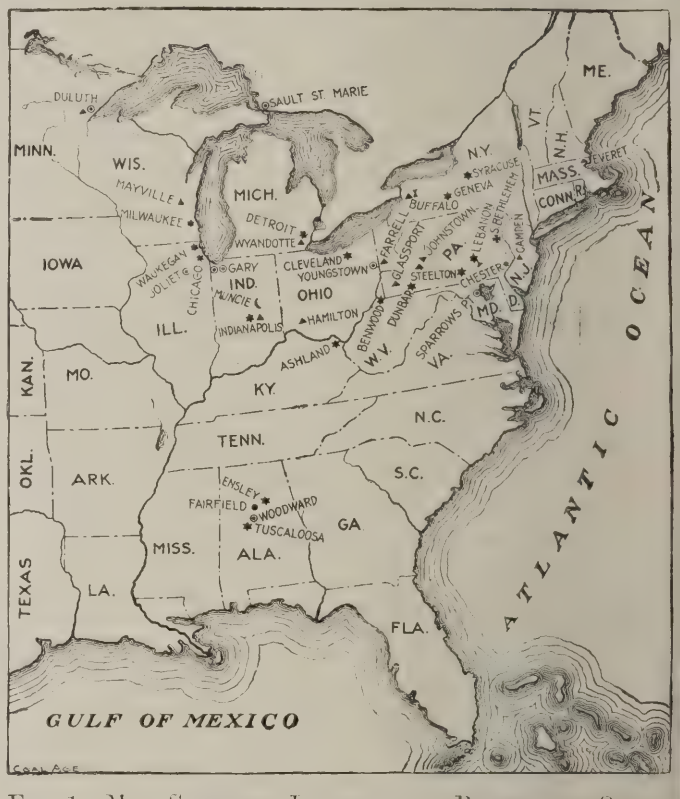


Fig. 1. Map Showing Location of Byproduct Ovens in the United States

Waste-Heat Ovens

The byproduct oven has been developed along two lines, the waste-heat oven, and the oven recovering the maximum amount of surplus gas. The former is the simpler type. It is ordinarily installed in places where the gas has little value. As is well known, in the carbonization of coal in a retort oven a portion of the gas produced is used for heating the ovens while the remainder is available for other uses. The waste-heat oven is not designed to obtain the greatest possible quantity of surplus gas and the products of combustion going off at a

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Note—Paper presented at the sixth general meeting of the Iron and Steel Institute, New York, May 22

high temperature are utilized for raising steam. This practice is comparable with that employed in those beehive-oven plants where the tunnel-head gases are collected and led under boilers, and to the non-regenerative heating furnace with boilers for utilizing the waste heat.

With the growing use of machinery for the storage and preparation of coal and for the preparation of coke, and the substitution of machinery for hand labor in other parts of the process, the requirements for power have grown materially, so that the amount required for a modern coke-oven plant is very considerable. There are many cases where the most economic results are obtained by a plant, so designed that there is just enough heat in the waste gases to supply the steam required, leaving the remainder of the gas available for sale.

A boiler plant properly designed for waste heat, with its accompanying economizers for preheating the feed water, is the most economical apparatus for utilizing heat in an industrial plant; that is, such a boiler plant will deliver the gases to the chimney, or to the exhaust fan which often replaces the chimney, at the lowest possible

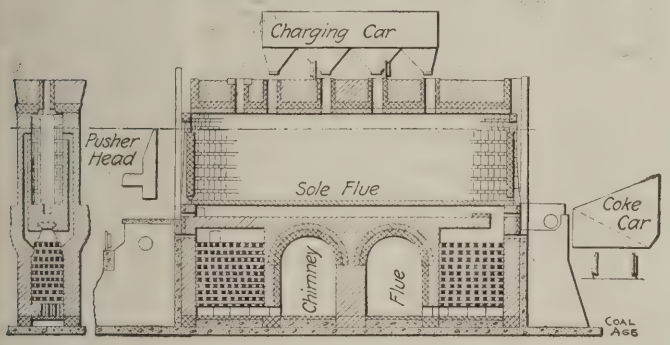


FIG. 2. SECTIONAL VIEW OF A TYPICAL OVEN

temperature consistent with commercial results. Such a design permits a very simple type of oven, with low first cost of operation. In the type of oven with which I am most familiar, the Semet-Solvay oven, these principles have been thoroughly developed, and under the conditions described above very satisfactory results have been obtained. A typical cross-section of this oven is shown in Fig. 2.

The gases are burned in the combustion flues, and then passed to the sole flue beneath the oven and out through the chimney flue to the boiler plant. The air for combustion passes first under the sole flue and then through the narrow flues on each side, where it comes into intimate contact with the heated brickwork; thence upward to the heating flues, where it meets the gas.

By a proper proportioning of these parts enough heat is abstracted by the air from the waste gases, so that the highest temperatures may be produced in the combustion flues, and at the same time sufficient heat remains in the waste gases to produce all the steam required for the operation of the plant, without any expense for fuel or for labor in firing. This system requires no attention from the operators except the regulation of the air at the burners on the one hand, and the maintenance of proper water supply to the boilers on the other. This method of heating the air is called "recuperation," to distinguish it from the familiar form of regenerator common to most high-temperature furnaces.

Fig. 3 shows an oven designed to operate with the smallest amount of fuel, and at the same time maintain, as far as possible, simplicity of construction and operation. In this design, regenerators are substituted for the recuperative system, one pair of regenerators for each oven, with the two chimney flues arranged between them. The whole construction of the oven and regenerator is located between the two vertical walls peculiar to this type of oven. These walls extend from the concrete foundation straight through to the top of the oven.

The operation of the regenerators is, in general, similar to that of on openhearth furnace, except that an entire block of 60 or more ovens is reversed at one operation. The air is usually blown in by a fan located beyond the reversing damper and is distributed under the block through a single chimney flue. It enters at the bottom of the regenerator, rises and passes through the flue system, meeting the gas at the several burners in the combustion flues. On reversal, the air enters the other regenerator, rises through the air flue, shown in dotted lines, and descends through the horizontal combustion flues, meeting the gas as before. The products of combustion pass out through the other regenerator to the reversing damper and stack in the usual manner. By this system the entire series of combustion flues are swept by all of the air required for combustion, so that hot spots are prevented and a uniform temperature is maintained throughout.

PROBLEMS IN OVEN CONSTRUCTION

Anyone familiar with the use of the high temperatures required in metallurgical work will realize the difficulties connected with the proper heating of a byproduct oven. The walls of the chamber are, say 36 ft. long and about 12 ft. high. Every portion of both of these chamber walls must be heated to a high temperature, and the temperature must be uniform in all parts, excepting that perhaps the upper part may be somewhat cooler. Any inability to control the temperature at any portion of this surface, about 430 sq.ft., means the production of imperfect coke, delay in the operation, or injury to the brickwork.

The method used in controlling the heat over this surface is interesting. It is illustrated in Fig. 4. The air raised by the regenerators to a temperature of about 1000 to 1100 deg. C. travels through the flue system, as described above. At the ends of the flues are gas burners, consisting of simple pipes, which admit the gas. When the air is traveling downward through the system it flows through the first flue until it reaches the first gas burner. The stream of gas is deflected downward by the air current and burns in the air as it travels through the flue. At the end of the second flue the air meets another stream of gas, which also is deflected downward and heats the third flue, and so on, until the gas from the last burner consumes the last of the oxygen.

When the air current is traveling upward the streams of gas are deflected upward, so that the entire combustion system is reversed at the usual half-hour periods by the manipulation of only one reversing damper for the entire block of ovens. A proper adjustment of the relative amount of gas delivered by each of the burner pipes maintains just the right relation between the heats in the different parts of the system, with the minimum attention. This method insures an even distribution of heat throughout the whole heating system. It seems clear also

that in the practice of passing the entire volume of air required for the combustion through the entire flue system there is a gain in efficiency of transfer of heat from the hot gases to the oven walls, as compared with the older methods of heating.

There has been some discussion as to whether the heating of a byproduct oven is effected by radiant heat or by convection and conduction, but I believe that the arguments are in favor of the latter theory. Under the conditions which exist in a coke oven the brick wall, at working temperatures, is a good conductor of heat.

This is illustrated by the fact that an increase of the thickness of this wall from 2½ to 4½ in. does not demand in practice a higher temperature in the flues to produce the same result in the coking chamber. The flame as burned in the oven flues is only slightly luminous, and it has been shown by good authority that the radiation from a non-luminous flame is only about one-third of that from a luminous flame. Moreover, radiant heat is transferred in accordance with the difference between the fourth powers of the temperatures of the radiant and receiving bodies, while heat is transferred by conduction proportionately to the first power of the difference in temperatures. It would therefore seem clear that under the conditions we are considering, at least a large portion

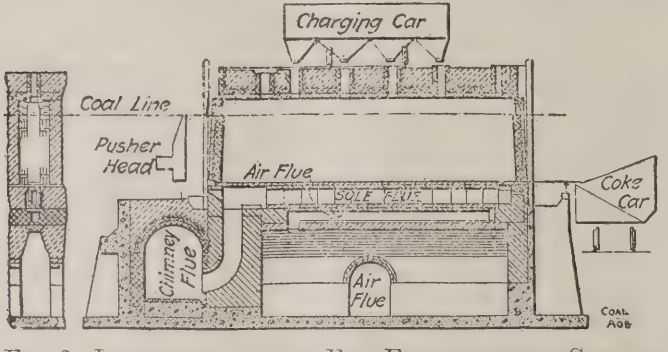


FIG. 3. LONGITUDINAL AND END ELEVATIONS IN SECTION

of the heat transferred from the hot gases to the flue walls must be by convection and conduction, and the system which uses this latter method is the more efficient.

In a system of heating flues where the layers of gases lying next to the walls are practically stationary, or moving slowly, it has been shown by experiment that these layers of quiet gases form an effective nonconductor which offers a greater obstacle to the transfer of heat than the wall itself. When the flow of gases is sufficiently rapid to sweep away these quiet layers, the hot gases are permitted to come in direct contact with the walls and transfer their heat to the substance of the wall according to the first power of the difference in temperatures, and the efficiency of transfer is proportionately good. The comparative rapidity of flow of the gases during their combustion also has the practical value of distributing the heat and preventing injury to the brickwork, avoiding thereby the dangerous condition which arises in an operation where temperatures are generated approaching the melting point of the refractory material.

Each burner on the Semet-Solvay oven is directly under the hand of the man in charge of the heats as he walks in front of the ovens, and each flue may be inspected by the removal of a plug from a peep-hole. The importance of convenient access both to the control of the gas supply and to the inspection of the heating flues in a block of byproduct ovens cannot be stated too strongly. With a given coal, the quality of the coke produced depends very much upon the maintenance of the proper temperature in the oven, not only as a whole, but in every part; nothing injures the quality of the coke more than inequalities in the heat in different parts of the chamber, so that certain portions of the charge are over-coked while the cooler spots are being finished. In an industrial plant it is essential that any important operation shall be done conveniently and in comfort to the operator, otherwise one may be sure that it will be done badly except under the closest supervision. Given good construction and simplicity of parts, the oven which permits the most convenient and accurate control of the heats is the best.

DISCUSSION BY CARL A. MEISSNER

The figures given in Mr. Blauvelt's interesting paper show in a striking manner to how great an extent our national coal resources, and the valuable byproducts derived therefrom, could be conserved by the more extensive use of the byproduct as against the beehive oven. He also describes the development made by his company in the construction of byproduct coke ovens in increasing their capacity and efficiency.

Mr. Blauvelt shows clearly how much has still to be done in this country in order to replace the beehive ovens by the byproduct ovens. The main reason for this is claimed to be the high initial cost of constructing a byproduct-oven plant as against a beehive-oven plant. I say "claimed to be," because when we consider all the costs—the conservation of the coal, larger coke yields, the recovery of the gas, tar, sulphate of ammonia, benzol, etc., in fact, all factors connected with the question of manufacturing coke from coal—it is not possible to present any figures that will not show a much larger return on the original investment from a byproduct coke-oven installation as against a beehive. This is the ultimate crux of the whole situation from a manufacturer's standpoint.

The advantages of better coking control, more uniform quality of coke, ability to collect and mix at one plant various coals, to improve blast-furnace operations, lessen the coke consumption and reduce the whole cost of making pig iron, as well as improve its quality for making steel, are all points that have to be taken into consideration.

Mr. Blauvelt refers to the gradual increase in capacity of ovens, which is governed largely by their dimensions and by the coking time. I am satisfied that we will be able to increase this capacity slightly with every new plant that we may build until the final limits, which will be governed by practice and experience, are reached. Great care must be exercised in doing this. I know of several cases where attempts were made to "jump" to greater dimensions with very unsatisfactory results.

As to the number of ovens to a battery and the number of batteries to a plant, this is again a matter for careful study and consideration. We have at Gary, Ind., 560 ovens and at Joliet, Ill., 280 ovens, and our experience has been that the operating cost per ton of coke at these two plants is practically the same. We feel that it would not be wise to place more than up to 100 ovens of American silica-brick construction in a battery nor install more than 600 ovens in a plant unit. The operative supervi-

sion becomes more difficult unless additional department heads are employed, which means increased cost, and where coke has to be "made right" in order to give the best results in a blast furnace, this operative supervision is a factor of prime importance.

Coking High-Volatile Coals

The most important question that has probably delayed more serious consideration of byproduct coke-oven installations and prevented greater progress in this direction, has been whether high-volatile coals can be coked in byproduct ovens so as to give as good a blast-furnace coke as many of them do in beehive ovens. This refers particularly to the great Connellsville and Klondike coal regions, though it also affects many other districts having high-volatile coals heretofore not considered fit for coking even in beehive ovens. Mr. Blauvelt refers to his successful experience with the use of high-volatile coals and all of our experience in this direction shows that many of these can be coked to the extent of 100 per cent., so as to give a good blast-furnace coke, while in other cases suitable coke is made by the admixture of 10 to 35 per cent. of low-volatile coals. Even those coals which have been considered by many as not being at present available for coking purposes—such as certain sections of the Pittsburgh seam, and those of a great many other coal districts—have been and are being used to make a satisfactory blast-furnace coke by being mixed with larger quantities of low-volatile coal, up to 60 and 80 per cent. of the latter being used.

There can be no further question in my mind that the present types of byproduct coke ovens have solved the problem of ultimately being able to utilize for coking purposes in a greater or less degree almost any bituminous coal found in this country. Even anthracite coals are mixed in small proportions with some of the high-volatile coals in Germany and have been found to make a more satisfactory coke than some of these high-volatile coals when coked at 100 per cent.

In view of all the above, the point of keen interest is the type or system of byproduct oven which is best suited for accomplishing this. Mr. Blauvelt very clearly points out what the requirements of the horizontal type of oven are for this purpose, and he shows that simplicity and perfection of uniform heating are the two main requisites.

The new Semet-Solvay horizontal-flue regenerative oven described by him is one of the latest types of byproduct oven constructed to meet the conditions in this country. It naturally differs materially from the latest type of vertical-flue oven now in successful operation in the United States. The oven described by Mr. Blauvelt represents the successive and progressive steps made by the Semet-Solvay Co. in strength, simplicity and effort for uniform temperature.

Oven Types and Coking Time

Much has been said in favor of simplicity of recuperation as against regeneration for the combustion of the gas in the flues, also of continuous heating versus reversing; but, all told, all modern types have finally found it to be more economical and efficient to use regeneration in place of recuperation, except in certain isolated cases, as pointed out by Mr. Blauvelt. Unless great care is taken in design, it is almost impossible to prevent short-circuiting or leakage of gas and air in recuperative chambers or flues and this is not only wasteful, but impairs, to a certain extent, the efficiency and the control of combustion.

The strength of construction in this latest type of Semet-Solvay oven is a noteworthy feature of great importance, for strength of oven and flue walls is imperative in our modern coke-oven practice of fast driving necessitated by short coking time. The simplicity of control of gas and air and the ready supervision of the combustion in the flues by means of peep-holes are factors that will appeal to all coke-oven operators.

As to coking time, I regret we have no definite data from Mr. Blauvelt, for this is a point of great importance to us. We have found, as a rule, that the shorter coking time gives the best blast-furnace coke and that there must

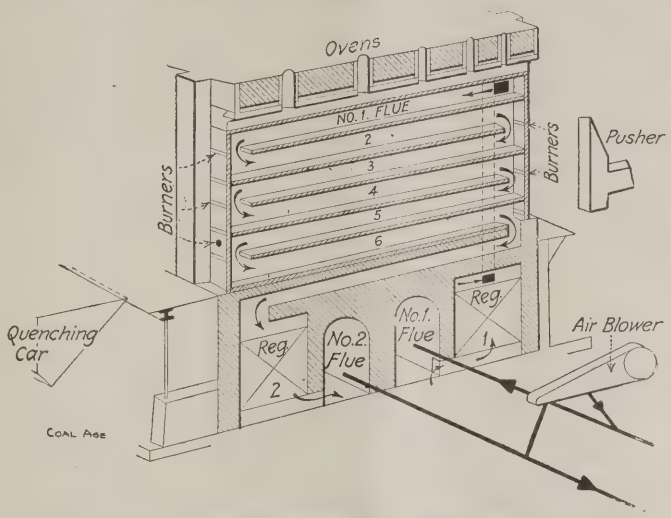


Fig. 4. The Arrangements of the Semet-Solvay Oven

be no delay in pushing the coke out of the oven after it is coked. What the actual length of coking time for various coals alone or in mixture is, has to be determined by actual trial; so far, we find that there is no great difference in coking time in the type of oven with which I am most familiar, whether we use high- or low-volatile coals. It may be found advisable to increase the coking time somewhat when using all high-volatile coals, but the difference between this and low-volatile mixtures does not, in our present experience, exceed, say, two hours on the average.

In view of its ability to obtain high and uniform coking temperatures, I can see no reason why the new Semet-Solvay coke oven should not be able to make coke in practically the same time as that of any other system. All in all, this latest development is of keen interest to us, as it is the purpose of the company with which I am connected, the United States Steel Corporation, to adopt always the latest and most approved type of byproduct coke oven, being in no sense whatever tied down to any one system by preference, prejudice or any other reason.

Some English coal figures were supplied to the Nottingham Society of Engineers by W. Bardill. Whereas the coal output in 1860 was 80 million tons per annum, in 1911 it was 270 million tons. Forty years ago, an output at a colliery of 500 tons a day was regarded as heavy indeed, but today, at many collieries, they raise 3500 tons per diem. This marvelous development was attributed to the increased use and adaptation of mechanical appliances by mining engineers.

The Labor Situation

SYNOPSIS—The Ohio situation is a deadlock, because the miners have bound themselves to make a contract with the eastern Ohio operators which would be wholly unfair to their employers. But some of the miners are disposed to withdraw concessions already offered, returning to their former demand for 49.64c. per ton of machine-mined, run-of-mine coal. In Colorado, President Wilson has suggested a form of agreement which seems more acceptable to the miners than to the operators.

Since the adjournment of the joint-scale committee in eastern Ohio on Sept. 4, there has been no reason to suspect that an agreement will come soon. In fact, the position of the miners has been considerably strengthened by the approaching solution of the difficulties in Colorado, and by the rehabilitation of union funds, now that the Vancouver and West Virginia troubles are ended. The expectation that all the resources of the union will now be diverted into eastern Ohio fills the miners on strike with the keenest of satisfaction. It is as if Germany and Austria were to make peace with all nations but France. Such a consummation would fill Germany with assurance and France with gloom. The position of the eastern Ohio operators is not less harassing than would be the position of the French republic under such circumstances.

A Fair Proposition

The operators have offered a new compromise on the run-of-mine law. They have offered to pay for slack, but not at the lump-coal price. They will give 58c. for lump coal and 22c. for slack, and it must be conceded that the offer is equitable and shows that the operators are now prepared to accept an exact equivalent, provided that their interests are protected by a scale which will reward the miners for care in handling their coal.

The proportion of coal which is not slack is 64 per cent. The equivalent rate to that formerly obtaining, namely, 69½c., should be 64 × 69½, or 44.48c. But if 64 per cent., the lump coal proportion, is paid for at a rate of 58c., 37.12c. per ton mined will be realized for the lump coal. If 36 per cent., the slack portion, is paid for at 22c. per ton, then 7.92c. per ton mined will be realized for the fine coal. Adding these together, we find that the miner will receive 45.04c. per ton, which is 0.56c. per ton more than an exact equivalent.

How any right-thinking man can turn down such an agreement is beyond comprehension. It is surely right to put a premium on the making of large coal, and to pay the miner for both kinds of fuel approximately on the basis of selling prices. By refusing this most reasonable offer, the miners of eastern Ohio have placed themselves in an unenviable position. Their only defense now is that they have made a promise to the operators in other parts of Ohio which they cannot break. Such a promise, which meant a reduction in wage in southern Ohio and an increase in eastern Ohio, should not have been made. Surely the miners in eastern Ohio should be allowed by the union to return to work at an increased wage, regardless of how small that increase may be. For everywhere else they have been counseled to return to work at unchanged wages except in the rest of Ohio, where wages are actually decreased.

Disposition to Return to Work

The men are really disposed to return to work in most cases at the offers made to them by the operators. The miners at the Pursglove mine at St. Clairsville are said to have held a meeting on the 9th and decided that they were willing to return on the 58-22 basis. But several out-of-town officers of the organization came around in the nick of time and prevented the men from acting. At Neff, where there has been much destitution, the prospect of winning the strike by a half-cent rise and a recognition of the run-of-mine bill looks too good to the men to be passed up. It is stated that 270 men out of 300 on a local comprising the miners of the United States Coal Co., in Bradley, petitioned their representatives at the miners' and operators' conference to settle the strike on the best terms available. The petition was not read.

But Some Men Get Less Reasonable as Time Passes

But the sentiment is not all in one direction. On the 10th, 225 members of Local No. 1077 held a mass meeting and unanimously adopted a resolution calling, not for 47c., but for the original demand of 49.64c. for machine-mined run-of-mine coal. The local is composed of employees of the Rail & River mine in South Bellaire, and there are about 400 members in all. Local union No. 1666, of the Fort Pitt mine, opposite Moundsville, W. Va., discussed the same matter and urged that the demand for 49.64c. be renewed.

The Militia Wanted by the Miners

Another difficulty has arisen. The operators formerly employed union men to operate their pumps and fans. Recently they have called on their petty bosses to do that work. These men are nonunion employees, and the miners insist that the understanding with J. M. Roan, the mine commissioner, to the effect that only union men should be employed, be carried out. It is not clear whether these bosses, who are replacing the union pumpmen, engineers and repairmen, are monthly employees who are usually paid by the company whether the mines work or not. Some of the companies have let the mines be flooded and the air become stagnant rather than engage union men who are striking against them.

Local union No. 430, at McClainsville, west of Bellaire, passed a resolution requesting that troops be sent to Belmont County to compel the operators to reinstate the men thrown out of work by the employment of petty bosses. They have urged that the need for this work is just as urgent now as it was when the operators desired the militia for the protection of those nonunion men who were then doing the pumping and repairing.

There has been some expectation that the operators would introduce strike-breakers, but W. R. Woodford, president of the Pittsburgh Vein Operators' Association of Ohio, denies it without qualification. Benefits of $3 weekly will be paid from now on by the union, and now union activity elsewhere has ceased, a large amount of money will become available to back the eastern Ohio cause. This feature, and the miners' pledge for a 47c. rate, will be the sole causes for delayed settlement.

The operator is not unreasonable in eastern Ohio. He surely has outstripped all other operators by offering an increase in wage, however small. Even 44.61c. on a mine-run basis has been offered, and this is better for the miner than last year's scale.

The Coshocton Difficulties

In the Coshocton district, the scale has not yet been adjusted, but arrangements have been made for a conference in the near future to try to arrive at an adjustment. The difficulty in that district is not so much a matter of scale as the question of the payment of 5c. a ton to the men for pushing the mine cars from the neck of the room to the face and back again when loaded. It is believed the matter will be amicably adjusted.

Questions of the quantity of fine coal allowable under the mine-run law have generally been settled at the various mines without calling on the Ohio Industrial Commission.

Violence at Elverton

At Elverton, Fayette Co., W. Va., there has been a strike resulting in much violence. On the 10th of this month, several men were being lowered down a plane. Two loads of men were allowed to pass, but riflemen, declared to be strikers, fired at the men in the third car and killed one man who had lately arrived from Pittsburgh, Penn.

The shooting began at 4.30 p.m. and continued for 15 min. After the men had reached safety in shanties at the foot of the hill, the fire was directed on the company store, which also serves as the home of W. R. J. Zimmerman, the manager of the Branch Coal & Coke Co. The shooting was maintained at intervals till 5 o'clock, and fire was returned from the company store and office.

The dispute is about a check weighman whom the company refuses to recognize. The man is declared to be neither in the employ of the company nor a practical miner. The miners' officials and Gov. Hatfield, president of the board of conciliation, have tried to get the men back to work, leaving the dispute open till the governor has had time to render his decision. The men will not accede to this arrangement, though it follows the lines of their agreement. The company declares it will not reinstate four of the striking men. It has employed its own detectives and has refused to accept the assistance of the sheriff's officers. It is though that much trouble may result, and the subdistrict president, L. C. Rodgers, of the New River United Mine Workers, declares he is

endeavoring to prevent union men from compromising themselves by staying around the scene of the trouble.

No Reduction in Wage

From all quarters, we are assured that there is no truth in the story that there has been a decrease in the mining rate along the Norfolk & Western Ry. William Leckie, a large operator of Welch, W. Va., writes us that he has not heard of any such reduction in rate. N. H. Mannakee, civil and mining engineer, of Williamson, W. Va., also declares there has been no cut in that region. It has also been reported to us that inquiries have been made throughout the Pocahontas field, and no operation has been discovered at which any cut had been made.

The Mailed Fist

Some time ago we printed an editorial entitled "The Mailed Fist," condemning certain orders of the War Department, and learned later, apparently in contradiction of our statement, that the administration did not require men to be citizens of the state of Colorado before entering the service of Colorado coal corporations. Residence alone, we learned from the War Department, was required. We expect to publish a full record of the War Office orders which we have secured, and to add to it the letter of the War Office to us, in which the issue is carefully dodged. An order was issued on Aug. 14, 1914, requiring that all miners recently employed must be citizens of the state of Colorado. Afterward, this order was modified, and it is no longer in force.

The Colorado Armistice

President Wilson is endeavoring to arrange a three-year agreement between the Colorado operators and union miners. The latter have spent $3,000,000 on their strike, and are at their wits' end to secure the money for further finance, especially since the eastern Ohio situation has called for money in larger quantities in the hitherto peaceful states. The agreement, on which we expect to comment next week, is as follows:

There hereby is established a three-year truce, subject to:

1. The enforcement of the mining and labor laws of the state.
2. That all striking miners, who have not been found guilty of violation of the law, shall be given employment by the employer they formerly worked for, and where the place of the employee has been filled, he shall be given employment as a miner at the same or other mines of the company.
3. Intimidation of union or nonunion men strictly prohibited.
4. Current scale of wages, rules and regulations for each mine to be printed and posted.
5. Each mine to have a grievance committee to be selected by majority ballot at a meeting called for the purpose, in which all employees (except officials of the company) have the right to participate.

Members of said committee must be employed at least six months at the individual mine before being eligible.

Married men to be in the majority on each committee.

6. It is understood as a condition of the creation of said commission that during the life of the truce,

(a) The claim for contractual relations is to be waived, but this shall not prevent the voluntary agreement betweeen any employer and their employees during the life of this truce.

(b) No mine guards to be employed, but this does not preclude the employment of necessary watchmen.

(c) In the establishment of the truce, the presence of the federal or state troops should become unnecessary.

(d) There shall be no picketing, parading, colonizing or mass campaigning by representatives of any labor organization of miners that are parties to this truce, which will interfere with the working operations of any mine during the said period of three years.

(e) During said truce, the decisions of the commission in cases submitted shall be final and binding on employers and employees.

(f) There shall be no suspension of work pending the investigation and reaching a decision on any dispute.

(g) The suspension of a mine over six consecutive days by the company may be authorized for cause satisfactory to the commission, but not pending any dispute.

(h) Wilful violators on any of these conditions will be subject to such penalties as may be imposed by the commission.

The Miners Approve and Operators Question

The miners' convention on Sept. 16 voted to accept the proposals after a two-day debate, the vote being 83 in favor of the agreement and 8 against it. The Colorado mine operators held a meeting Sept. 19 and succeeding days, to prepare a reply to the President relative to the proposed agreement. A committee was formed to formulate a reply, consisting of J. C. Osgood, F. E. Gove, of the Victor-American Fuel Co., and D. W. Brown, of the Rocky Mountain Fuel Co.

The Colorado Fuel & Iron Co., through J. W. Welborn, its president, declares that it does not have room in its mines for all strikers not proved to be criminals. It has already almost as many men as it needs in the service. Mr. Welborn also declares that it is dangerous to employ men hostile to the company's purposes, at work as hazardous as coal mining. He states that, where there are vacancies he is willing to employ any strikers who have not been guilty of acts of violence or overt hostility.

He objects to the provision giving a commission the right to determine whether the company shall close its mines for more than six days at a time. He states that the needs of the market are best known to the company. He also declares that the assessment of fines would only be operative against the coal corporations, as the men could not be made to pay them. He is very willing to see that the mining laws are complied with, and says that they have always been observed by his company. He also adds that, in accordance with the proposal, he has already ordered a full publication of the rates of mining and regulations appertaining thereto.

At Last an Agreement Is Made in the Southwest

Districts 14, 21 and 25, comprising Kansas, Missouri, Arkansas and Oklahoma, held conventions in Kansas City, at which the joint interstate agreement was ratified with minor changes, and the agreements reached between the committees of operators and miners were also ratified with trifling modifications. The new contracts, which remain in force till July 31, 1916, make practically no change in the wage scales. The chief changes are in local matters affecting only the particular districts.

The most important matter of the present contract and interstate agreement is that as to arbitrators. All disputes reach finally, under the new plan, a board of arbitration or district joint board, which is supposed to settle grievances without strikes or stoppage of work. This board consists of three members from the miners and three from the operators. There is to be a joint board in each district, but there will be two such boards in District 21, one for Arkansas and one for Oklahoma.

The officials of the districts and of the conference are this week going over the agreements and conferences carefully preparatory to their f rmal publication.

The boards appointed are as follows:

Kansas, District 14—Operators: George Richardson, commissioner; Ira Clemens, John Mayer. Miners: Bernard Harrogan, district president; Francis McDonald, James James.

Oklahoma, District 21—Operators: E. W. Hogan, commissioner; Dan McAlpine, James Cameron. Miners: Edward Cunningham, district president; Pete Hanraty, Ben Brown.

Arkansas, District 21—Operators: E. W. Hogan, commissioner; William McKinley, M. M. McWilliams. Miners: Edward Cunningham, district president; Peter Stewart, Robert Kendrick.

Missouri, District 25—Operators: W. L. A. Johnson, commissioner; William Harkes, B. T. Whitey. Miners: George Manuel, district president; B. C. Morrow, Charles Daither.

The Bache-Denman Coal Co. Approves the Check-Off

It is interesting to see that the Bache-Denman Co. is now using the check-off as a weapon to collect money from the Arkansas union for the riot and arson of the members of that organization at the Bache-Denman mines. Judge Frank A. Youmans has attached the funds of the Union in a dozen banks of western Arkansas at the suit of the Bache-Denman Coal Co., and the miners are not desirous of collecting the check-off if the money thus collected is to be lost to them by being applied to pay for the losses due to their lawlessness. It will take a long time for the Arkansas union to collect $1,250,000, and the men threaten to strike on general principles. Evidently such a strike can only be called for the purpose of influencing the court against continuing to attach the money of the union.

Our Front Cover This Week

The interesting photos shown on the front cover of COAL AGE, this issue, were furnished us by the General Electric Co. The two locomotives shown in the pictures are of "G. E." manufacture, the one operating in Kentucky being a 5-ton machine. Locomotives of this type are now being used for long hauls on the surface, as well as underground.

Mine Foreman Association Meet

In our issue of Sept. 5 we stated that the Knoxville field day was to be held on Oct. 15. This should have read Oct. 24. A number of teams are to compete for some nice prizes. The event is under the auspices of the Mine Foreman Association.

The Export Trade

A British View of Our Possibilities in the South American Trade

The *Colliery Guardian* (London, England) has the following to say regarding our attempt to break into the South American coal markets:

If this country is in a position to detach a large portion of Germany's foreign trade at the present time, it should not be forgotten that the United States, free from most of the difficulties that beset us, cherishes hopes also of benefiting from the embroilment of Europe. Amongst other ambitions, the desire to popularize Pennsylvania and West Virginia coal in South America is prominent. It is highly probable that efforts will be made to introduce American coal in other markets, but the Argentine Republic and Brazil naturally present themselves as those which, *a fortiori,* are most vulnerable to attack.

The matter, however, is not so simple as it looks. In the first place there is the difficulty that the United States has few ships adapted for this trade. The Ship Registry Bill, which has just passed through the American Senate, seeks to provide a remedy. The Bill admits to registry in the United States foreign-built ships when owned by citizens of the United States or corporations organized under the laws of the United States or of any state; but it excludes such vessels from engaging in the coastwise trade.

A section of the Senate Bill also authorizes the President to suspend the laws requiring watch officers on such vessels to be citizens of the United States whenever, in his judgment, there are not enough citizens of the United States available and qualified to fill such positions. The bill also authorizes the President in his discretion to suspend the "provisions of the law requiring survey, inspection and measurement by officers of the United States of foreign-built vessels admitted to American registry under the Act."

We can contemplate but little advantage to our American cousins on this score. The guerilla warfare of the "Dresden" and other German cruisers in the Atlantic must soon come to an end from lack of fuel alone, and insurance will add but little to the cost of freight.

On the other hand, our ships have the advantage of a return freight, which is not available to United States shipping, and exporters are strongly entrenched in South America. The bulk of the import trade in coal is in the hands of British exporters, who may be trusted to lose no opportunity of maintaining and extending their province. Of course, it is possible that South American shipping may be called into action. Brazil, Argentine, Chile and Peru own about 622 ships, with a combined gross tonnage of 204,473 tons.

But another greater difficulty that meets the American coal operator is the long credit system which prevails in the Southern Continent. The American shipper is not accustomed to the c.i.f. basis. . . It is true that in several cases since the war broke out buyers of British coal, who usually deal on a c.i.f. basis, have consented to clear the freight themselves so as to accommodate the exporter, who still has enormous sums outstanding to his credit, but it is certain that, if we are to continue business, a purely cash system of trading all around is out of the question.

It is important to remember that such coals as those of Pocahontas and New River, and some of the Pennsylvania and West Virginia gas coals, are but little inferior to the best that we can supply. It is an open secret that some of the largest firms of British coal exporters have been heavy buyers of American steam coals during the last year or two. Our impression is that if American coals do reach South America in any quantities, it will be through the agency of these houses. The markets, it may be added in conclusion, are most valuable, and the actual tonnage of coal, which exceeds six million tons per annum, does not by any means represent the whole of this value, for the connection with South America, in which coal forms one link, is of national importance.

A factor that must not be overlooked is the opening of the Panama Canal, which facilitates the transport of American coals to Chile, Peru and Bolivia, at present extensive customers for British and Australian coals.

The U. S. Geological Survey on the Export Question

The exports of coal from the United States have never been large enough to affect the production materially. They amounted to 20,000,000 short tons in 1912 and 23,200,000 tons in 1913, or less than 4 per cent. of the total output of the mines in each of those years. At present, however, while the six European nations that rank next to the United States as coal-mining countries are at war, the demand for export coal from neutral countries is inevitable.

It must be granted that the sale of manufactured products for export is preferable to the sale of raw materials, but there appears now to be a large opportunity for coal export that will not curtail in the least either the domestic supply of coal or the activities of domestic manufacturers. The exportation of coal to South American countries must be of advantage both in establishing trade relations and in insuring a balance of trade in our favor. Already shipments to European and South American ports have begun, and there is demand for authoritative information regarding the quality of the coal from the different fields accessible to the seaboard. How this information can be obtained has already been mentioned on page 9.

Our Coal Reserves

As stated by Secretary Lane, "Coal is our one resource about which there need be no present anxiety." In 1908,

Note—Abstract from "Our Mineral Reserves," U. S. Geolo. Survey Bulletin No. 599.

Campbell estimated that our reserves of easily accessible anthracite and bituminous coal were more than eleven hundred billion (1,166,527,000,000) tons and that nearly half as much more of the same grades was accessible with difficulty, besides comparable tonnages of sub-bituminous coal and lignite. Five years later a new estimate made by the same geologist, in the light of much better geologic data, especially regarding the extent of the Rocky Mountain coal fields, exceeded these figures by nearly 30 per cent. His estimate of more than 15 hundred billion (1,500,000,000,000) short tons in the United States, exclusive of Alaska, was published in a volume on the world's coal resources resulting from an international inquiry made by the Twelfth International Geological Congress. This publication, in preparing which the geological surveys of the world coöperated, furnished the first authoritative statement of the coal supply of the world, and showed that North America possesses nearly two-thirds of this supply and that the United States alone has reserves exceeding those of any other continent and nearly double those of Europe.

In view of the steadily increasing consumption of coal in the United States the question how long the exportation of coal should be encouraged or continued must be considered at some future time, for it will plainly not be wise to deplete too greatly this reserve of fuel, on which the Nation's industrial life must depend. At present, however, the question of the duration of our coal supply includes so many indeterminate factors that any prophecy as to the date of its exhaustion must be of doubtful value, and it does not now seem at all improvident for us to utilize in some degree this abundant resource as a means of building up our foreign commerce and making new markets for the products of our industries.

Until the present war broke out, Great Britain was the only country that exported coal in considerable quantity, but Great Britain is already beginning to feel the pinch of poverty in her coal supplies, and it is highly probable that when peace is once more established she will place restrictions upon her exports of coal. In 1913, the exports of coal from Great Britain amounted to 82,200,000 short tons, and the bunker trade called for 23,555,288 short tons more. In the same year the exports from the United States, as already stated, amounted to a little over 25,000,000 short tons and the total bunker trade at the principal ports—New York, Philadelphia, Baltimore and Hampton Roads—was only about 7,500,000 tons, indicating that most of the trans-Atlantic liners, the majority of which are English, have been carrying from the other side a sufficient quantity of coal for the round trip.

The high-grade steaming coals of the United States, which would be the ones in chief demand for export trade, are found largely in the eastern half of the Appalachian coal field, which includes the Clearfield, Allegheny, and Somerset districts of Pennsylvania on the north; the Cumberland region of Maryland; the Elk Garden, Fairmont, New River and Pocahontas districts of West Virginia; the southwestern counties of Virginia; the eastern counties of Kentucky and Tennessee; and the Birmingham and other districts of Alabama on the south. Of these coals, those available in highest quality are the semibituminous coals of the Pocahontas, New River, Elk Garden, and Cumberland districts and the better grades of Clearfield. The fields nearest the seaboard are those of the Cumberland and Elk Garden districts, but these are approaching exhaustion, so that the advantage in this respect will fall to the Alabama mines, which are being made more easily and cheaply accessible by the slackwater improvements in Warrior River, which have already resulted in a marked advance of Mobile as a shipping port.

United States Almost Independent in Mineral Resources

Probably no other nation in the world so nearly approaches absolute independence in respect to mineral resources as the United States.

A glance at the statistics of mineral imports affords a means of comprehending in a broad way how great and complex is the task of attaining national independence in the mining, metallurgical, and chemical industries. Last year the imports of mineral products, both crude and manufactured, exceeded $270,000,000. Of this total probably $200,000,000 represents raw materials and crude metals, the value of these imports being about 8 per cent. of that of the domestic output.

In this list of imports the larger items named in the order of value are unmanufactured copper, precious stones, nitrate of soda, copper ore and matte, nickel, tin, iron ore, pig iron and steel, petroleum products, manganese ores and alloys, platinum, aluminum, pyrite, graphite, stone, potash, and magnesite.

This country has an abundant supply of most of these mineral products that are now imported in large amounts, and as to them it can be independent of foreign countries. The only essential minerals of the first rank of which the United States has no known supply at all commensurate with its needs are nitrates, potash salts, tin, nickel and platinum, the list thus comprising two essential mineral fertilizers and three useful metals.

The Coal Markets of Cuba

Coal contracts for the large consumers in Cuba as a general rule are made in the autumn of each year, and are affairs of many years standing. The three largest consumers of coal in the Island of Cuba are: The United Railways of Havana and allied lines; the Cuba R.R., Camaguey, Cuba; and the Havana Electric Railway, Light and Power Co. In addition to these, the sugar mills and mining companies of the island consume large quantities. A complete list of these appears in the Cuban section of the World's Trade Directory, issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington.

The largest importers of coal in Cuba for retail purposes, that is, for ship's use, are the Havana Coal Co. (E. J. Berwind & Co.) and the West Indies Coal Co. The first named, having an extensive plant in Havana for loading and unloading, has almost a monopoly of the business.

One horsepower-hour is equivalent to 2545 B.t.u. per In a pound of Pocahontas or other coal containing 15,000 B.t.u., there is enough energy, could it all be utilized, to supply almost 5.9 hp.-hr. or to raise a weight of one pound 2210 miles against the force of gravity. This energy would lift a 100-ton locomotive 58 ft.

Power Department

The Operation of Rotary Converters at Coal Mines

By C. A. Tupper*

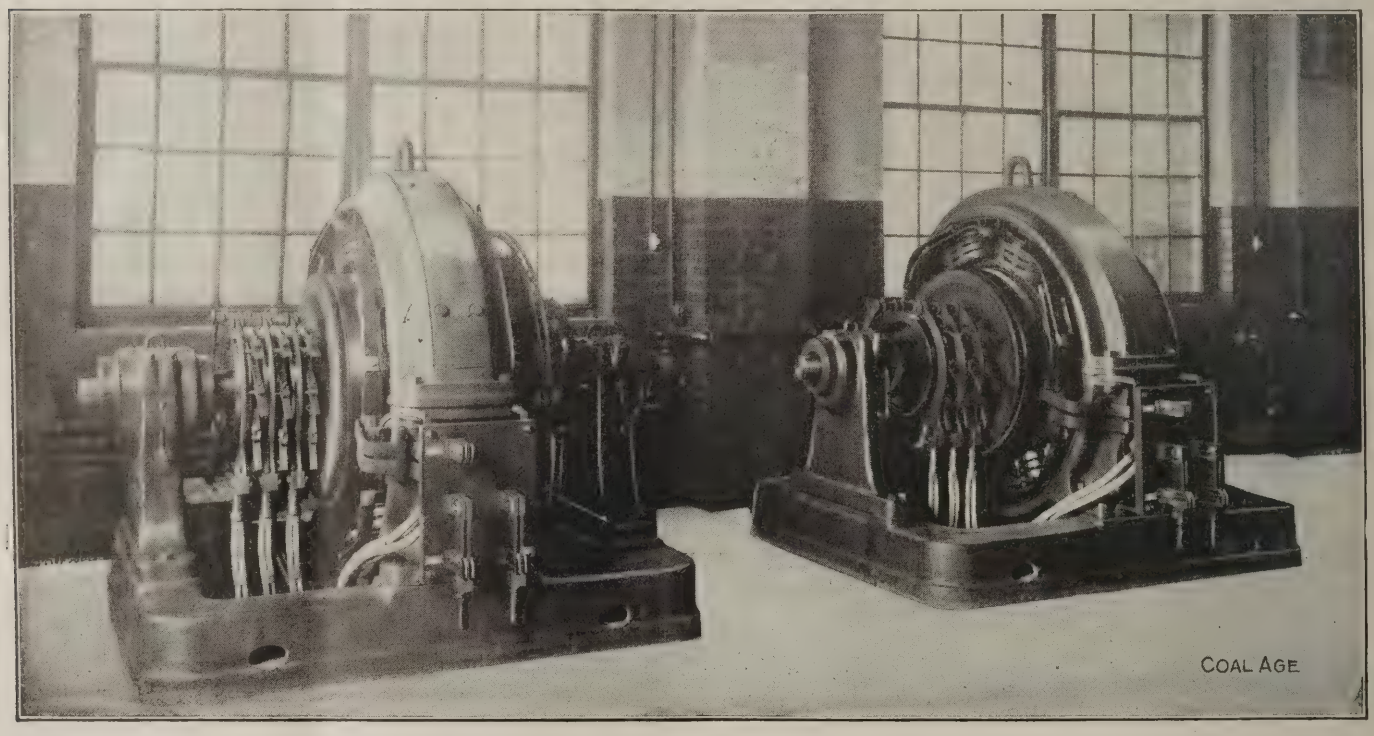
SYNOPSIS—A rotary converter is virtually a synchronous motor-generator set with the frame, field and armature windings common to both elements of the unit. This hybrid among electrical machines must be brought into synchronism with the source of supply before being loaded.

In previous articles, methods of installing and operating generators and motors, both for alternating and continuous current, have been described. These pertain to complete systems, either of the one or the other, while possible links between the two were not considered.

changers have been developed. These are known as the motor generator and the rotary converter. Each is best suited to some particular kind of work, and the choice will depend upon the engineering and economic considerations entering into the problem.

The rotary converter has usually the advantage over the motor-generator set in point of cost, there being but one machine instead of two, and also in respect to efficiency, as both the mechanical and electrical losses are naturally less. In practice, the use of the rotary converter is usually limited to substations from which direct current is distributed, in amounts of 100 to 200 kw. upward; but for this purpose in coal-mining service, it is particularly well adapted. The ordinary installation consists of 300- to 500-kw. machines.

The use of the rotary converter in coal mining is a



Two 300-Kw. Rotary Converters. Six of These Machines Have Been Installed by the Virginia Pocahontas Coal Co. at Coalwood and Juno, W. Va.

While, however, the tendency at present, in plants of any size, is to generate and transmit power, even over short distances, as alternating current, the use of continuous-current motors has so far retained its place for certain purposes, as, for instance, coal-cutting machines, underground haulage, electric hoists, surface tramming, or otherwise where variable-speed drive is required, that a considerable proportion of the power generated is still applied through motors operating on such current.

To make possible the use of the two systems in connection with each other, without going to the expense of separate generating plants, two principal types of current

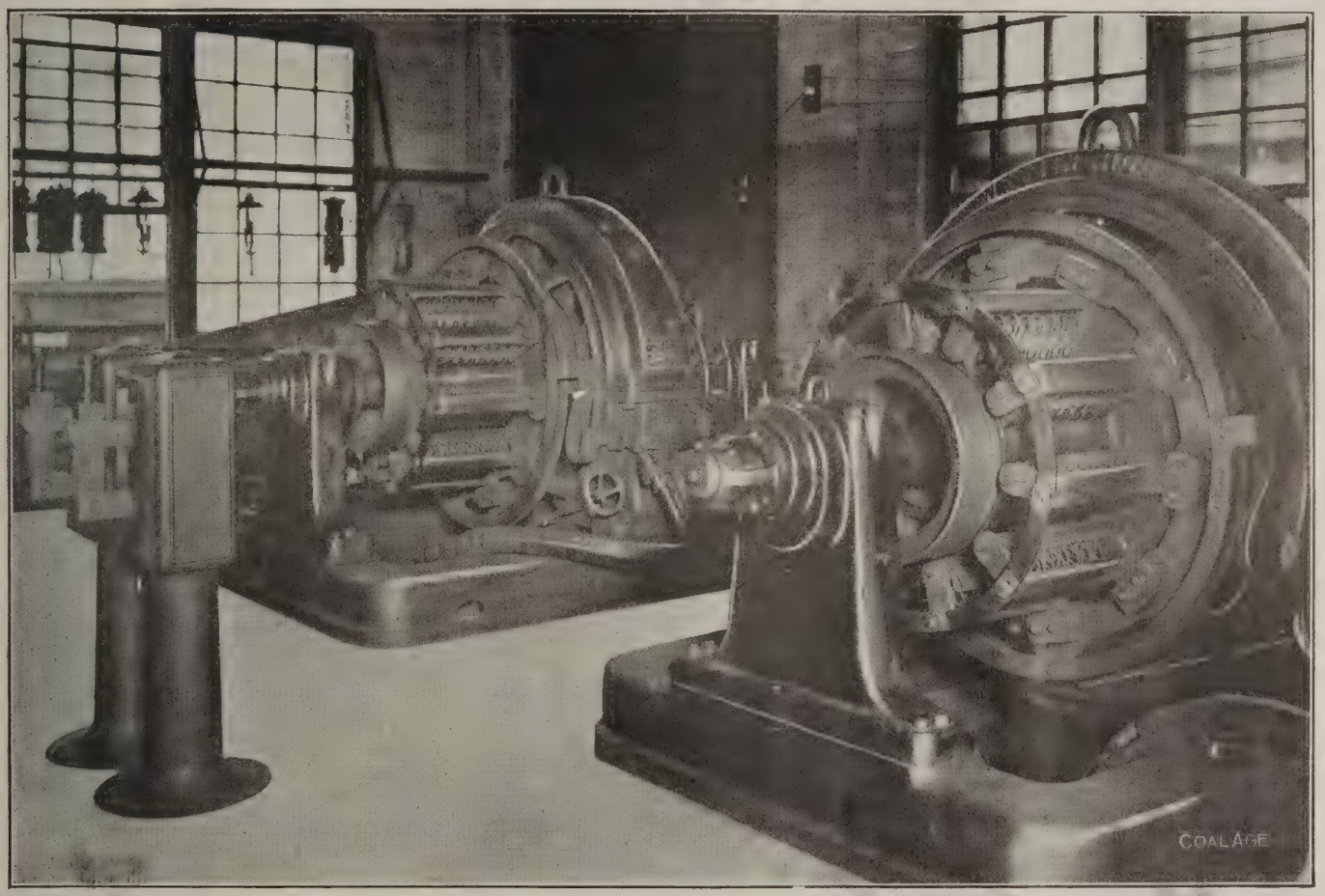
good illustration of the utility of "borrowing" ideas from other lines of industry. It first became prominent in electric-railway, commercial-power and lighting service; then it was taken up in various industrial systems operated partially on direct or continuous current; and from these reached the collieries and finally spread into other fields of mining.

A simple explanation of the rotary converter, which will aid the reader in applying to it many of the rules for installation and care previously given, without repetition in this article, is to regard it as developed in several successive steps.

Taking the synchronous motor-generator set, with its synchronous motor and continuous-current generator, as-

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sume that the two armatures are brought side by side on the main shaft, under a single inclosing circle of field coils. Then observe the further simplification which results from placing the two armature windings on the same drum, and finally consider the effect of connecting the two armature windings or using the same winding for both machines. An idea is now obtained of the conditions which exist in the rotary converter. It has been aptly described as a direct-current machine to which slip rings, connected to suitable points on the armature, have been added.



Rotary Converters for Large Coal-Mining Operation, Run in Parallel to Equalize Load or Boost Power Factor

The direct-current voltage of a motor-generator set is independent of that of the supply circuit and can be adjusted as may be desired; but the continuous-current potential delivered by the rotary converter depends upon and is fixed by the electromotive force of the alternating current received through the slip rings, necessitating, in the case of high-voltage transmission, the insertion of a step-down transformer on the alternating-current side.

On a three-phase machine, which is the most common type, the alternating-current voltage is usually about 61 to 62½ per cent. of the continuous-current potential. The same is true of double-delta-connected six-phase rotary converters. For single-phase, two-phase and diametrically connected six-phase converters, the alternating-current voltage is approximately 71 per cent. of that of the continuous current delivered.

Three Methods May Be Employed in Starting

There are three ways in which rotary converters can be started; and, as the alternating-current side of the machine is a synchronous motor, it must be brought into synchronism with the central-generating plant before the load is thrown onto the continuous-current side.

First Method—The machine can be started from the continuous-current side when it is connected to a general distribution system.

Second Method—It can be stated by means of a small induction motor, either belted or direct connected to the shaft.

Third Method—It can be started from the alternating-current side by supplying a reduced voltage to the slip rings, as in the case of induction or continuous-current motors.

This reduced voltage is usually obtained through taps on the transformers. When the machine is started by the third of these methods, the field must be broken. This method has this advantage, that the rotary converter automatically falls into synchronism. It will, therefore, be considered first here.

The starting voltage required varies somewhat for the different sizes of rotary converters. It is standard practice in mining, however, to provide one starting voltage only and to make this approximately one-third of the operating voltage on the alternating-current side; but, for the larger sizes of converters and under certain local conditions for which expert advice will be required, it is sometimes desirable to use two starting voltages, approximately one-third and two-thirds of the normal operating potential.

After a rotary converter has been installed and dried out, according to the methods dictated by good practice for *both* alternating- and continuous-current machines, the entire unit should be subjected to a thorough final inspection, to make sure that it is ready for starting. The brushes on the continuous-current side, for example, must be sound and free from chipping, should move freely in the brush-holders and be properly adjusted to the commutator and also be set in the right position with reference to the neutral line. The alternating-current brushes will also need to be adjusted for good contact without cutting the slip rings too rapidly.

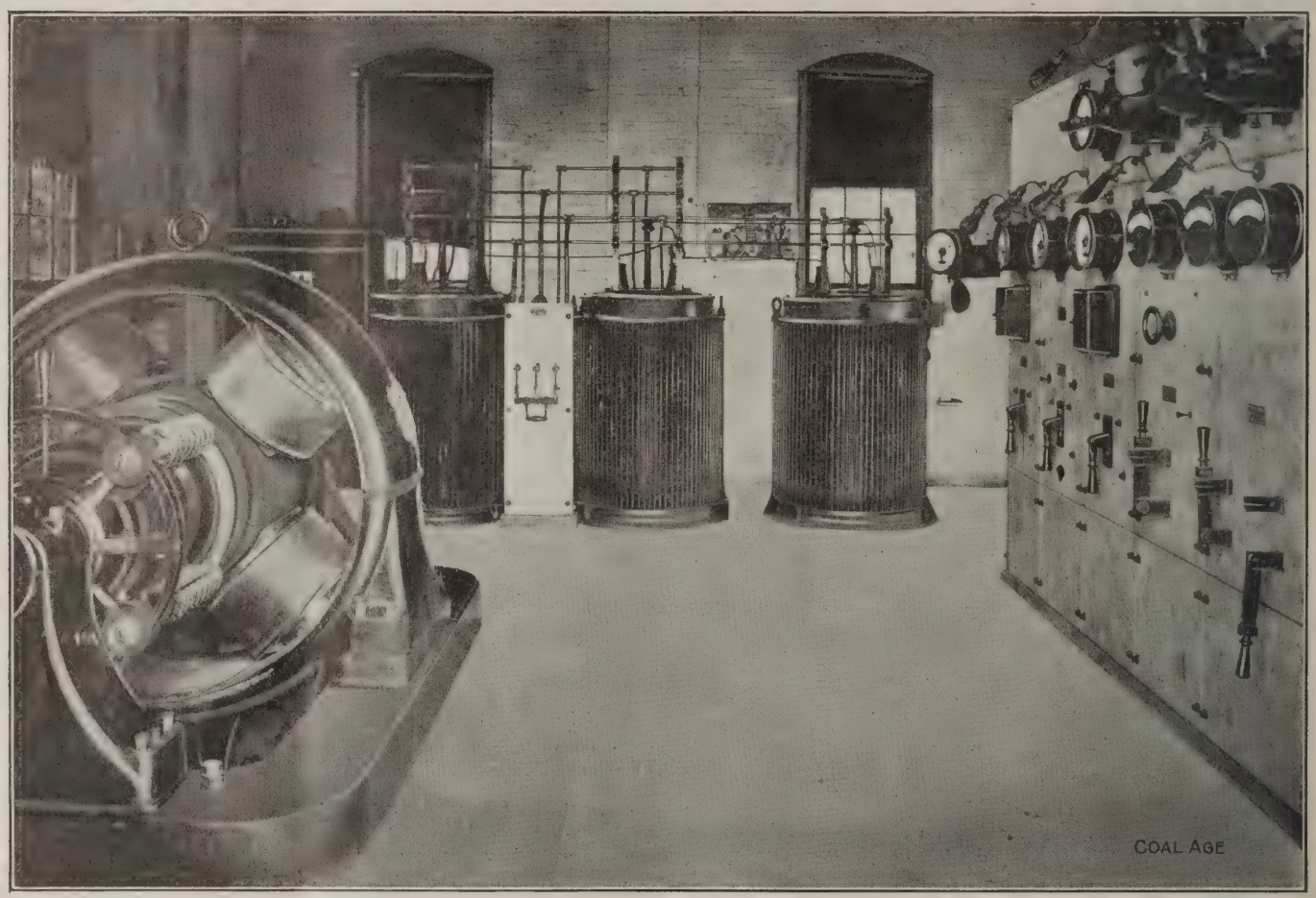
It will then be well to examine the interior surfaces of the unit, to see that no foreign material has become lodged in it, particularly tools or broken brush carbons, and to be certain that the insulation, especially on the ends of the armature windings, is intact.

Examination of the bearing housings, to make sure that there is plenty of oil in the wells and that the rings are free to turn, should not be omitted.

The Switches Should Be Examined

Finally, the various switches should be inspected, to insure that no one has tampered with them. Above all things, the field break-up switch must be open. If this happens to be closed during starting, a dangerous voltage is certain to be developed. The speed-limit switch must also be open and in good condition, with contacts clean and the spring operative. Furthermore, all knife switches on the switchboard connected with the operation of the rotary converter, as well as on the starting panel, on the pedestals if used there, and on the rotary converter frame for both the alternating- and continuous-current circuits, should be *open*.

Assuming, then, that we are to start the unit from the alternating-current side, at one-third voltage, the following directions will govern. These are based on the operation of a Westinghouse machine but are applicable to any other make, so far as the apparatus mentioned is used in the plant. Any differences in this respect can be readily detected and the procedure altered accordingly. When in doubt, get expert advice.

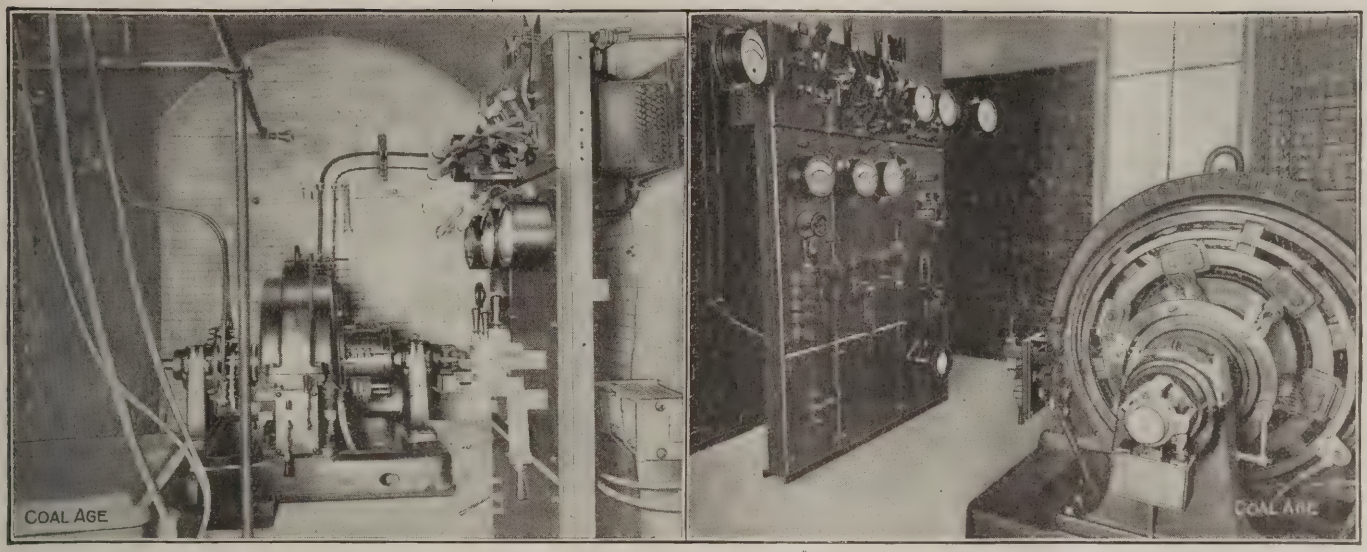


A Thoroughly Modern Type of Mining Substation at the York Run (Penn.) Plant of the H. C. Frick Coke Co. The Converter Is a Three-Phase, 25-Cycle, 344-355-Volt Machine

The rotary converter about to be started, with a single reduced voltage applied on the alternating-current side, is, say, a 3-phase, 60-cycle machine, delivering continuous current for coal-mining service at 250 volts. Its normal speed will be 1200 revolutions per minute.

The preliminary conditions having been complied with, close the oil circuit-breaker on the high-tension side of the transformer and insert the plug for the continuous-current voltmeter. Put the double-throw starting switch up to the starting position; then, when the voltmeter above mentioned indicates the correct polarity, close the field break-up switch in the "down" position, so as to have the rheostat in the field circuit.

As soon as the voltmeter indicates reversal of polarity, close the field break-up switch in the upper position, thus reversing the shunt field and connecting it directly across



A 500-Kw., 60-Cycle, 600-Volt and a 150-Kw., 60-Cycle, 250-Volt Rotary Converter. Both These Machines Are Installed in Colorado Coal Mines

the armature. The indicator of the voltmeter will swing back toward zero. When it reaches that point, throw the field break-up switch again to the lower position.

The unit should come up to synchronous speed in about 30 sec., and lock into step, indicating this condition by a steady current on the alternating side and a steady deflection of the continuous-current voltmeter.

If the voltage comes up with the right polarity, showing that the unit is up to synchronous speed, throw the starting switch down to the running position. If, however, the machine fails to slip a pole and the voltage again comes up with reversed polarity, it is evident that the field induced by the alternating current in the armature is too strong. The starting switch should accordingly be opened momentarily, to permit the machine to slow down somewhat, and closed again in the up position to proceed as before.

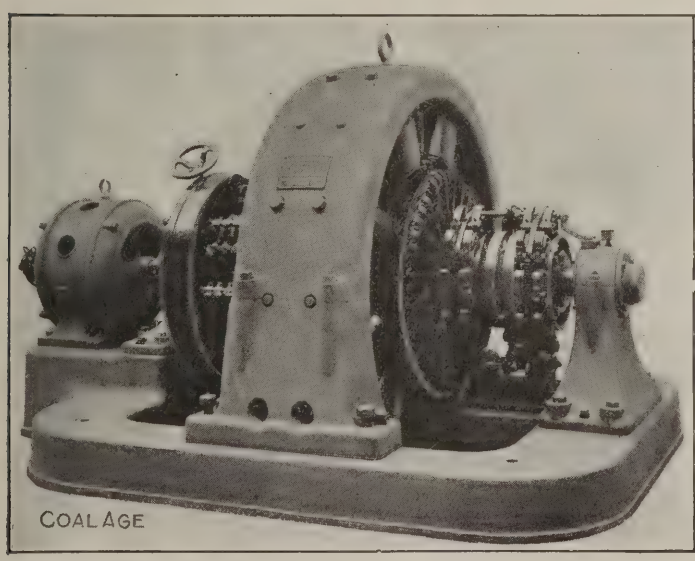
With the rotary converter properly running, adjust the continuous-current voltage to the proper value. Means of varying the voltage, which differ according to the character of the installation, will be referred to later.

If there is a series shunt, close the switch for that circuit, then the continuous-current circuit-breaker, then the equalizer, negative and positive switches. When operating two or more machines in parallel, adjust the field rheostats so as to equalize the load. Finally, make another examination of the bearings to see that the rings are turning and carrying plenty of oil.

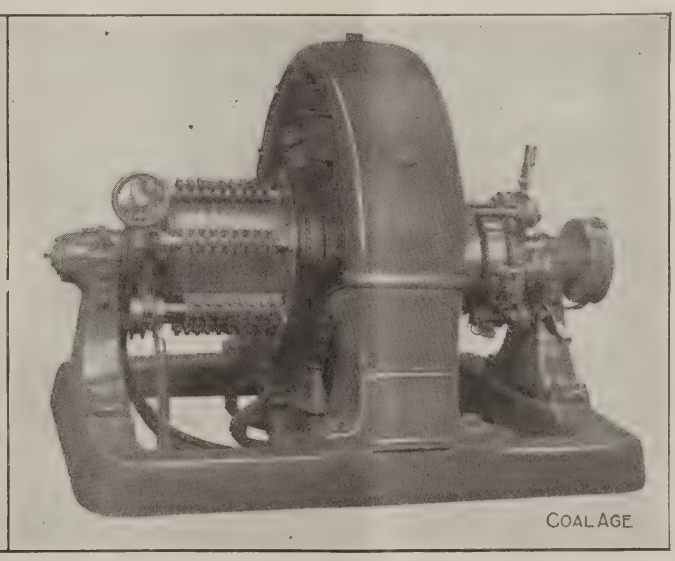
Larger Machines Have Two Starting Voltages

Where two starting voltages are applied, in the case of the larger machines, the procedure will differ in few particulars from that given above; but there will, of course, be two starting switches to handle. At the beginning, both should be thrown *up* to the starting position, and then the switch connected to the low-voltage tap on the transformer closed to the second starting position.

The time elapsing between these two operations should be such that the swing of the ammeter, when the second voltage is applied, will not exceed that caused by the first starting voltage. This time varies somewhat with machines of different capacities and can best be determined



A 250-Kw., 6-Phase, 50-Cycle, 480-Volt, English Rotary Converter with Starting Motor



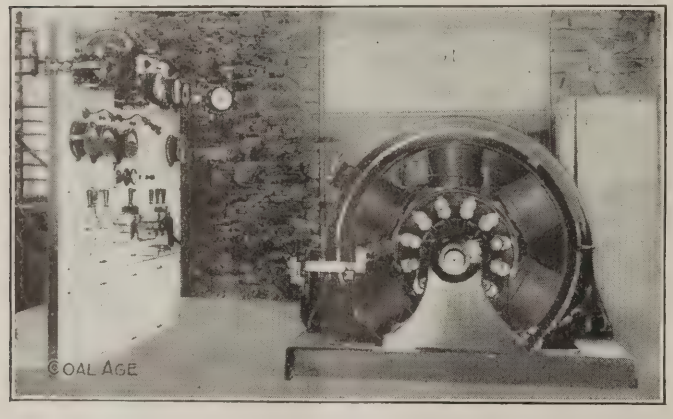
A Standard American Rotary Converter for Coal-Mine Service

by practice. When the rotary converter is up to synchronous speed, the second starting switch should be thrown down to running position and the first starting switch opened. Adjustment of the continuous-current voltage follows, with the remaining course as before.

Induction Motors Are Sometimes Used in Starting

In practice, it is not unusual to employ a small induction motor to start a rotary converter and bring it up to speed and synchronism with the supply circuit. No separate exciter is necessary, as the converter itself, when put in motion, furnishes continuous current from the commutator. The method of starting is as follows:

First, see that the resistance of the rheostat is all cut in on the field circuit, that the knife switches on the alternating-current side are open and that the oil circuit-breaker on the high-tension side of the transformer is closed, also that the plug for the continuous-current volt-



A 200-Kw., 25-Cycle, 250-Volt, Rotary Converter of the McKell Coal & Coke Co., Sydney, W. Va.

meter and the synchronizing plug are inserted. Then start the induction motor, and thereby the rotary converter, by closing the knife switch controlling the former. Build up the continuous-current voltage to approximately that of the line by adjusting the field rheostat, and slow down the rotary converter to synchronous speed by closing the switch controlling the synchronizing resistance. If the speed becomes too low, open and close the switch until it gets to the point desired.

When the lamps or synchroscope indicate synchronism, connect the rotary converter with the supply circuit on the alternating-current side, by closing the switch or switches—there being two in the case of six-phase double-delta connection—and open those controlling the starting motor and synchronizing resistance. Adjust the field rheostat to obtain the minimum current in the alternating-current circuit, and then proceed as above recommended for self-starting.

As will be gathered from the foregoing, this auxiliary induction motor is wound for a speed slightly in excess of that for which the rotary converter is designed, and the method above outlined simply means that the latter is brought down to synchronous speed by loading one of the phases through a suitable rheostat. This method makes the process of synchronizing exceedingly simple, and, as the power developed by the induction motor need only be about one-tenth of the full load output of the rotary converter, the additional cost for its installation should not be excessive.

Self-Starting Is Adaptable to Large Sizes

Of the methods described, self-starting from the alternating-current side would seem to be best adapted only to the smaller sizes of machines, say 300 kw. and under, while a starting motor has been generally thought advisable for the larger units. In practice, however, self-starting has become practicable for even the largest machines and is now common. The chief objection to it, originally, was the rush of current from the supply mains, amounting to about three times the normal full-load consumption of the rotary converter, and, since this current was much out of phase with the supply pressure, the regulation of the entire system was seriously affected. The method outlined above, which insures that, before switching on the supply, adequate provision is made for reducing the voltage across the slip rings by taking intermediate tappings from the low-tension side of the step-down transformer, has overcome that difficulty.

Starting from the Direct-Current Side

Where there is connection to an independent supply of continuous current, say the exciter system of the main generating plant, any rotary converter can be started from the commutator side. This is a simple matter, and the method is similar to that used for an ordinary shunt-wound or compound-wound continuous-current motor.

The rotary converter is then synchronized by varying the field excitation until the correct speed, as indicated by the lamps or synchroscope, is obtained, when the switches on the alternating side can be closed, making the connection to the supply circuit. If the latter is 3-phase, it is usual to close one of the switches first; and then, at the moment when synchronism has been attained, the other two are thrown in.

In cases of emergency it is possible—although never advisable when it can be avoided—to omit the process of synchronizing. The rotary converter will then be run up to a speed slightly above synchronism, as when started by an induction motor, the continuous-current switches opened and the alternating-current switches immediately closed to make the connection to the supply circuit. The machine will pull itself into step and as soon as that has been accomplished the switches on the continuous-current side can again be closed.

It should also be stated that, although the rotary converter has thus far been considered in this article as taking the supply from an alternating-current system and transforming it to continuous current, the machine is readily reversible and can be supplied with continuous current at the brushes, in which case it will give out alternating current at the slip rings. Thus, if there are independent alternating- and continuous-current generating systems, the rotary converter can be made a load balancer between the two.

When, however, a rotary converter is feeding into an alternating-current system and running in parallel with synchronous generators, some difficulties may arise, due to the absence of armature reaction in the machine. In that respect, it differs materially from a synchronous generator or motor. Lagging currents on the alternating side will, therefore, tend to weaken the field and produce a condition of instability which may cause a falling out of step. This, however, can be overcome by special methods of field excitation.

For ordinary operation, in supplying direct current,

this absence of armature reaction—or the fact that it is practically negligible—is an important advantage; for, with a fluctuating power load, the pull on the machine can be varied enormously. Instances are recorded of temporary overloads in excess of 300 per cent. of the regular load, and the carrying of 100 per cent. overload for considerable periods.

Interpole Motors for Mine Locomotives

By A. R. Anderson*

On May 9, 1914, I presented an article in the Coal Age on "Interpole Motors for Mine Locomotives," which has been criticised in the Sept. 19, 1914, issue of the same magazine by Messrs. R. E. Hellmund and W. A. Clark, who do not see fit to agree with the views expressed in the original paper.

Of course, it was not expected at the time this paper was written, that it would meet with the approval of all readers, neither was it expected that any argument such as that presented could convince anybody whose experience with noninterpole motors was so entirely unsatisfactory as the experience of these two gentlemen evidently has been. I am not surprised that those whose experience with noninterpole motors leads them to say "the absence of interpolees and consequent poor commutation" should thus vigorously advocate the use of interpoles.

The experience of the writer, however, and the comments which he has heard made by practical men in the coal-mining industry stand in marked contrast to the evident experience of these two gentlemen. In fact it was the observation of the generally excellent commutation of properly designed noninterpole mine-locomotive motors, and the polished condition of the commutators of such machines, especially where ball bearings were used, that prompted the writing of the first article.

Even further, the writer's experience has extended to noninterpole motors of the same general design and a comparison between the commutation of interpole and noninterpole motors left the impression that the application of interpoles was labor lost. Of course, the commutation with interpolees was excellent; so it was with no interpoles, and it was on such observations as these that the original paper and arguments contained therein were based. I am sure that had the gentlemen who criticized this paper had the opportunity of seeing as much of good noninterpole motors as the writer has had, they could not conscientiously have given utterancee to the phrase, "the absence of interpoles and consequent poor commutation."

It is the privilege of any manufacturer of mine locomotive motors to build them either with or without interpoles as he may see fit, since there are no fundamental patents standing in the way. The original article on this subject was an attempt in a broad analysis of mine-locomotive motors and the conditions under which they worked, to show why nothing was to be gained by the application of the interpole motor over a properly designed noninterpole machine.

The statement made in the first article in regard to the horsepower rating of the machine, depending almost entirely upon the size of the motor carcass, will bear repeating:

"Motors of the railway type are totally inclosed; they are rated on the one-hour basis, and since there is practically no difference in efficiency between interpole and non-interpole motors, the amount of heat to be radiated for a given horsepower is practically the same in both cases and the dissipation of this heat within a given temperature rise requires a machine of practically the same size in both cases."

Thus the horsepower rating permissible on a motor of given dimensions, will be the same for both, whether interpole or noninterpole, and these dimensions generally permit of the design of a noninterpole machine with good commutation.

Keeping in mind that the subject under discussion is motors for *mine locomotives,* it is a little surprising that the gentlemen who criticized my article should submit a value of 40 per cent. for the coefficient of adhension under mine conditions. It may be possible under exceptionally favorable circumstancees to reach such a high value with soft tires, sharp, dry sand and a heavy rail, but it has been my experience that under actual mine conditions a coefficient of adhesion of 25 per cent., which is generally accepted for steel-tired wheeels, is very close to what is actually obtained.

It is only rarely that this coefficient of adhension is considerably exceeded. If it were possible to obtain such a coefficient greater than 25 per cent., the manufacturers would certainly take advantage of the higher rated draw-bar pull which this would place on their locomotives.

Another point then that will bear repeating is the statement that a properly designed mine locomotive can be and should be over-motored. For example, the Jeffrey Manufacturing Co. is building locomotives regularly, in which the motor capacity is such that at full normal rated load on the motors, the tractive effort capable of being developed by the machine corresponds to a coefficient of adhension well over 30 per cent., having been, in many cases, as high as 44 per cent.

It is by no means true that all locomotives at present available to the trade may be oveerloaded when the coefficient of adhesion is as high as 30 to 40 per cent. A locomotive can and should be over-motored. Then the proper weight of locomotivee is selected for the duty required, and regardless of the territory on which it is to operate, the machine will always have ample motor equipment.

Train resistance has absolutely nothing whatever to do with the draw-bar pull and motor equipment of a mine locomotive. If the train resistance is great, it simply means that a locomotive of given weight cannot haul a great load. The subject of train resistance is absolutely irrelevent material in the discussion of locomotive draw-bar pull and motor equipment.

Although it is possible to build certain sizes of railway motors with only two commutating poles, there are a great many sizes in which four such poles must be employed, and where this is the case, it is impossible to connect a reversible motor with fewer leads than shown in the diagram in my original article.

Any figures which may be submitted on the life of brushes and commutators are almost meaningless. To make such data of value, the mechanical construction of the motor, the grade of brush used, and the conditions of service to which the locomotive is put must be very definitely known.

The length of life of brushes and commutators on noninterpole emotors, which have come under my observation, have been very satisfactory, and I doubt if either could be greatly prolonged by the application of interpoles.

*Electrical Engineer, Jeffrey Mfg. Co., Columbus, Ohio.

Who's Who in Coal Mining

Herbert C. Campbell

There is plenty of room in the coal-mining industry for young life and blood, and quite a few of the so called second generation are availing themselves of the opportunities presented. The fallacy that only age and long experience are to be trusted has been exploded, and the world is better for it. Many corporations, once great, have gone to seed, simply for lack of the hope and enthusiasm that youth imparts. Great successes in mining as in all industrial and commercial life are but "dreams come true," and it is the air castles of our young men that materialize into the realities of our actual everyday existence.



H. C. Campbell

Our hard-headed, philosophical friends are always telling us of how hopeless is the future of the young man afflicted with a rich daddy. The handicaps, they say, are insurmountable, and even if the son himself isn't a pin-head, his environments are so unreal, so artificial, that all possibility of individual achievement is completely destroyed.

In the case of Herbert Campbell who was born in Kansas City, a little more than 30 years ago, the outlook, measured by above standards, was unusually dark. There wasn't any fake about the quality of the spoon in his mouth when he first saw the light of day. The article was solid silver and quite heavy at that. However, the family decided to take a chance, and the work of rearing the young man commenced. It so happened that the late Chas. Campbell, Sr., father of the boy, had ideas of his own concerning many things, among which were some data pertaining to laws, rules, regulations, and safety precautions relative to raising a boy in the U. S. A. Several times when Herbert wandered beyond the danger sign of the fireboss, Campbell, Sr., sent out a rescue corps, and later when alone, himself applied the first-aid measures.

As a result of such solicitous care, Mr. Campbell, Jr., became cautious, absorbed an education at St. Paul's School in New York, and on receiving his diploma, hurried back to Kansas City, arriving there in time to report on the morning shift. That same day, long before noon, the following entry was made on the books of the Central Coal & Coke Co.: H. C. Campbell, clerk, auditor's office.

They say the reason he was placed in the auditor's office was to teach him that the best opinion of responsible people in America favors the plan of demanding and getting 100c. in value for every dollar expended. It's good training for a young man to see, think, and talk all day about sums of money representing many thousands of dollars, and then after work, have to walk 37 blocks to save 5 cents.

At any rate, the drilling in the auditor's office was so comprehensive, and Mr. Campbell's conduct was so exemplary, that the company decided to remove all his illusions concerning the color and characteristics of coal, and forthwith ordered him to their mines in the Arkansas field, tempering their verdict of "guilty" by listing him on the payroll as assistant superintendent of the Arkansas mines.

Right here let me say it would be a good thing if all coal-company auditors were sometimes lifted gently but firmly from their office chair and conveyed without delay to the place where the coal is mined. Arriving there, they should be inclosed in neatly tailored overalls and jumper, and a delicately carved utensil commonly spoken of as a shovel should be placed in their hands. Next we have a pile of coal just shot from the face, an empty car, a starter's pistol and a recording stop-watch. I'm sure the picture is complete.

And that isn't all. It is just as essential that mine superintendents be subjected to an occasional change in climate. They might with advantage recreate in the auditor's office, punch a time clock, wear a fancy vest, a stiff collar and swear off swearing. To make the super feel at home amid his new surroundings, someone might be specially designated to blow coal dust in his face, singe his hair and drop a light weight of some kind on his head, all at stated intervals. The benefits of such a change are obvious.

But returning to Mr. Campbell, his stay in Arkansas was ended when the "big boss" appointed him assistant superintendent of their Kansas mines. This job kept him busy for three years, when he was advanced to the more responsible place of assistant manager of all the company's coal properties. Five years have elapsed since this last advancement, and they say out West that Herbert is making good with both feet. True, he found it necessary to run over to Kentucky and carry off for his very own a blushing Southern bride. But this is the only time he ever weakened, and since the company's punishment was inflicted in the form of a raise in salary, no great damage was done.

Mr. Campbell is a director of the Campbell Glass & Paint Co., and a director of the East Oregon Lumber Co The Country Club, Blue Hills Golf Club and Commercial Club, all of Kansas City, list him as an active member. He is likewise interested in the work of the Rocky Mountain Coal Mining Institute, having played the part

of host on the institute's stop at Rock Springs in June, 1913.

There is no more popular young man in the coal industry of the Middle West than "Herb" and no one who is more democratic.

Extracts from a Superintendent's Diary

It falls to my lot to witness often the gullibility of the average human.

We mining men have a way of shrugging our shoulders and smiling whenever one of our friends in town mentions some newspaper or magazine article dealing with an event at a mining camp, because we have come to know that such articles are always either greatly exaggerated or are ridiculous. But of late I am beginning to realize that such things are not always chargeable to malice and ignorance on the part of editors, but rather to their reporters, who swallow highly colored facts that are volunteered to them by the average mining-town citizen.

It has always been the policy of men in charge of large mining operations to talk as little as possible and it naturally follows that whenever newspaper reporters want to work up a feature story, they waste little time on bosses, but rather fall back on the talkative ones, whatever their prejudices and position may be.

That's where the fun begins if the miner encountered is possessed of a sense of humor. He does not stop to think of the possible effect of a published story built up on the statement he is volunteering, but only anticipates the laugh he will have on the reporter and then later on his acquaintances in town.

I have accompanied numbers of people into coal mines on their first trip and I have yet to see one who was not in a mood to believe most anything that might be suggested, if accidentally left in darkness for even a moment.

I always recall in this connection a sentence from one of Stevenson's essays: "Certain dark gardens cry aloud for a murder; certain old houses demand to be haunted; certain coasts are set apart for shipwreck.

A young reporter arrives at a camp in search of a story; although he has never been near a mining camp before, he feels that miners must be a pretty brave lot to hazard death by explosions, fires and all of the other terrible things that happen around them. And being a pretty decent sort of a chap, he plainly shows his admiration for all of the smutty-faced miners who pass him on their way from the pit mouth. Later on, at the boarding house, he gets on friendly terms with some of the younger men and they exchange confidences. Gradually they begin to realize that they are heroes in this young fellow's eyes and, unconsciously, perhaps, by word of mouth, they begin to live up to expectations.

Many of the terrible tales (imaginative) of hardships imposed by employers can be traced back to such interviews, as can also tales of wanton sacrifice of men due to failure on the part of those in power to adopt well known safeguards.

During strikes, the encounters between the "thugs" (the romantic name for mine guards) and the miners, as told by the miners to the reporters, take precedence over the ordinary adventures inside, and here again the same influences can be detected if one reads between the lines.

I am reminded of all this by a conversation I overheard tonight between our boss driver and a young cousin of his who is here on a visit from a distant farming section. The driver remarked that today he cut into an old room in the mines (he has to my knowledge never cut anything larger than a piece of pine and never used anything for cutting heavier than a pocket-knife) and found himself facing a skeleton. They were probably the bones of a victim of an explosion that occurred years ago. "We miners must always keep our nerves keyed up to expecting something of that sort," was the way he ended the narrative.

A Dust Arrester for Drilling and Boring Machines

Much attention is being paid at present to the avoidance of free or floating dust during drilling or boring in stone, coal or other materials. One method of attacking this problem is by directing a spray of water onto the part where drilling is in progress, but this is not always possible, unless a supply of water is easily available.

An alternative arrangement which has been introduced by Holman Brothers, of Camborne, England, under the patents of M. T. Taylor, consists of providing the drilling or boring machine with a means of arresting and collecting the dust so that it cannot permeate the air.

The boring tool is provided with a cup or receptacle slipped over the shank and having a soft-edged mouth, which accommodates itself to the rock surface when pressed against it. The soft edging at the mouth of the receptacle is secured by a sponge collar or gasket.

At the lower part of the receiver a nozzle is arranged, from which the dust is led away through a hose into bags or a water trough. A gland closed at the lower end by a rubber washer fits around the drill.

The machine when it commences to bore compresses a spiral spring, which butts against the cup receiver and forces it against the rock surface and the dust on coming out of the hole, being unable to make its escape because of the soft edging, passes away through the dust-collecting duct into the receptacle provided.

The whole arrangement is extremely simple, and easily applied, its simplicity of application is a strong point in its favor, inasmuch as the average miner is prone to give but little attention to his physical condition if such attention involves any extra trouble in the operation of his equipment. It is to be hoped that with the introduction of dust-allaying devices, miners' phthisis, of which so much has been heard in recent years, will be done away with, or at least effectively curbed.

Extracting Benzine from Coal

A new electrical process for extracting benzine from coal has recently been invented by a Swedish engineer, Mr. Vidstrand, of Stockholm; the costs of manufacture are said to be considerably lower than those with the methods now employed, and the product is stated to be as good as any fuel for motor cars. The process has been patented in eighteen countries and the inventor is carrying on negotiations with a group of Norwegian financiers with the view of disposing of the patent rights for Norway.

Editorials

Picking the Winners of First-Aid Contests

It will serve no good end for us to disguise the fact that there is a degree of uncertainty as to the quality of decisions in first-aid contests. There is no question but that an element of chance does enter in, and that not infrequently a team which does not deserve the fewest demerits carries off the palm in competition with teams whose execution is more perfect. And in this we have reference to no specific contest, nor to any particular series.

It is no great misfortune if a team entitled, we will say, to fifth place receives only seventh prize, nor if one entitled to a prize of low order is deprived of all award. But among the first three or four teams where competition is keen, the uncertainty in the result, due to faulty judging, is a matter of considerable discouragement, and eventually it will serve to reduce the interest in contests and limit the distance which contestants are willing to travel to attend meets. For crack teams will go a long way if only the award is sure to fall to the team of greatest merit.

We do not believe the interest will flag if one or two teams are invariably winners, so long as the contests are known to be fair. The international yacht races have lost little of their charm, though for years the American yacht has carried off the cup. But if a doubt were to arise in that nautical event as to the relation subsisting between success on the one hand and excellence of design and seamanship on the other, then the race would be deemed a useless event, and the sporting world would hardly maintain its interest from year to year.

Consequently, we think any method of performance and judging which will give the best team first place will serve a useful purpose and make the prizes obtained a cause of real gratification to the teams securing them.

We would suggest, therefore, that the events in which the contestants all enter, be regarded as elimination trials. Every capable judge should serve who can possibly be secured. There should, if possible, be as many judges as teams, and the men acting in that capacity should be, as far as may be, not only physicians, but men also having first-aid contest experience.

They should discuss the events beforehand and should agree on the preferable technique, and moreover they should decide what demerits they will give for any deviation from the desired procedure. Of course, the judges should be rotated and should not be connected, even remotely with any of the contesting teams. They should watch the manner of operation, as well as observe the final result. Moreover, a list of rules, far more complete than those we now have, should give the competitors a knowledge of what is expected.

But when all this preliminary judging is done, the first three or four teams should be selected for a final contest. So many of the judges we are obliged to employ are not mine physicians, for most of those who are interested enough to attend have teams entered. The local doctors in general practice have not studied first-aid as a science, and moreover do not know how to spot errors in technique as readily as do those who have trained teams for months or even years. Consequently, assuming a doctor can and does observe every move, the judgment of one of the judges may easily be slightly in error, and moreover, the lenience of one judge often wins a close contest.

In order that the winner may be the best team, we propose a final contest for the leading contestants. One team should be chosen to perform a certain event in the presence of all the judges. This event should not be preannounced. The other final contestants should be removed from the field, and when the first team has finished the final, the others, one by one, should come forward to perform the same event in the presence of the same judges. The award of the whole bench would be regarded with favor and confidence, and the fact that several teams had been already eliminated would probably make it possible to have the judging bench consist wholly of the medical directors of teams already out of the contest.

It may be objected that this will take time. It will, but where rescue work forms a part of the meet, the final first-aid contest could take place concurrently with the rescue events.

We believe that such a system will lead to great advances in execution and to discussions of technique more valuable than have yet arisen. The hurry on the field before the main contest makes it hard to get the careful consideration necessary to determine just how some six separate events should be conducted. So far the American Mine Safety Association has done only a small part of the work needed in formulating rules for action in the field, and there is a large degree of uncertainty as to whether demerits will be awarded for certain methods presented. If the rules of the game are undecided, and the ideas of each judge are the final laws for the teams he inspects, then there can be no confidence, and without confidence there can be no real contest.

Our Commercial Relations with Brazil

Ever since James G. Blaine, while secretary of state, attempted to establish a better political understanding with the various other nations of the new world, there has been a persistent feeling among Americans that this country should have a closer commercial relationship with our sister republics to the south. The present conflagration in Europe has afforded our first real chance to cultivate and foster such a relationship. Fate, unbid and unsought, has laid opportunity at our door.

Of the two great South American republics by far the larger in land area is Brazil, and unlike all other countries in America, the language there spoken is Portuguese. In spite of the discoveries and contributions to our geographical knowledge made by our well known and intrepid ex-president along the "River of Doubt," Brazil is

nevertheless about the only country in the world today across the map of any considerable portion of which may be written the word "unexplored."

Notwithstanding the fact that perhaps the major portion of the area of the country is virgin forest or wild land, Brazil has a population of about 22,000,000 people. It has also approximately 15,250 miles of railway and many thousand miles of navigable rivers.

The gradual increase in the exportation of the products of the country which has taken place for some considerable time past was not continued during last year, the total value of exports decreasing from $362,245,951 in 1912 to $313,628,078 in 1913. This decrease is accounted for by the lower market prices paid for coffee and rubber, the two products which for many years have constituted over 80 per cent. of the country's export.

The United States is the largest purchaser of Brazilian products, absorbing more than Great Britain and Germany put together. Besides purchasing 36 per cent. of the exports of coffee, this country buys the bulk of the Brazil nuts, cacao, carnauba wax, manganese ore and skins exported. On the other hand, we sell to Brazil only about one-third as much as we buy.

So far as we are able to learn, of coal or other solid mineral fuel, Brazil produces none or practically none. Throughout the rural districts, particularly in the states of Pernambuco and Sao Paulo, where sugar is a staple product, the mills almost exclusively burn wood and bagasse under the boilers. The same is true also of the domestic fuel consumed. Wood is, however, rather expensive and is becoming more so from year to year.

During the year 1913, Brazil purchased coal to the value of $19,505,066 and patent fuel or briquettes to the amount of $2,668,068. Of these amounts the United States furnished coal to the value of $2,162,098, while Great Britain furnished almost the entire balance.

Approximately 75 per cent. of the imports into Brazil come from the United States, Great Britain, Germany, France and Argentina. The percentages of these countries being 15.7, 24.5, 17.5, 9.8 and 7.4, respectively. These importations consist mainly of arms and ammunition, breadstuffs, cotton and cotton manufactures, coal, clocks and watches, chemicals and drugs, vehicles and accessories, electrical machinery and supplies, fish, fruit, glass, scientific instruments, iron and steel manufactures, leather and leather goods, meats and dairy products, musical instruments and accessories, naval stores, oils, paper and manufactures thereof, vegetables, wood and wooden goods, and miscellaneous articles of various kinds.

During 1913, Brazil exported products to the five countries previously mentioned, valued as follows: to the United States, $102,436,302; to Germany, $44,333,640; to Great Britain, $41,650,331; to France, $38,637,801 and to Argentina, $14,830,127.

The principal articles exported consisted of Brazil nuts, bran, coffee, cacao, cotton, cotton seed, carnauba wax, gold, hides, manganese ore, monazite sand, precious stones, rubber, skins, sugar and tobacco. Of these, the United States took the major portion of the Brazil nuts, coffee, cacao, manganese ore, rubber and gems.

In the number and tonnage of vessels, both steamships and sailboats entering Brazilian ports in 1913, the nations other than Brazil in order of their rank were Great Britain, Germany, France, Italy, Austria and Holland. Ten steamships and three sailing vessels, having a gross tonnage of 37,057 and 2448, respectively, are listed as being North American. It is doubtful if even one of them flew the Stars and Stripes.

Extensive improvements on the docks at Rio de Janeiro, where all vessels entering the port now come alongside, have been completed, together with modern warehouses and coal- and ore-handling apparatus.

Brazil is naturally one of the richest countries in the world, but her wealth lies almost wholly in her soil and climate. She has a diversity of products such as this country could well use. Something like 300 different kinds of useful woods including such varieties as ebony, mahogany, Spanish cedar, iron wood, ivory wood and bamboo, might be to advantage exported to this country for furniture manufacture. Her supplies of fuel are, however, deficient, and it is believed that henceforth coal, coke and briquettes will form an ever increasing portion of Brazilian imports from the United States.

A Big Slump in the British Exports

The figures for the British exports for the first month of the European war show the expected heavy decline. The gross exports of all kinds, including fuel, fell off 45 per cent. in value, as compared with the same month last year. It should also be remembered in this connection that these figures do not show the full force of the curtailment for the entire 30-day period. The declaration of war only occurred on Aug. 4, and it was a number of days after this before the complete cessation in shipping became effective. It is only fair to state in this connection, however, that much of this enormous falling off is due to unwarranted apprehensions among those in the affected industries and also to the disruption of the customary channels of business; it is, therefore, fair to assume that much of this is of a temporary character.

The fuel exports experienced a particularly heavy decline, the gross for the month aggregating only about three million tons, or about one-half normal. The most interesting and significant phase of the British export figures to the American operators, is the enormous decrease in the South American shipments. The August exports to the Argentine Republic amounted to only 98,344 tons, as compared with 290,741 tons for the same month last year, and 312,387 tons in 1912. In this one instance, therefore, we have a flat loss of nearly 200,000 tons, which cannot now be made up with anything except American coal.

While this is perhaps the most important tonnage that American operators can expect to obtain, there are other possible contracts involving relatively large volumes of coal. For instance, the British exports to Uruguay decreased from 72,006 tons in August, 1913, to 39,103 tons in this year, the relative figures for Brazil for the same period being 111,504 and 48,983, respectively.

The greatest decline in British exports, very naturally, was to Germany, the figures for August, 1913, being 798,177 tons, as compared with 132,026 tons for August of this year. It is interesting to note, however, that the shipments to Russia have suffered almost equally as much, decreasing from 769,794 tons in 1913, to 169,353 tons this year.

Legal Department

Forfeiture of Coal-Mining Leases

By A. L. H. Street*

SYNOPSIS—Although an agreement authorizing forfeiture for breach of a material condition will be enforced by the courts, the decisions are not uniform as to whether breach of the lessee's implied obligation to diligently carry on operations will sustain an involuntary cancellation of his rights. Right to forfeiture may be lost through the lessor's acquiescence.

One of the legal phases which frequently arises in coal-mining litigation is that pertaining to the right of a landowner to forfeit a coal-mining lease granted by him, for default on the part of the lessee—usually failure to commence or continue mining operations. In showing the policy of the courts on this question, I leave out of consideration cases which involve abandonment of a lessee's rights, confining myself to instances in which there is no showing that he ever intended to relinquish his rights—an essential element of abandonment.

Although all the courts probably agree that, even when there is no express covenant on the lessee's part to commence operations within any particular time, he is impliedly bound to work the property with a reasonable degree of diligence. And judicial authority is unanimous to the effect that a right of forfeiture for breach of a material covenant on the lessee's part, *expressly* reserved, will be enforced. The judges disagree, however, on the proposition as to whether breach of such an *implied* obligation will afford the lessor the right of cancellation. The Circuit Court of Appeals and the appellate courts of North Carolina and Virginia have sustained this right, while it has been held in other jurisdictions, including Ohio and Pennsylvania, that, in the absence of express reservation of the right of forfeiture, it does not exist. Under the latter view, the lessor's only remedy is an action for damages.

Leading Decisions Cited

In the case of Smith vs. Eagle Coal & Mercantile Co., 155 Southwestern Reporter 886, the Missouri Court of Appeals recognized the right of a lessor to enforce an expressly reserved right of forfeiture for failure of the lessee to pay royalties, or for suspension of operations for more than sixty consecutive days not attributable to strikes, car shortage or legal proceedings. But in this case a forfeiture was refused because it appeared that a suspension of operations relied upon by the lessor was due to a strike.

In the case of St. Louis Union Trust Co. vs. Galloway Coal Co., 193 Federal Reporter 107, the United States Circuit Court for the Northern District of Alabama announced the following principles:

Shortage in the payment of royalties is no ground for forfeiture, if innocent and if the lessee offers to pay the full amount due. Making of a mine-working contract by the lessee with a third person does not constitute a violation of a stipulation against assignment of the lease without the lessor's consent, so as to entitle the latter to enforce a forfeiture on that ground. Nor did use of narrow work in the removal of coal from adjoining land forfeit the lessee's rights. No forfeiture will be declared for claimed failure to properly develop the property, if it appears that the lessee has proceeded in good faith, and if the proper manner of development was largely a matter of judgment.

Forfeiture for Unreasonable Delay

But, where a lessee agreed to commence operations within one year from the date of the lease and continue developments to ascertain whether the property could be profitably worked, the lessor was entitled to forfeiture on showing that for 24 years the lessee had failed to proceed. (Kentucky Court of Appeals, Diamond Mining & Developing Co. vs. Sellars, 136 Southwestern Reporter 1016.) In a similar case (Brown vs. Wilmore Coal Co., 153 Federal Reporter 143), a lease was canceled as being a cloud on the lessor's title, where the lessee had failed to proceed with operations for 20 years, although mining was extensively carried on in the vicinity in the meantime. But the Kentucky Court of Appeals refused to decree a forfeiture because a lessee failed to commence operations within ten days and failed to do the development work required by the contract. (Ross vs. Sheldon, 119 Southwestern Reporter 225.) This decision was influenced, however, by the facts that time for commencement of the work was not made of the essence of the contract, no right of forfeiture was expressly reserved, and the lessee acted in good faith, having been delayed in his operations by illness and a temporary difficulty in obtaining necessary funds. It was further decided in this case that a lessee is not chargeable with delays arising after lessor brought suit to terminate the lease.

In Price vs. Black, 101 Northwestern Reporter 1056, the Iowa Supreme Court refused a forfeiture where it appeared that the lessor had acquiesced in a delay in prosecuting the mining and a large expense had been incurred in constructing a shaft to carry on the work just before suit to declare a forfeiture was brought.

On the other hand, the West Virginia Supreme Court has decreed cancellation of a lease for failure of the lessee to conduct operations for a period of two years and three months, where the lease contemplated production on a monthly royalty basis at the end of one year. (Starr vs. Huffman, 59 Southeastern Reporter 179.) And the Missouri Supreme Court forfeited a lease for sixteen months' delay. (Brooks vs. Gaffin, 90 Southwestern Reporter 808.)

Lessee Cannot Dispute Lessor's Title—A person who occupied coal lands under a lease and option could not dispute the title of the lessor, nor could a coal company which claimed under an assignment of the lease and option. (Oregon Supreme Court, Rouse vs. Riverton Coal & Development Co., 142 Pacific Reporter 343.)

*Attorney-at-law, St. Paul, Minn.

Discussion By Readers

Method of Working Underlying Coal Seam

Letter No. 1—Referring to the proposition of Mr. Lyman, as described in his inquiry, COAL AGE, Aug. 29, p. 357, I had hoped to see this proposition fully discussed by the practical readers of COAL AGE, and will venture to express my own opinion in reference to the working of this seam of coal, in the hope of inducing others to do the same. Perhaps no subject is of greater interest to mining men than that relating to the economical and safe mining of coal under difficult conditions.

In the first place, in my opinion, neither the thickness of the seam nor the nature of the strata lying immediately above and below this coal present any features that would recommend the adoption of the pillar-and-stall system of mining. In all pillar systems applied to the mining of coal, one of the greatest difficulties experienced is the question of keeping the roadways open, as the development of the mine progresses. In all pillar systems of mining, the danger of squeeze exists to a greater or less extent, and the extraction of the coal is accompanied or followed by a greater or less settlement of the roof, which is sometimes gradual and gives little trouble, but more often results in breaks and roof falls that hinder and endanger the work and increase the cost of getting out the coal.

Owing to these considerations, in the adoption of the pillar system of mining, it is necessary to take the precaution of driving all roads with a sufficient height or headroom that will provide a good margin of safety. Unless a sufficient allowance be made for head clearance above the top of the loaded car, taking into account the settlement of the roof that is certain to occur, it will frequently be necessary to suspend work at the face temporarily, while lifting bottom or brushing the roof.

In the present inquiry the thickness of the seam is given as 4½ ft.; and it is stated that the roof is composed of soft shale, slate and limestone. These conditions make it almost certain that stringers or crossbars will be required to support the roof. These crossbars or collars will occupy from 6 to 12 in. at the roof, while the track will require 6 in. more at the floor, leaving only about 3 ft. of clear headroom above the rail. The soft floor is also an item that must be considered before adopting any pillar system of mining, as the weight coming on the pillars will have a tendency to heave the bottom.

Taking these considerations into account, I would recommend the adoption of the longwall-retreating system of mining. It is true that, in the adoption of this system, the roads must first be driven to the limit; but, since these are made in the solid coal, they will be more permanent and require the handling of less waste material than would be necessary in any pillar system. The work, generally, will be much safer, the extraction of the coal more complete, and the ventilation of the mine will present fewer difficulties than when mining on the pillar system. The longwall system also insures a larger output of coal for the same length of roadway, which reduces the cost of maintaining the roads; also, the work of collecting the cars, at the face, is much simplified, because the work is more concentrated. There is generally a greater percentage of lump coal produced in longwall mining; and the roof settlement being more gradual, less damage results on the surface. By the adoption of the retreating longwall plan of mining, there will be less danger of the pillars in the overlying seam breaking through into the workings below, provided suitable attention is given to the stowing of the waste behind the longwall face, as the work proceeds.

No doubt some would prefer the adoption of the pillar system of mining in this case, notwithstanding the existing conditions, had the thickness of the coal been greater, which would then require the handling of less waste material in the rooms. I hope to see this proposition further discussed by men whose experience will be of value to us all.

JAMES DICKSON.

Nanaimo, B. C., Canada.

The Safety Lamp and the Eyesight

Some time since, I remember, the question of the effect of the safety lamp on the eyesight was discussed in COAL AGE. Since that time, my eyes have become affected by the use of the safety lamp; and I would like to ask if anyone can tell how long it would probably be before a person so affected would become totally blind and what could be done to prevent such a calamity.

The trouble with my eyes began with an apparent swinging motion of the floor or the ground on which I stood. I next noticed that lights, at about 500 ft. distant, began to revolve when I looked at them. This has grown worse recently, and, now, lights close at hand often seem to revolve as I look at them. This continues until I can't see at all. I can see the light on my safety lamp, however, as well as ever; but when I proceed to put the date of my examination on the coal face, my hands seem to swing around and around. I have been firebossing for seven years continuously. I would very much appreciate some of our readers giving me further information, so that I will know when I ought to quit.

J. MILES KEMP.

Maben, Ala.

[In the discussion of the question of whether the continuous use of the safety lamp, in coal mining, affected the eyesight of miners, COAL AGE, Vol. 4, a great number of varying opinions were expressed; but, as stated in review of this discussion, COAL AGE, Vol. 4, p. 585; and Vol. 5, p. 135, it has not been shown that healthy eyesight has been impaired from this cause. Men who had used the safety lamp continuously for more than a quarter of a century, testified to having as perfect eyesight as could be expected if they had not used the lamp.—ED.]

The Reverse or Counter-Current Theory

Letter No. 8—In his recent letter, COAL AGE, Sept. 5, p. 398, Mr. Ashworth seems to infer that there is a collaboration between Mr. Verner and myself with respect to the graphic illustration of Mr. Verner's theory of the initiation and cumulative effects of a coal-dust explosion, which appeared in my letter, COAL AGE, Vol. 5, p. 1059 and was reproduced in the issue of Sept. 5, p. 398. In justice to Mr. Verner, I feel it my duty to state that, so far as I am aware, this diagram never received his sanction.

Believing, with Mr. Ashworth, that an idea or theory can be more clearly and comprehensively conveyed by a diagram when the subject matter will permit, I embodied my idea of this theory in a graphic illustration, trusting that, if my conception was wrong, Mr. Verner or some other authority would point out the error, that myself and others might profit thereby.

In his criticism, Mr. Ashworth remarks:

> It is clear, however, that no such reverse current would be produced until the force exerted by the powder or other explosive had expended its energy.

This statement, though slightly indefinite, agrees practically with what I stated, in my explanation, p. 1059, to the effect that a reverse current will *not* take place until the force of the blast "becomes more or less exhausted" or is opposed by an equal or stronger force, through the elasticity of the air compressed. Also, that the reaction between the resulting compression and depression would manifest itself at the point of least resistance, at the floor. If I have correctly interpreted Mr. Ashworth's meaning there is no difference of opinion in this respect.

Again, Mr. Ashworth remarks:

> It would seem also that, at the point C in the figure, the air would be in a state of compression instead of a depression or vacuous condition, existing.

I have always regarded the gas and flame of a blown-out shot as analogous to a projectile. If a projectile strikes a nonelastic body, the greatest compression will occur at the point of impact; and, if complete penetration takes place, alternate compression and expansion will result in different parts of the mass. If, however, the body struck be elastic, the compression of the area of impact will result in an expansion of the surface or mass not in the line of impact. Air being elastic may therefore be expected to expand toward the line of impact, thereby creating the vacuous condition at *C* and along the line of discharge. Mr. Ashworth's method of proving my deduction to be incorrect is not consistent with his own statement, as his diagram, Fig. 2, accepting for the purpose his argument, proves the existence of a vacuous condition along the longwall face, on each side of the shot, in which respect it does not differ from the diagram I submitted.

Mr. Ashworth further observes that, in explosions of this kind with which he has had experience, he has "observed that there was invariably a large cavity or air space in the immediate neighborhood of the blast." I take his meaning to be that such an area is more favorable to a general expansion of the blast, and furnishes besides, a sufficient supply of oxygen for the initiation of the explosion. So far the logic is sound; but, if he intends to say that an explosion will not occur except through the agency of such an area, I fail to grasp the argument. That explosions have occurred where such a condition existed, is no proof that an explosion will not occur where such condition does not exist, if the necessary factors for its occurrence be present; and the reverse current supplies these factors.

Mr. Ashworth's opinion that "when a shot blows out, the heated gases and particles of solid matter are projected into the mine roadway where the blast stirs up the dust" is generally conceded to be correct. But speaking of the initial moment when the fatal blast occurs, he says:

> At this initial moment, the atmosphere in the immediate vicinity of the shot is quickly rendered devoid of oxygen, which makes an explosion of the dust and gas at this point impossible.

I regard this statement as a very strong argument in favor of Mr. Verner's theory; but a practical test, as has been suggested, would be to place a barrier across the air course so as to prevent the supplying of sufficient oxygen for the necessary combustion through the agency of the reverse current.

Mr. Ashworth, in concluding his remarks, says there has not been shown "any reverse current other than that due to the cooling of the heated gases, which occurs in what is properly called, the condensation stage, etc." If this be true, then such an explosion would be characterized by only one compression and one expansion. In a recent issue of COAL AGE (Aug. 22, p. 294), there was given a description of an experimental explosion at the British experimental station at Eskmeals. At the mouth of the experimental tube a marker indicated upon a plate the compressions and expansions of the atmosphere, from the moment of the occurrence of the blast to the termination of the explosion, plainly showing that more than one compression and expansion took place.

Mr. Ashworth has not touched upon the cumulative effects of a coal-dust explosion which I believe is one of the principal things the theory seeks to explain. I question whether a practical test of Mr. Verner's theory, by the methods he has suggested, would result in the prevention of an explosion; but that the cumulative effects of such an explosion may be due to such a cause, I see no reason to doubt.

I. C. PARFITT.

Jerome, Penn.

Letter No. 9—I notice, by Mr. Ashworth's letter, COAL AGE, Sept. 5, p. 398, that he rejects the theory that the counter-current set up in a mine entry, immediately following an explosion of gas or dust, becomes a factor in the development and propagation of the explosion throughout the mine.

I want to express my indebtedness to Mr. Parfitt for his detailed explanation, COAL AGE, Vol. 5, p. 1059, of the action of such counter-currents occurring as an incident of the initial explosion at the face of a room or entry. I feel assured that Mr. Ashworth, after he has read Mr. Dean's description of the test at Eskmeals Experimental Station, COAL AGE, Aug. 22, p. 294, will no longer doubt the existence of the counter-current, in dust explosions, and its influence in the initiation and propagation of the resulting mine explosion.

At the present time, I will only briefly review Mr.

Ashworth's criticism of Mr. Parfitt's illustration, which is reproduced as Fig. 1, p. 398. The diagram represents an ideal or suggestion of what may reasonably be assumed to take place when a shot, fired at the face of a chamber or heading, is discharged into an explosive atmosphere of gas or dust. The principal force of the explosion is shown as projected along the roof of the heading, giving rise to a counter-current setting in along the floor at a point marked *F*. Referring to this sketch, Mr. Ashworth states:

> It is clear, however, that no such reverse current could be produced until the force exerted by the powder or other explosive had expended its energy.

My own observations and the results at Eskmeals and elsewhere have proved, to my mind, that the reverse current is not delayed until all the energy of the explosive blast has been expended; but that such a current sets in immediately after the explosive force has reached and passed its maximum; or, in other words, as soon as the pressure begins to decline. I am pleased to say that I regard Mr. Parfitt's sketch, in this respect, as fairly representative of true conditions in the mine.

Mr. Ashworth, further, doubts the existence of "a depression or vacuous condition" behind the blast when the shot is fired at the face of a heading, as indicated by *C* in Mr. Parfitt's Fig. 1, and suggests that a shot fired at a gate-end, in a longwall face, might produce such a condition by drawing the air from the road along the face, after the principle of an injector (Fig. 2, p. 398). I consider that the large space open at the longwall face suggested by Mr. Ashworth would prevent any depression being formed there at the moment the shot is fired.

Permit me to say, in conclusion, that the existence, during every dust explosion, of air inrushes, counter-currents, reverse impulses, or any other name by which these air movements may be known, has been established, by the experiment at Eskmeals, in the most convincing manner. Granting this to be true, the next step, in my opinion, should be the investigation of the function of such a reverse current. In other words, an effort should now be made to show how such currents influence the initiation and propagation of a dust explosion throughout the mine. This is what I have termed the "air factor" in a mine explosion. It is possible, I believe, to carry this investigation to a final conclusion and establish beyond a doubt what this influence may be. When that work has been accomplished at experiment stations, we shall possess more definite information in regard to mine explosions and be able to determine more effective means for their mitigation or prevention.

JOHN VERNER,
Former State Mine Inspector.
Chariton, Iowa.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Theory of Siphoning—In order to operate a mine siphon successfully it is absolutely necessary to understand the theory of its working, and to know its limitations, and be able to detect the causes of failure when the results obtained are not satisfactory. Aside from the requirements of an air-tight pipe line and the complete or effective submergence of the ends of the pipe and assuming a clean bore, unobstructed by corrosion, sharp bends, globe valves, etc., there are other important considerations that affect and limit the flow of water in a siphon.

1. It is necessary to consider the flow of water from the intake end to the summit (short leg), as independent of the flow from the summit to the discharge end (long leg). The flow in the short leg is caused by the pressure of the atmosphere; that in the long leg is due to gravity.

In the **short leg** the gravity head (h_1) opposes the atmospheric head (H), which gives,

Effective head (short leg), $H - h_1$

In the **long leg,** the atmospheric head **(H)** opposes the gravity head (h_2), which gives,

Effective head (long leg), $h_2 - H$

2. It is evident, at once, that the gravity head (h_1) or rise in the short leg must always be less than the atmospheric head (H), in order that water shall flow to the summit of the pipe, and, further, as the rise of the pipe approaches the atmospheric head, the effective suction head will be correspondingly less.

The **atmospheric head** varies with the elevation above sea level and is, besides, subject to barometric changes. The average atmospheric head at sea level, expressed in water column, is $14.7 \div 0.434 =$ say 34 ft., which is therefore the theoretical limit to the rise of a siphon, at sea level. Owing to the frictional resistance of the pipe and other obstructions to the flow, the practical limit of rise is much less.

A **practical rule** for calculating approximately the allowable rise or **suction head,** in siphoning or pumping is:

Rule—Approximately, under ordinary conditions, the allowable suction of a pump or siphon in feet, may be taken as nine-tenths of the height of the barometer, in inches.

3. The **flow in the suction end,** under the effective head $H\text{-}h_1$, is calculated by equating this effective head with the sum of the friction head and the velocity head expressed in gallons per minute (G); length of suction end in feet (l_1); and diameter of pipe in inches (d_1), which are as follows:

Friction head, $\dfrac{l_1 G^2}{800\, d_1^5}$

Velocity head, $0.0026\, \dfrac{G^2}{d_1^4}$

$$H - h_1 = \frac{l_1 G^2}{800\, d_1^5} + 0.0026\, \frac{G^2}{d_1^4}$$

Then, solving for G, the flow in the suction end is

$$G = d_1^2 \sqrt{\frac{800\, d_1\, (H - h_1)}{l_1 + 2.08\, d_1}}$$

The Coal Age Pocket Book

4. The **flow in the discharge end,** under the effective head $h_2\text{-}H$, is calculated in the same manner as before, by equating this effective head with the sum of the friction and velocity heads and solving for G, which gives

$$G = d_2^2 \sqrt{\frac{800\, d_2\, (h_2 - H)}{l_2 + 2.08\, d_2}}$$

5. The proper **design** of a mine siphon requires that the diameters of the suction and discharge pipes shall be proportioned to their respective lengths and effective heads.

To determine this relation, in practice, whenever the diameter of the pipe in inches, does not exceed its length in hundreds of feet, the velocity head can be ignored with an error that will not exceed one per cent. This eliminates the term 2.08d in the above formulas expressing the flow.

In order that the siphon shall run full continuously, without necessitating the throttling of the discharge, the flow of water to the summit, under the effective suction head must at least equal the flow from the summit, under the effective discharge head. Therefore, equating the expressions for these respective flows, and disregarding the velocity head,

$$\left(\frac{d_2}{d_1}\right)^5 = \frac{H - h_1}{h_2 - H} \times \frac{l_2}{l_1}$$

Or, the relation of the **effective head, diameter** and **length** of pipe, in the respective suction and discharge arms of a siphon, when the diameter of the pipe in inches does not exceed its length in hundreds of feet, is expressed by the following:

Rule—The fifth power of the diameter of the pipe varies directly as its length and inversely as the effective head. Or, in other words, the fifth power of the diameter ratio is equal to the length ratio multiplied by the inverse ratio of the effective heads.

When the dimensions of the pipe, in each arm of the siphon, respectively, are thus proportioned to the effective heads, which are producing the flow, the pipe will run full throughout its length; and the velocity of the flowing water will be such that there will not be the same tendency for the air contained in the water, to escape and accumulate at the summit of the siphon or pipe line.

6. The use of **air traps** and **valves** to throttle the flow of the water in the discharge, and thus prevent the siphon emptying itself or "running dry" are unnecessary devices in a properly designed pipe line.

An air trap is a chamber attached to the summit of the pipe line, its connection therewith being controlled by a stop cock or small valve that will permit water from the chamber to replace the air that accumulates at that point when the siphon is not properly designed.

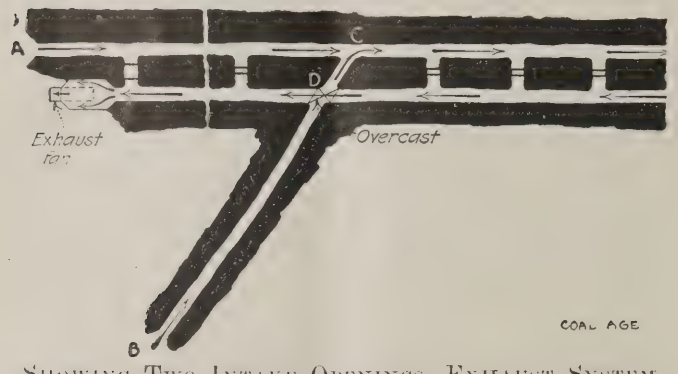
When a valve is required at the discharge end of a siphon a gate valve should be used in place of a globe valve, as the form of construction of the latter presents greater obstruction to the flow of the water. A valve may be required to control the flow in a **poorly** designed siphon; **or** whenever the fall in the discharge end of the pipe exceeds the atmospheric head, expressed as water column.

Inquiries of General Interest

Taking a Water-Gage Reading In a Mine

In order to settle an argument in reference to the proper method of taking the water-gage reading in the mine illustrated in the accompanying sketch, will you kindly state which of the methods advanced is the correct one to adopt in this case, that the reading of the gage shall represent correctly the pressure producing the circulation in the mine.

This is a drift mine and, as shown in the sketch, the fan is exhausting the air from a single main-return airway. There are two main-intake roads by which the air enters the mine at *A* and *B*. These air currents unite at *C* to form a single intake current, which traverses the main-intake road and, after passing through the workings, returns to the fan by the main-return airway. The return current is overcast at *D*, before it reaches the fan. The arrows show clearly the course of the air.



SHOWING TWO INTAKE OPENINGS, EXHAUST SYSTEM OF VENTILATION

It is claimed by one party that, in order to obtain a correct water-gage reading in this mine, the gage should be placed on a stopping inby of the point *C*, where the currents join. The other party claims that a correct water-gage reading for the entire mine can only be obtained by placing the gage in such a position that it will indicate the difference of pressure between the main-return airway at the fan and either of the intake roads, close to the entrance of the mine or outby from the point *C*, where the currents join; or, what is practically the same thing, to take the gage reading between the fan drift and the outside air. He urges in support of his claim that "when a fan is exhausting, the barometric pressure of the outside atmosphere forces the air into and through the mine against the partial vacuum created by the action of the fan; and the difference of these pressures is the pressure measured by the water gage in the position he has suggested. We would like to see this question answered in COAL AGE.

U. S. WILSON.

Briceville, Tenn.

In the ventilation of a mine, the air always moves from the point of highest pressure which is the mouth of the intake, to the point of lowest pressure at the mouth of the return airway. The course between these points does not include the passage through the fan. When the fan is blowing, its location is at the mouth of the intake airway and the point of *highest* pressure, in this case, is in the fan drift, close to the fan; while the lowest pressure is the barometric pressure at the mouth of the return airway. When the fan is exhausting, however, the point of *lowest* pressure is in the fan drift, while the highest pressure is the barometric pressure at the mouth of the intake airway. In either case, the water-gage reading taken on the fan drift will show the difference between the highest and the lowest pressure of the circulation, which will be the correct mine pressure.

The fact that, in this case, there are two intake openings and two intake currents that unite at *C* to form a single intake current, does not alter the situation. Since this fan is exhausting, the barometric pressure of the outside atmosphere, at *A* and *B*, is the highest pressure in the circulation; and the pressure in the fan drift close to the fan is the lowest pressure. The correct position of the water gage when ascertaining the mine pressure is, therefore, on the fan drift close to the fan, but at such a distance from it as to avoid the violent oscillation of the water in the gage that sometimes takes place, owing to the eddying of the current or an unsteady action of the fan.

Adding Air to Reduce Flame Cap

Referring to the answer to an examination question, COAL AGE, Sept. 12, p. 444, it seems to me that the air required (37,300 cu.ft.) is not nearly sufficient to dilute the gas so that no cap will appear on the lamp. The amount of gas in the air current is found to be 946 cu.ft. per min.; but I do not understand why this is divided by 0.02 to obtain the total volume of the return current. Kindly explain.

INQUIRER.

South Brownsville, Penn.

If the 946 cu.ft. of gas is 2 per cent. of the total return current (air and gas) after dilution, 1 per cent. is

$$946 \div 2 = 473 \text{ cu.ft.;}$$

and 100 per cent. of the total return current including the air added, is then

$$473 \times 100 = 47{,}300 \text{ cu.ft. per min.}$$

The same result is obtained by dividing at once by 0.02, as in the answer given Sept. 12, p. 444; thus,

$$946 \div 0.02 = 47{,}300 \text{ cu.ft. per min.}$$

The original current of air and gas being 10,000 cu.ft. per min., the air added to this current is

$$47{,}300 - 10{,}000 = 37{,}300 \text{ cu.ft. per min.}$$

To prove this result, find 2 per cent. of the total return current, which is the gas present; thus,

$$47{,}300 \times 0.02 = 946 \text{ cu.ft. per min.}$$

Examination Questions

Wyoming Questions (1912)

(*Answered by Request*)

Ques.—What is afterdamp and why is it dangerous to life?

Ans.—Afterdamp is a variable mixture of the gaseous products of an explosion of gas or dust, generally mixed with more or less air. The composition of afterdamp is very variable, depending on the character of the gases burned and the conditions attending the explosion, in respect to the quantity of air available for the combustion of the gases. As the proportion of air (oxygen) available for combustion is increased, the percentage of carbon dioxide (CO_2) formed is increased, while the percentage of carbon monoxide (CO) formed by the explosion is decreased, as shown by the following:

Gas to air, 1 : 4.5; 10 per cent. of carbon burns to CO_2
90 per cent. of carbon burns to CO

Gas to air, 1 : 5; 13 per cent. of carbon burns to CO_2
87 per cent. of carbon burns to CO

Gas to air, 1 : 6; 20 per cent. of carbon burns to CO_2
80 per cent. of carbon burns to CO

Gas to air, 1 : 9.57; all of the carbon is converted into CO_2

Afterdamp is dangerous to life for two reasons; namely, the available oxygen is insufficient for the support of life; the gases composing the mixture are either poisonous or suffocating when breathed into the lungs.

Ques.—Explain the meaning of the terms, *ventilating pressure, water gage* and *resistance of air,* as used in mine ventilation.

Ans.—The ventilating pressure is the pressure producing ventilation. This should be the entire pressure exerted on the sectional area of the airway, which is the equivalent of the resistance to be overcome in passing the air through the airway. The term "ventilating pressure," however, is quite generally used for the *unit* pressure or pressure per square foot of sectional area.

The term, *water gage,* refers to the inches of water column supported by the air pressure producing the circulation. The water gage is, therefore, the measure of the difference of pressure between the intake and the return airways, in any given circulation of air. One inch of water gage corresponds to a pressure of 5.2 lb. per sq.ft.

The *resistance* of an airway is the force developed in opposition to the passage of air through the same and is equal to the pressure exerted on the total sectional area of the airway to produce the circulation. The resistance of an airway is expressed in pounds. It is caused by the friction of the air rubbing on the sides, top and bottom of the airway and the obstruction offered by timbers and other abutting surfaces that impede the flow of the air.

Ques.—(a) How is pressure measured in a mine airway? (b) Explain the constant, 5.2, used in connection with water-gage calculations.

Ans.—(a) The pressure producing circulation in a mine or airway is measured by means of the water gage, which is a U-shaped glass tube containing water in the bend of the tube. Both ends of the tube are open, one of these being connected with the intake while the other is open to the return airway. The pressure on the intake airway always being the greater, the water in this arm of the tube is depressed, while that in the other arm rises an equal amount. The difference between the two water levels of the gage is the water column that measures the difference of pressure between the two airways or the pressure producing the circulation. Since each inch of water gage corresponds to a pressure of 5.2 lb. per sq.ft., the water-gage reading multiplied by 5.2 will give the unit of ventilating pressure, in pounds per square foot.

(b) The weight of a cubic foot of water is practically 62.5 lb.; and the weight of water 1 in. deep spread over an area of 1 sq.ft. is, therefore, $62.5 \div 12 = 5.2$ lb. Since water always rises to the same level, this weight of water, in pounds, spread over 1 sq.ft. of area is equal to the pressure, in pounds per square foot, corresponding to 1 in. of water gage.

Ques.—If the length of an airway is increased four times, what is the effect on the friction of the air current?

Ans.—The friction will be increased in the same ratio as the length of the airway; or, in this case, the friction will be increased four times.

Ques.—If the velocity of the air current be increased four times, what will be the effect on the friction of the air passing through the airways?

Ans.—The friction increases as the square of the velocity of the air current. If the velocity be increased four times, the friction will be increased $4^2 = 16$ times the original friction.

Ques.—If an explosion should occur in the safety lamp when testing for gas, or the lamp should suddenly fill with flame, what would you do to insure your own safety?

Ans.—It is important, in either case, to make no quick movement, as that would increase the danger. An explosion within the lamp chimney indicates that the air entering the lamp approaches closely to the lower explosive limit. Owing to the presence of more or less burnt air within the lamp chimney, which reduces the explosive condition within the lamp, the air surrounding the lamp may at the same time be highly explosive. Under the observed conditions stated here, a quick movement of the lamp, by assisting the circulation, might cause a sharp explosion within the chimney that would pass the flame through the gauze and ignite the gas outside the lamp.

The flaming of the lamp indicates a similar condition within and surrounding the gauze chimney, but to a lesser degree. A quick motion of the lamp downward causes a greater upward pressure within the chimney and tends to transmit the flame through the upper portion of the gauze. In the flaming of the lamp, the moment of greatest danger is when the lamp is being removed from the gas into fresher air below. The entrance of the fresh air into the combustion chamber of the lamp increases momentarily the explosive condition of the gas-charged air within the chimney, which might cause an explosion that would transmit the flame through the gauze.

Coal and Coke News

Washington, D. C.

The Senate Committee on Public Lands has reported the bill to provide for leasing coal lands in Alaska, which passed the House of Representatives on Sept. 5, in an entirely new form. This provides for authorizing the Secretary of the Interior to survey the lands in the territory of Alaska, just as was done in the house bill. In Sect. 2 of the measure, 5120 acres of coal-bearing land in the Bering River field and 7680 in the Matanuska field are reserved to the United States for the purpose of mining for government use. Then the following draft of Sect. 3 is inserted with reference to the conditions under which the unreserved lands are to be taken up:

That the unreserved coal lands shall be divided by the Secretary of the Interior into leasing blocks or tracts of 40 acres each, or multiples thereof, and in such form as in the opinion of the Secretary will permit the most economical mining of the coal in such blocks, but in no case exceeding 2560 acres in any one leasing block or tract; and thereafter, subject to any prior valid existing rights, which said rights may be perfected under the laws in force at the time the same were initiated.

The Secretary shall offer such blocks or tracts and the coal, lignite and associated minerals therein for leasing, and shall award leases thereof through advertisement, competitive bidding, or such other methods as he may by general regulations adopt, to any person above the age of 21 years who is a citizen of the United States, or to any association of such persons, or to any corporation organized under the laws of the United States or of any state or territory thereof.

Provided, that no more than one of said blocks shall be included in any lease.

And provided further, that no railroad or common carrier shall be permitted to take or acquire through lease or permit under this act, any coal or coal lands in excess of such area or quantity as may be required and used solely for its own use, and such limitation of use shall be expressed in all leases or permits issued to railroads or common carriers hereunder.

And provided further, that any person ,association or corporation qualified to become a lessee under this act and owning any pending claim under the public-land laws to any coal lands in Alaska may, within one year from the passage of this act, enter into an arrangement with the Secretary of the Interior by which such claim shall be fully relinquished to the United States; and if in the judgment of the Secretary of the Interior the circumstances connected with such claim justify so doing, the moneys paid by the claimant or claimants to the United States on account of such claim may, by direction of the Secretary of the Interior, be returned and paid over to such person ,association or corporation as a consideration for such relinquishment, or in lieu of such repayment, the Secretary of the Interior may execute and deliver to said person, association or corporation, in preference to any other lessee, a lease under this act of the land so claimed or any part thereof within the limitations of area and location fixed by Sect. 2 hereof, and the said moneys may be credited upon the royalties to become due under such lease: Provided, that if the land so claimed be within a reservation made in pursuance of Sect. 7 of this act, other coal lands in Alaska of substantially equal value may be substituted in said lease for the lands so relinquished.

The later sections relate to details concerning the purchase or acquirement of mining rights by individuals. Sect. 9 reads as follows:

That for the privilege of mining and extracting and disposing of the coal in the lands covered by his lease ,the lessee shall pay to the United States such royalties as may be specified in the lease, which shall not be less than 2c. nor more than 5c. per ton, due and payable at the end of each month succeeding that of the shipment of the coal from the mine, and an annual rental, payable at the beginning of each year, on the lands covered by such lease, at the rate of 25c. per acre for the first year thereafter, 50c. per acre for the second, third, fourth and fifth years, and $1 per acre for each and every year thereafter during the continuance of the lease, except that such rental for any year shall be credited against the royalties as they accrue for that year. Leases may be for periods of not more than 50 years each, subject to renewal, on such terms and conditions as may be authorized by law at the time of such renewal.

Five Per Cent. Rate Case to Be Reopened

Contrary to expectations, the Interstate Commerce Commission has reopened the 5 per cent. rate case and will again hold hearings regarding it. There is no official assurance on the subject, but it is pretty generally understood that the commission has no intention of changing its attitude on the question of rates on heavy products, of which coal is a conspicuous example.

From all appearances, whatever the commission chooses to do will be done with due regard to the necessities of the coal industry, as already ascertained, and of others which are in a like position. There was no industry, it is learned, which made a stronger demonstration of its position during the hearing before the commission when the original 5 per cent. case was being heard than the coal industry.

HARRISBURG, PENN.

There is wide interest in the argument arranged for Sept. 25, on the "Mine foremen's certificate" case, which will be heard by Judge Kunkle, in this city.

The United Mine Workers are anxious to prevent the issuance of certificates to the successful candidates, who they allege have not had the requisite experience of five years in actual work of cutting coal at the face. The law requires that each applicant shall have had five years' experience as a miner, but the attorney-general recently applied an interpretation that "miner" means anyone engaged about the mines.

The United Mine Workers take a different view of the matter from that of the chief of the Department of Mines, who is abiding by the interpretation of the attorney-general. They began proceedings in the name of James Mathews, president of the Schuylkill district, to stop the issuance of certificates to the large number of men who passed the recent examination when the bars were let down. As a result, the certificates of the anthracite region have not been issued. The candidates who passed the examination have now retained ex-Judge A. L. Shay, who has applied for a mandamus on the chief of the Department of Mines, Hon. James E. Roderick, to compel the issuance of the certificates which were awarded by the examining boards.

Judge Shay claims that the court cannot go behind the returns of the examining board unless fraud is alleged, and that the board is sole judge of the qualifications of the candidates.

He quotes a decision of the Schuylkill County court in the case of Thomas Reese, who was refused a certificate for mine inspector. In that case, the court said it could not substitute its own discretion for that of the board and refused any relief to Reese.

The argument on Sept. 25, therefore, may not be on the merits of the question, but whether the courts have jurisdiction under the circumstances surrounding this case. The whole anthracite region is keenly interested in the matter. The miners have engaged as counsel, James J. Moran and ex-Congressman J. B. Reilly, who will argue that the safety of many thousands of men depends on having efficient and experienced foremen. Deputy Atttorney-General J. E. P. Cunningham will represent the Department of Mines.

A Medal Is Awarded

The Bliss breaker, owned and operated by the Delaware, Lackawanna & Western R.R. Co., was struck by lightning on July 27, 1914. The bolt tore off a portion of the roof and set the building afire, the employees running panic-strucken from the breaker to a place of safety. John Zabigolski, who is employed as a slate boss, instead of following his fellow-employees, picked up a hose and turned a stream of water on the fire, which resulted in saving the big building.

The company has just rewarded Mr. Zabigolski for his bravery by presenting him with a beautiful gold medal as an award of merit. The medal is engraved as follows:

SAFETY FIRST
AWARD OF MERIT
JOHN ZABIGOLSKI
JULY 27, 1914
MINING DEPT.

Mr. Zabigolski may well feel proud of the honor, since it is the first medal presented as a token of merit by the Lackawanna R.R. mining department in this region to any employee for an act of heroism.

PENNSYLVANIA

Anthracite

Girardville—Anthony Faran was killed and John Regan was seriously injured and four others were entombed for several hours when the timber in an old gangway collapsed under a fall of coal at Packer Colliery No. 5 of the Lehigh Valley Coal Co., on Sept. 17. A rescuing force reached the entombed men after three hours of perilous labor.

Ashley—Because it is alleged that three patchers employed in Maxwell Colliery, Lehigh & Wilkes-Barre Coal Co. had not been given an increase in pay which they claim was promised

them, and which they say is due them under the terms of the last agreement, a strike was called on Sept. 18, and the entire colliery was shut down.

Plymouth—A button strike was called at the Lance colliery, Lehigh & Wilkes-Barre Coal Co., at Plymouth. A number of men have refused to join the union and the others refuse to work with them.

The strike at the Dorrance colliery of the Lehigh Valley Coal Co., which grew out of the company's new regulation regarding car topping is still unsettled.

Wanamie—Officials of the Lehigh & Wilkes-Barre Coal Co. are considering the project of erecting a new breaker at No. 18 colliery. It is said that plans are to be made for a new all steel structure some distance from the present breaker. Electricity for power and modern machinery for coal preparation are to be used.

Mt. Carmel—Two men were killed and one fatally injured in the Midvalley colliery when a trip of cars upon which they were riding struck a mining locomotive. In order to avoid a long walk to reach home, 11 men and boys disregarded the rules and warnings of the company. The trip started at high speed when the cars reached a curve on the slope and crashed into a locomotive drawing a trip of loaded cars.

Hazleton—The anthracite mines in the Lehigh coal fields, on Sept. 14, started on their second week of steady time, which is to be continued indefinitely. The Lehigh Valley R.R. is getting ready for heavy fall coal business. Motive power is being repaired and cars are being gathered from all points to handle the traffic. With the mines in steady operation and local industries going nearly full blast the Hazleton region is not suffering depression. The European war has not yet caused any suspension of work at local mills; but as Hazleton and the surrounding towns depend mainly on the anthracite industry a good winter is ahead.

Bituminous

New Salem—The main business block of this place, an H. C. Frick Coke Co. town of about 2000 population, was destroyed by fire on Sept. 17. The damage is estimated at $40,000. A school building erected at a cost of $30,000 was burned several months ago. It is rumored that these fires were of incendiary origin.

Jerome—The probability of Sunday shifts to keep up with the great demand for its product was announced on Sept. 15, by the Jenner-Quemahoning Coal Co. Orders for coal from this company's mines are said to be piling up faster than the company can fill them at the present rate of mining, and long trains are being sent both east and west, loaded with coal. The condition is considered extraordinary by operators, as there is a noticeable slump in business in most of the workings in the vicinity.

Milford—The 700-acre tract that was optioned for the Hinchman Brothers of Mount Pleasant may be sold to Cambria County capitalists. The field under option includes coal underlying the farms of G. J. Hayes, J. M. Critchfield, A. J. Newman, Walker Brothers and F. F. Welmer. It has been learned that the Cambria County operators are favorably impressed with the quality of the coal and will likely purchase the tract together with several acres of surface upon which to build a plant.

Mines on all these farms have been opened and have been supplying local trade for several years. It is believed that the equipment for operating the tract will be placed on the Hayes farm, which is more accessible to the Somerset & Cambria branch of the Baltimore & Ohio and that the mine opening at this particular point has been better constructed. The deal for the 700 acres will likely be closed before the end of September.

Pittsburgh—The plans for the new buildings of the U. S. Bureau of Mines located in Pittsburgh have been completed and are now in Washington awaiting the approval of the government architect. It is expected that bids for the construction of these buildings will be invited and contracts awarded not later than Oct. 15.

Connellsville—The Connellsville coke region is now producing approximately 250,000 tons weekly, which is a new low record for the year. The coal market in the Pittsburgh district on the other hand, has been slightly more active as the result of increased demand for domestic purposes.

WEST VIRGINIA

Charleston—It is announced by the mine workers' organization that all contracts which expired in the Kanawha district in March have now been renewed and that the entire district is now at work without friction. Contracts are also being sought with the Milburn Coal Co. and the Solvay Coal Co., both of which have begun operations on Paint Creek. The miners working these operations have been working on a temporary agreement, but it is believed that there will be no difficulty in securing the consent of the two companies to operate under the general wage agreement.

Fatality records in the department of mines show that during the month of August, 32 men lost their lives in West Virginia coal operations. Chief Inspector Earl A. Henry is calling the attention of both miners and operators throughout the state to the number of accidents and deaths due to riding on loaded trips, 10 of the 32 fatalities during the month arising from this cause. Eleven more are classified as due to carelessness. A further classification shows that 15 deaths were due to falls of coal and slate, 10 to mine cars, motors and the like, 6 to electrocution, and one to machinery.

Welch—Complaint was recently brought before Justice of the Peace, A. T. Hufford, charging that William Concoski, of Superior No. 1 Mine, a Russian, was carrying matches and smoking under ground. The mine is worked on locked safety lamps and permissible electric lights. He was fined $100 and costs. This is the first case of its kind, and should be a lesson to others violating Sec. 18 of the Mining Law.

TENNESSEE

Chattanooga—Coal shipments are to begin soon from the developments the Castle Rock Coal & Coke Co. The capital of the company is provided and it is opening up the famous Coal City seam on the side of the mountain nearest Whiteside, Tenn., on the Nashville, Chattanooga & St. Louis R.R.

KENTUCKY

Whitesburg—Last week was a record breaker in point of coal shipments from the Consolidation Coal Co.'s plants in the Jenkins-McRoberts-Burdine fields, though definite figures are not available. The company is planning continued increases in its output.

Louisville—Of the 866,980 workers in Kentucky engaged in gainful occupations, 21,100 or 2.4 per cent. of the total are miners, according to the detailed report of the census bureau for 1910. Of the miners, all by but 9 were males, while of the total number of miners 18,310 were coal mine operatives.

Hazard—The Hazard Town Coal Co. is opening a large mine in the No. 4 seam of coal immediately west of Hazard, on the North Fork of the Kentucky River. The main line of the Lexington & Eastern division of the Louisville & Nashville R.R. is on the opposite side of the stream. The tipple will be built beside the railroad and the coal carried from the mine to it across the river in an aërial tramway.

Benham—The Wisconsin Steel Co. is now shipping a larger coal tonnage than at any time in the history of its operations in the Cumberland River field. At present the Wasioto & Black Mountain R.R., a branch of the L. & N. is taxed to the limit to handle the unusually large coal tonnage going out from the different plants. A large increase was made also last week in the working force of the company, while increases are billed to take place from time to time within the next two or three weeks.

OHIO

Columbus—The mine rescue car which was purchased several months ago by the Ohio department of mines has proven its worth. It has shown that the investment of $10,000 for the car has been a piece of wisdom and that it is one of the genuine assets of the department of mines. Upon two occasions the car and its equipment have been called upon and in both cases it has done all that was claimed for it. The first occasion was a fire in the mines of the Superior Collieries Co. at Wellston, where fire from the tipple was communicated to the interior workings. The car was called and with the aid of the equipment the fire was extinguished in three days. The second occasion was the opening of Mine No. 301 of the Sunday Creek Co. at Congo.

INDIANA

Indianapolis—The local inspector of weights and measures has ordered that coal in baskets must be sold by weight, 80 lb. of soft coal and 40 of coke to the bushel. A certificate of weight must accompany delivery.

ILLINOIS

Belleville—The annual report of the County Mine Inspector for St. Clair County gives a total tonnage of 5,117,002 tons of coal produced for the year. The 54 shipping mines in the County shipped 4,900,489 tons, and the local mines, numbering 17, shipped 107,514 tons. There are 160 mining machines, 27 locomotives and 4313 miners employed, with 425 men at miscellaneous labor. The shipping mines worked on an average of 145 days throughout the year, and the local mines worked 213 days.

Owners of 45 mines in the Belleville district have received letters from Adam Hoffman, Jr., of St. Louis, requesting that the present option for the purchase of these operations be extended for a period of 90 days. Hoffman who has been promoting a $15,000,000 deal had hoped to raise the capital in France. This plan has fallen through for obvious reasons.

Pana—The men of the Peabody Coal Co. recently went on strike because of the alleged refusal of the company to recognize the pit committee and the district president.

East St. Louis—It is rumored that the Prairie mine, owned by the Aid Coal Co. of St. Louis, is in such a condition that it will likely be abandoned on account of the excessive squeezes that have created doubt as to the likelihood of ever being able to operate the mine at a profit again. This is one of the largest and best mines in St. Clair County, but it has not been operated since early last spring.

Johnston City—The work of developing the property of the Cambria Coal Co., north of here, continues, and an enormous pile of coal, containing several thousand tons, has been taken out and heaped up waiting for the railroad extension to be built into the property. It is understood that the temporary top works will remain until next spring, when a steel tipple and up-to-date head gear will be erected.

Marion—Many of the mines in Williamson and Franklin Counties are able to run only about two or three days a week, on account of the congested condition of their storage tracks, and all sidings on the railroad, with steam coal. Some mines have over a hundred cars of the smaller sizes that they are unable to move at any price. At Johnston City one mine is dumping all of its screenings on a lot adjacent to the mine.

MISSOURI

Richmond—Perry Rice, of Richmond, has leased the Vibbard mine which has not been worked for several years; it is said to have a vein of about 27 in. at a depth of 400 ft. Mr. Rice is reported to be making plans to reopen the old shaft and sink another. The Santa Fe will build a spur to the mine.

UTAH

Eureka—A cave-in occurred recently in the 1600 ft. level of the Continental mine burying 12 mine workers. It is believed that all of these were crushed immediately.

FOREIGN NEWS

Cardiff, Wales—Miners producing the coal for the English navy have shown their loyalty in a manner highly gratifying to the Admiralty. In the face of attempts on the part of labor leaders to take advantage of the present situation for the enforcement of demands upon the Admiralty, the Welch miners have waived all holidays and are working Sundays whenever it is necessary to keep the navy supplied with coal. Union leaders asserted that it was not necessary for the men to surrender their holidays, but the latter disregarded their ruling.

PERSONALS

W. O. Stillwagon, of Mount Pleasant, Penn., is about to retire from the employ of the H. C. Frick Coke Co., after 33 years of service.

R. B. Waddell, formerly connected with the Commercial Coal Co., of Detroit, has accepted a position with the Colonial Coal & Supply Co., of Columbus, and will cover Northern Ohio.

S. A. Bramlette has been appointed special commissioner for the operators in District 25, to assist in digging out of work accumulated during the recent long conferences over Southwestern and district agreements.

H. L. Warner, general manager of the Victoria Coal Co., has completed a thorough inspection of the mines of the company. D. C. Hitt, sales manager of the company, accompanied by Fred C. McConnell, recently visited the mines of the East Kentucky Coal Co., at Torchlight, Ky.

J. M. Roan, chief mine inspector of Ohio, is receiving subscriptions in the form of money and clothing for the benefit of destitute children and women among the miners' families of eastern Ohio. In many instances the children have been unable to attend school because of lack of clothing.

W. L. Carter, until recently general manager of the Bessemer Coal, Iron & Land Co., of Birmingham, Ala., and since engaged in special work, is now general manager of the Himyar Coal Corporation, at Himyar, Ky. This firm is just completing the installation of a new plant including electric hoists and cutters, reinforced concrete tipples, loading booms, etc.

R. A. Colter, secretary and treasurer of the C. G. Blake Co., of Cincinnati, and of the Waldensia Coal & Coke Co., in his capacity as vice-president of the Cincinnati Chamber of Commerce represented that body at the centennial celebration of the city of Covington, Ky., held recently, appearing formally at an elaborate banquet at which prominent local and state officials were present, and addressing the guests on behalf of Cincinnati.

CONSTRUCTION NEWS

Coshocton, Ohio—The Ohio Cannel Coal Co. expects to open its 5-ft. bed of coal underlying 1200 acres in Bedford Township near Coshocton within the next few weeks.

Providence, Ky.—The Providence Coal Co. is constructing what will be the largest retail store in Webster County for its commissary department. The building is to be of brick, 36x90 ft., with a full basement.

Benz Creek, Penn.—W. H. Hughes & Co. have installed at their No. 1 Slope Benz Creek, Cambria County, Penn., the largest electric hoist in that region. This hoist is driven by a Westinghouse continuously rated 400-hp. alternating current motor.

Williamson, W. Va.—Contracts for the construction of two bridges across Tug River and two miles of railroad up Blackberry Creek have been awarded by the Norfolk and Western Ry., and the construction of this road will open up one of the greatest coal fields in eastern Kentucky.

St. Louis, Mo.—Actual work has been begun on the one-story brick building in the 600 block of Catalan St., to cost $25,000, which will contain the first battery of Koppers by-product coke ovens, for the Laclede Gas Light Co. The entire plant, when completed, next July, will have cost $750,000.

Winchester, Ky.—It is stated that the Consolidation Coal Co., which has been considering driving a tunnel through the mountains that separate McRoberts from Jenkins has ascertained that the opening will be run through 9 ft. of coal and that a sufficient quantity can be thus secured to pay for the work of excavation.

Hazard, Ky.—The Ashless Coal Co. is completing a bridge across the Kentucky River to reach the main line of the Louisville & Nashville R.R. This will follow the completion of a short, three-mile branch road in order to tap an extensive coal field on Davidson's Creek. The company expects to be shipping coal out from its plant within 30 days. There is unusual industrial activity around the Hazard and Perry County coal field.

Lansford, Penn.—The Lehigh Coal & Navigation Co., is now installing at its No. 11 shaft the largest alternating-current equipment used in the anthracite region. The hoist is operated by means of a Westinghouse motor and liquid controller, rated at 750 hp. continuously. The weight of coal, car and cage combined is 28,000 lb. Forty trips per hour are made from the 500-ft. level and 60 trips per hour from the 266-ft. level. The r pe speed being 1300 ft. per minute.

NEW INCORPORATIONS

Chattanooga, Tenn.—The Castlebroom Coal & Iron Co., with a capital of $25,000, has been organized here.

Jenny Lind, Ark.—The Moma Coal Co. has been incorporated here with a capital stock of $3000, by Joseph Moma, J. L. Henson, Max Richardson and others.

Earlington, Ky.—The Atpontley Coal Co. has announced through its president, James E. Rash, and its secretary, Paul M. Moore, that it is winding up its business in order to dissolve.

Williamsburg, Ky.—The Letz-Jellico Coal Co. announces that its business is being closed up and that the corporation will be dissolved. J. W. Latham is president and J. Robert Zimmerman is secretary.

New Albany, Ind.—The Edward J. Hackett Coal Co. has been incorporated here, with $20,000 capital stock, for mining purposes. The directors are Edward J. Hackett, John W. Whedon and S. M. Lawrence.

Charleston, W. Va.—The Hardy Coal Co. of Mullins has been organized with a capital of $100,000. The chief works will be in Parkers Ridge district of Wyoming County. The incorporators are J. C. Sullivan, H. W. Hubbard, J. A. Wood, C. A. Mead, Edward Cox and Frank A. Prince.

Frankfort, Ky.—Articles of incorporation of the Mountain Central Railway Co., which projects a 12½-mile line to run from Campton Junction, Carter County, to Campton, Wolfe County, have been filed with the secretary of state. The company has $25,000 capital and among the incorporators is the Day Lumber & Coal Co., of Clay City, where headquarters will be located. A large coal and timber area will be opened.

INDUSTRIAL NEWS

Chattanooga, Tenn.—The Continental Coal Corporation recently received a cablegram from Brazilian interests asking quotations on 150,000 tons of coal to be delivered at Charleston, S. C.

Cincinnati, Ohio—It is reliably reported that an order from Brazil for 200,000 tons of coal for immediate shipment, presumably for use by war vessels belonging to the Triple Alliance, has been turned down by local companies operating in the West Virginia fields.

Des Moines, Iowa—Matthew Holmes, administrator of the estate of the late John Holmes, asked damages to the amount of $20,000 against the Bloomfield Coal Co. in the district court. John Holmes was killed by a fall of slate in the defendant's mine, and negligence is charged.

Johnstown, Penn.—J. H. Salisbury, of Punxsutawney, and John Harrington, of Horatio, have purchased the Liston mine at Listonburg, Somerset County. Forty men will be employed from the outset with both purchasers taking an active part in the operation of the property.

Washington, D. C.—The people of Alaska may be cut off entirely from their coal supply according to Senator Walsh of Montana. He states that practically the entire supply for Alaska comes from British Colombia and that this province is considering placing an embargo on the exportation of coal owing to European hostilities.

Connellsville, Penn.—According to the report of the State Geological Survey, the total value of the mineral production of Fayette County in 1913, excluding the natural gas, was $38,906,843. This total does not include the value of the coke manufactured, since this was made from coal, the value of which is included in the total given.

Washington, D. C.—Aiming to expand the coal trade with South America during the emergency resulting from war in Europe, the Bureau of Mines recently began the distribution of a bulletin among consumers in Latin American republics describing the coals of the United States best available for export. These bulletins are printed in Spanish, Portugese and English.

Scottdale, Penn.—There has been recently considerable inquiry about the completion of the model coal and coke plant at the H. C. Frick Coke Co.'s Engineering Building. All visitors are welcome to view this model before it is sent to the Panama-Pacific Exposition. This model stands 26 ft. long and 16 ft. wide, and will be on exhibition from 3 to 5 o'clock in the afternoon, and from 7 to 9 in the evening.

Birmingham, Ala.—The Alabama Great Southern Ry. has just equipped all of its engines operating in the Birmingham limits with smoke consumers, in order to meet the smoke requirements. The Southern Ry. is also equipping all of its engines with the apparatus. Several methods of firing were tried in order to reduce the smoke, but without satisfactory results. A jet of steam emitted into the smoke has the effect of precipitating the dust, sending the smoke out in a white cloud.

Chicago, Ill.—The Gun-Crete Co., of Chicago, has purchased all the rights, titles, contracts, and interests in the Cement Gun Construction Co., and has also taken over the Construction Department of the General Cement Gun Co. This enlarges the scope of the business greatly. The combined business will hereafter be conducted under the firm name of the Cement Gun Construction Co. with offices at 914 South Michigan Avenue, Chicago.

Charleston, W. Va.—The Knight Couch Coal Co. recently filed suit in equity in the Kanawha County Circuit Court against the Sunday Creek Co. for $50,000 damages for alleged injuries done to the plaintiff company's mine at Riverside and the recovery of insurance alleged to be due for the houses belonging to the company which were destroyed by fire. The plaintiff leased the property to the defendant and claims that improper mining methods damaged the holdings to the extent of the amount of the judgment asked.

Connellsville, Penn.—Blast furnace operations in the East are on a much reduced scale, and are being still further curtailed. Three stacks most of the production of which has been of the merchant class have been blown out recently. These include Warwick, of Pottstown, Penn., Leesport, of Leesport, Penn., and Musconetcong at Musconetcong, N. J. The latter has been operated on foundry iron for the Singer Manufacturing Co. In Virginia, one active Low Moor furnace is going out leaving but four stacks now in blast.

Pittsburgh, Penn.—English buyers of Pittsburgh products are in some cases closing contracts for the delivery of steel in lighter finished forms. Pittsburgh manufacturers have recently received inquiries and some orders for wire rods of which several thousand tons have already been sold for shipment abroad. Pittsburgh coal men are considering inquiries for fuel from both South America and Europe, but thus far, business actually closed was drawn to eastern mines, which gained the benefit of a lower freight rate to the seaboard.

New York, N. Y.—The commission representing the Italian government that has been negotiating for coal for the Italian navy is reported to have closed a contract for 100,000 tons for prompt shipment, and is still in the market for a large tonnage for future delivery. Coal sales have also recently been made by local firms amounting to about 72,000 tons for export to Greece. Twenty steamships were cleared from Baltimore recently carrying about 100,000 tons, half of which is destined for Brazil, the balance of the shipment being for Mediterranean ports for Greece and one or two cargoes for Norway.

Montgomery, Ala.—The State Railroad Commission has been in session for some time hearing the proposed increases in the coal freight rates, and continued the hearing until this week. After over-ruling the petition of the contestants who believed the time was not ripe for a trial, the Commission refused to continue the case and immediately began the trial. A decision will determine whether or not railroads operating in the Gadsden-Anniston-Talladega district will be allowed to withdraw special manufacturers rates on coal from the Birmingham district, which rates have been allowed for several years.

Washington, D. C.—There seems to be no question but that West Virginia can dispose of her coal in the foreign markets. The Norwegian steamship "Ranvik" and the Greek steamer "Laertes" left Newport News within the past few days with over 14,000 tons of coal for River Plate ports. On Sept. 17, the British steamer "Glenartney" was awaiting cargo for Buenos Aires, the Norwegian steamer "Mathilde" had sailed with a cargo of 3058 tons for Guantanamo, Cuba, and three Italian steamers arrived from ports in the Meditarrean to load for Naples and Genoa. The question which appears to worry coal men at the present time is the permanency of this market.

Connellsville, Penn.—It is stated that during the year 1912, there were imported into Greece 482,768 short tons of coal of which Great Britain supplied 364,996 tons, Germany, 116,035 tons, the rest coming from Turkey, Belgium, and the Netherlands. The total imports for 1911 were 639,822 short tons, while the estimated figures for 1913 show a rapid recovery from the previous year. The imports into the ports of Pirateus for the last twelve months being 665,000 tons including steam and gas coal, etc. The coaling stations in the islands of Zea and Syra received 140,000 tons, most of which was later transferred to ships calling for coal.

Cincinnati, Ohio—The receivers of the Cincinnati, Hamilton & Dayton R.R. have formally filed application in the United States District Court for permission to issue receivers' certificates to the amount of $2,942,250, for the purpose of providing new rolling stock which is declared to be necessary for the proper operation of the road. It is declared in the petition that the present equipment of the road is neither sufficient nor up to the standard. The following new equipment is to be purchased: Five passenger locomotives, 30 freight locomotives, 1000 box cars, 1000 hopper cars, 12 steel passenger coaches, 8 steel combination passenger and baggage coaches, 4 steel combination baggage and mail cars, 5 steel baggage cars, 1 dining car, 1 steam crane, 1 steam locomotive crane and 105 cabooses. All of the equipment except the cabooses, which can be constructed in the company's shops, will have to be purchased, and bids have been received covering it, upon which the amount indicated is based.

Coal Trade Reviews

General Review

Heavy demand for anthracite continues unabated. Bituminous slows down still further and the outlook is now most discouraging. Lake shipments for the season show a big loss. Middle Western steam fuels given away for freight charges.

The anthracite trade is still marked by a steady, persistent call that presages a heavy business this fall and winter. The individuals are offering occasional concessions where some of the slow sizes have accumulated but as a rule full circular prices prevail. In the Lake trade the situation is rather mixed; some shippers claim they have sufficient stocks while others are eagerly taking all they can get. The heavy demand in other directions has absorbed so much coal that the Lake trade has readily taken up the balance.

It is becoming increasingly difficult to maintain prices in the Eastern bituminous trade. Some of the important distributing centers are more or less congested and the markets are steadily narrowing down. Shipments in the export trade are only fair and should there be further recessions along this line it will severely test the resisting powers of the market since these are an important factor in maintaining the present level. A most determined effort will be necessary to avoid a heavy slump in all directions. Rumors are current that shipments on some of the foreign contracts are already about finished.

The opening up of some domestic buying in the Pittsburgh district has been the only bright spot in an otherwise uniformly dull situation. Both railroad and manufacturing demand is light while advance estimates of the Lake shipping to the close of the season place the tonnage at one third less than last year; this latter has been a particularly discouraging proposition with the operators. The attitude of the railroads in refusing to buy beyond their immediate requirements has also proved a depressing factor. Should the rumors of a proposed moratorium in Canada develop into a reality this will tend to complicate negotiations and make the American operators even more cautious.

The heaviness in the Ohio steam market has reached a point bordering on demoralization and the depressing effects are spreading to the domestic branch as well. Production is somewhat reduced as a result of the adverse conditions which are considered by some as the worst in years. The Lake trade is the only encouraging aspect in the Ohio trade; a moderate season-end rush has developed which has created some activity in this department. As a rule the arrivals are in excess of requirements.

Local business in the Southern market is at more or less of a standstill; some small shipments have been made to foreign markets but no important tonnages have so far been reported.

The wide difference between the steam and domestic grades in the Middle West has been further accentuated. The shortage of high-grade domestic fuels created a stampede in that market, culminating in a spectacular advance in quotations. On the other hand operators are in some instances giving the steam fuels away for the cost of the freight or making arrangements to be supplied with side-dump hopper-bottom cars so that the coal can be dumped on the right-of-way. Mines as a rule are probably working on slightly better time. An increased buying movement on the part of the railroads is the best feature of situation at the moment.

ATLANTIC SEABOARD

BOSTON

Export demand slackens and prices on Pocahontas and New River are thought to be on the point of decline. Only a slim market in prospect. Volume of Georges Creek is steadily increasing. Pennsylvania grades fairly firm. Anthracite demand about even with supply, except in the case of stove size.

Bituminous—The indications are that the spot market for Hampton Roads coals is on the verge of a decline. Coastwise, there is practically no business whatever and for some reason the export trade has slackened notably. If this latter continues falling off nothing but the most resolute attitude on the part of shippers can prevent concessions in price in the course of a week or two. For the trade in general such a prospect is disheartening with all the hard work of re-establishing prices, etc., to be done over again. It is not easy to see where any market can be developed in this territory, even at reduced prices, for a long time to come.

In many cases where consumers were ready to buy extra tonnages early in August and their business was then refused by the shippers, particularly from Hampton Roads, they either did not buy at all or they placed orders with Pennsylvania operators. Such business therefore cannot be had now as there is no shortage of Hampton Roads coals.

Georges Creek shipments from Philadelphia and New York continue to improve in volume and not much difficulty is anticipated now in getting forward New England's normal requirements of this grade. Heavy shipments off-shore continue at Baltimore but it is understood that several of the large orders like that of the Greek Government are nearly completed.

There is no new feature in the market for the Pennsylvania grades. Consignees who are fearful of storing summer coal because of possible spontaneous combustion are now accepting deliveries with something like regularity. There are occasional offerings at low prices but for the most part Pennsylvania bituminous is holding firm.

Anthracite—The companies have plenty of September orders now to work on. There is no special delay in shipping, the demand being just about up to the supply on all sizes but stove. Stove is short with most of the companies and schedules calling for more than a third of a cargo are, in some quarters, being flatly declined. There is an active market here for dock screenings but unless the shipments of domestic sizes over the piers increase more than they have lately screenings will continue in short supply.

Current wholesale prices on bituminous are about as follows:

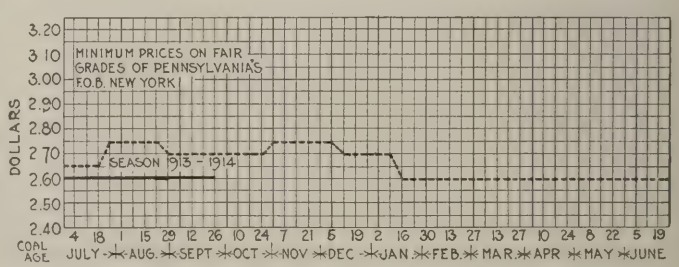
	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.25@1.65	$1.67@1.77	
Philadelphia*	2.15@2.80	2.50@2.90	2.92@3.02	
New York*	2.40@3.10	2.80@3.20	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.85
Boston†	.....	.....	.....	3.63@3.78
Providence†	.....	.....	.....	3.68@3.73

* F.o.b. †On cars.

NEW YORK

Bituminous weaker. No spot demand and some demurrage coal is noted. Anthracite picking up additional strength as the season advances. Heavy Western demand the latest important development.

Bituminous—There is almost a total absence of spot demand in bituminous coal and the market is perceptibly weaker than it has been in some little time. There is, however, little inclination on the part of the operators to force coal on to this market and the amount of demurrage coal



offering is small and prices are fairly well maintained although, of course, here and there a bargain can be had. The higher grades are, generally speaking, well placed under contract so that low prices are confined almost entirely to coals of fair and poor qualities.

The offshore business continues to ease up and there are few inquiries now in the market for export coal. More vessels

are offering and the heavy tonnages available in England are putting this business back into its former channels. The market on slack is very weak. Quotations continue as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania. $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—Reports from the West show a heavy movement of crops and the farming interests are beginning to realize on the yield. This furnishes them with money to take care of their coal accounts and is being reflected in the increased demand coming in from the retail dealers. This applies more particularly for rail shipments, Lake movement having been quite heavy and stocks in good shape.

The requirements from the West run about 50 to 60% chestnut, about 25% stove and a small percentage of egg. The heavy demand for chestnut in this direction has a particularly good influence as regards the Eastern market just at this time. In the East chestnut is a size which moves principally in small lots to the cash buyer and for immediate consumption in the cold weather. The Western demand is taking the strain off this market so that there is no druggishness in this size here at present. On the other hand, egg seems to be moving slowly and is being stocked by some of the companies. Stove size continues strong and is getting scarcer. It is practically impossible at this time to buy stove from any of the companies at tidewater without an accompanying tonnage of either egg or chestnut.

The retail situation in New York is quiet, the warm weather of the past few days causing a considerable let up in business. Orders continue to come in, however, from rail points in normal quantities for this time of the year and with any advent of cold weather there is no question that the demand on all sizes will easily take care of the supply with a probable shortage on stove.

The fine sizes continue in about the same condition as last week, the higher grades finding a ready market, whereas inferior coals can be had at considerably off circular. The No. 2 buckwheat does not seem to be as strong as heretofore which is rather an innovation as this size, particularly in high grade coals, has been short almost continually for the past year.

The market is now quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.10@5.35	5.30	4.80@5.30
Stove	5.35	5.35@5.40	5.30	5.30@5.40
Chestnut	5.60	5.50@5.60	5.55	5.30@5.55
Pea	3.55	3.50@3.55	3.50	3.40@3.50
Buckwheat	2.80	2.70@2.80	2.50@2.75	2.25@2.75
Rice	2.30	2.15@2.30	2.00@2.25	1.50@2.25
Barley	1.80	1.70@1.80	1.75	1.45@1.75

PHILADELPHIA

Anthracite trade still showing improvement. Restriction of operations has about ceased. Good fall business anticipated. Bituminous indicates slight improvement over last week.

Anthracite—Judging from reports from all sections of the country, the fall and winter demand will be heavy. Operations at the mines have practically been restored to an all week basis, and unless unforeseen circumstances occur, this will continue for the next four or five months at least. Everything points to a successful October, which is generally one of the banner months of the year, as far as actual consumption is concerned. Optimistic reports are coming from both the retailers and wholesalers, which is in vivid contrast to the pessimistic utterances of a month or six weeks past.

While there is still a tendency on the part of the individual operators to make substantial concessions on the slow sizes, taking the market as a whole, prices are well maintained. The exception is chestnut, figures anywhere from 40 to 50c. less than the established circular having been quoted in some instances. Pea coal is also off circular, but not to the same extent as chestnut. Broken, egg and stove seem to be readily absorbed, and stove, as usual, is short of the market requirements.

Tidewater business, which showed a slight falling off in the early weeks of September, is again picking up, and is felt to be the forerunner of heavy business in the near future. Prices rule about as follows:

	Circular	Individual
Broken	$4.75	$4.75
Egg	5.00	4.90 @ 5.00
Stove	5.00	5.10
Chestnut	5.25	4.80 @ 4.90

Bituminous—While the demand for bituminous coal shows a slight improvement, prices are unchanged. Tidewater business is more active than the line trade which is still inclined to be apathetic. Prices for good coals continue about $1.35 to $1.50, with the medium grades from 25 to 30c. less.

BALTIMORE

Slack takes another tumble and demand is generally poor for gas and steam coals. Export trade holds up well. The anthracite business shows strength on domestic account.

Slack during the past 10 days has been sliding, and sales at the West Virginia mines have been made as low as 40c. Run-of-mine coals were offering around 80c., and three-quarter around 90c. Pennsylvania line coals of lower grade were offering below the dollar mark in some cases, while the best grades were to be secured in limited lots at from $1.25 to $1.30.

The one feature that holds up well is the export trade. From two to three steamer loadings per day are being made, and the month's total should be a heavy one. Most of this coal is on old contracts, but there is enough new developing in Greece, Italy, Spain, Norway and the Argentine Republic to make it interesting.

Early in the week, a betterment was noted in the hard-coal trade. The domestic business is showing increased activity, and the movement for household use will be quite heavy within the next two weeks.

A distinct lack of coastwise charters Northward is noted. Several vessels were chartered for Tampa, Galveston and other points South. The Northern movement is almost entirely on long-term charters or in company-owned colliers.

HAMPTON ROADS

Dumpings for the week fair. Large cargoes both coastwise and foreign. Accumulation of coal slightly above normal. Prospects for September indicate a record month.

Dumpings at the various piers have shown up fair during the week but it is not believed that the total will compare favorably with the previous week's movement. Some large shipments, however, have been made, both coastwise and foreign, and in addition the government has also taken a fairly large quantity. Export shipments have gone to Genoa, Naples, Cagliari, Valparaiso, Para, Buenos Aires, Kingston, Port of Spain, Dakar and Piraeus.

Prices for New River and Pocahontas mine-run still continue around $2.85 to $3 but so far as can be ascertained little coal is moving at the latter figure.

In addition to New River and Pocahontas mine-run there have been a few cargoes of high volatile and nut and slack moving to the New England market. The accumulation of coal at the railway yards is perhaps slightly above normal with tonnage about due which will considerably reduce the supply on hand.

Both the Virginian Ry. and Chesapeake & Ohio are already well ahead of their dumpings for this month when compared with a corresponding period of August, and unless there is some delay to tonnage due between now and the first of October the total dumpings for the month of September should be well ahead of all previous figures for Hampton Roads.

COAL CHARTERS

The "Journal of Commerce" reports: The demand holds steady in several of the transatlantic trades, particularly for grain, petroleum, coal and deal carriers, and rates in all instances are firmly supported at the basis of last previous charters. The requirements of West India charters are apparently well covered for the time being, and there is but little inquiry from South American shippers. Tonnage offers moderately for prompt and forward shipment, with rates ruling about as last quoted. In the sailing vessel market a very limited business was concluded, and there was no improvement in the demand for tonnage in any of the several departments. Rates are low and favorable to charterers, and the supply of vessels is considerably in excess of charterers' requirements.

Coal charters have been reported as follows:

Vessel	Nationality	From	To	Tons	Rate
St. Gothard[2]	British	Baltimore	Port Limon	1790	
Glenartney[2]	British	Baltimore or Virginia	Buenos Ayres	3309	
Ranvik[2]	Norwegian	Baltimore	Buenos Ayres or Montevideo	3332	
Themis[2]	Norwegian	Norfolk	Greece	4184	
Confidenza	Italian	Baltimore	West Coast, Italy	2198	
Antares[2]	Norwegian	Baltimore	Havana	1104	
Lovisa	British	Baltimore	Jucaro, Cuba	880	
Alice M. Colburn[1]		Philadelphia	Ponce, P. R.	1335	$1.90
Claveresk[2]	British	Newport News	Havana	2441	
Alice May Davenport[1]		Baltimore	Porto Rico	952	
Childe Harold[1]		Philadelphia	Calais	675	
Pietro[2]	Italian	Baltimore	Naples, Savona or Leghorn	2429	
Thyra Menier[2]		Norfolk	Chandler, Que.	794	
Flora A. Kimball[1]		Philadelphia	Nassau	321	2.50
Edward H. Blake[1]		Port Reading	Camden, Me.	484	0.65

[1] Schooner [2] Steamer

LAKE MARKETS

PITTSBURGH

Slight increase in line trade and buying by retailers but decrease in Lake shipments. Total operations slightly reduced. Prices quite irregular and little new buying.

The local coal situation shows both favorable and unfavorable developments, net balance being unfavorable. The line trade has improved slightly, as compared with a fortnight or 30 days ago, with manufacturing consumers taking heavier shipments. As manufacturing activity has hardly increased it would appear that the change is due to stocks having been still in evidence up to a very few weeks ago. The retail demand has opened up, giving a fresh outlet for coal, and there have been fair shipments to retail dealers for two or three weeks past. The retailers, however, are not taking as much coal as they usually do at this date. The railroad demand is light, and has decreased somewhat.

The Lake trade gives the poorest account. There has been a decided decrease in Lake shipments since the closing days of August. It is true that August showed heavier Lake shipments than July, whereas last year August showed less movement than July, but this year the increase was not large, and the total of August shipments was less than in August a year ago. A rough estimate made by a well posted authority is that the total Lake shipments this year will be about 22,000,000 tons, against 28,000,000 tons last year, the banner year, thus showing a decrease of about 20%. Shipments have been impeded all season by congestion at the Upper Lake docks, the stocks accumulated there last season in anticipation of a prolonged suspension of mining this spring having been moved very slowly.

Mining operations in the Pittsburgh district do not average over 60% at the outside. Prices are irregular and are not closely quotable as there is no contracting and not a great deal of selling of free coal. In general mine-run is not much above a dollar a ton for prompt lots, slack being 50 or 60c. Circular prices for the season are: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50.

BUFFALO

Slack continues to depress the market. Railroads holding off are also adversely affecting the situation. Canada proposes a moratorium. Anthracite holding strong.

Bituminous—Some of the shippers are inclined to report a better market, but with slack so heavy it is difficult to see anything satisfactory in the trade as a whole. Estimates place the possible fall increase at 20% as compared with 30 or 35% normally. There is at least no present prospect of an advance in prices. The attitude of the railroads is adverse to any improvement. They will not buy a pound of coal where it can be avoided and they are crying poverty so persistently that everybody is affected.

The falling off in the slack trade is thought to be temporary, as there will soon be a big increase in the consumption. There is complaint from the anthracite shippers that the special demand for screenings has dropped off and coke taken up instead; if this is the case screenings will again be used for mixing with slack to make smokeless city fuel; this should make both more active soon. The proposed Canadian moratorium will be taken by all shippers as a confession of inability to pay debts and coal shippers will be still more cautious about selling that market.

The prices of bituminous are weak, but the circular has not been laid aside, some of the best Pittsburgh grades still commanding $2.80 for lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny sizes about 25c. lower. One reason for the slow sale of slack is that some consumers are finding a good grade of three-quarter that they consider cheaper.

Anthracite—Shippers with a good supply of anthracite regard themselves as fortunate as the demand has set in strong enough to cause premiums on stove. As a rule everybody is short of this grade. So much coal was sent in some other directions that only 82,500 tons were loaded for Lake shipment during the week. There is some difference of opinion to the needs of the upper Lake docks; some shippers believe that they have about enough there, while others are eager to fill up all available space made by current sales, which are reported good. There will be some caution about shipments to Canada, but as a rule shippers feel that they will be able to arrange for regular payment in spite of the unsettled conditions there.

COLUMBUS

Domestic grades continue heavy and will be a weather proposition from now on. Lake business the only active department. Steam coals slowest in years.

With a slackening in the demand for domestic sizes, due to higher temperatures, a slowing down in steam trade and an active Lake business, the coal trade in Ohio has been almost at a standstill during the past week. Notwithstanding these bad features the tone of the trade has been satisfactory and future prospects are not altogether bad.

The Domestic Trade is largely a weather proposition at this time as the stocking-up season is about over. As a result orders from now on will depend largely upon the temperature. Prices on the whole have been well maintained despite the unfavorable weather.

Lake Trade still retains its activity and a considerable tonnage is moving to the Northwest. Chartering is going on actively and there is a good supply of vessels. Docks in the Upper Lake ports are sending coal to interior points and are thus free from bad congestion.

The Steam Trade is the slowest in years. Manufacturing establishments are not requiring as much fuel as formerly and many have resorted to buying on the open market, rather than to enter into contracts. Railroad fuel business does not show any increase. Many of the larger railroad contracts are still open and the indications are good for a continuation of this condition.

Production in various Ohio fields during the past week has declined to a certain degree. Reports from Hocking Valley district show the output to have been about 75 to 80% normal. In the Pomeroy Bend field the output is about 90% and in other fields about 75%.

Prices in Ohio districts are:

	Hocking Valley	Pomeroy	Kanawha
Re-screened lump	$1.70	$1.75	
Inch and a quarter	1.60	1.60	$1.50
Three-quarter inch	1.45	1.45	1.45
Nut	1.15	1.50	1.15
Mine-run	1.15	1.15	1.15
Nut, pea and slack	0.30	0.35	0.30
Coarse slack	0.20	0.25	0.20

CLEVELAND

Market remains inactive. Current receipts small, but too large for immediate consumption. Orders in the Lake trade have been reduced by leading shippers.

While a few local factories are working only part time or not operating at all, there are some working night and day to supply increased trade due to the European war. The automobile plants, carbon works and clothing industries are very busy, but use comparatively small amounts of fuel. The blast furnaces and steel mills are doing more than they have for a month. Coarse coal is not moving. Nut and slack are readily placed, but pea and bug-dust are refused by the consignees.

Lake Shipping was ordered reduced by shippers who find they will be unable to handle the coal at the upper Lake docks. Large boats of the 10,000-ton class are accepting cargoes to ports where unloading is a matter of a week. Boats of 3000 and 4000 tons usually go to these ports, but the ship managers are so hard up they will carry anything. Freight rates have not been cut.

Prices for current shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.60				
Lump, 6 in.			$2.45		
Egg	3.60				
Egg, 6 in.			2.10		
Lump, 1¼ in.		2.40	2.20		
Lump, ¾ in.		2.30	2.10	2.00	2.05
Mine run	2.75	2.15	2.00	1.90	1.95
Slack	2.40	1.55@1.60	1.55	1.50@1.55	1.50

CINCINNATI

Bad market conditions have spread to the domestic trade. Prices are weakening badly, and while there are some signs of betterment, immediate improvement is improbable.

The poor demand which has been noted in the steam market is now in evidence among domestic consumers and dealers as well. The industrial situation remains poor. Prices have shown signs of a collapse on both sides of the market, concessions being freely offered all around. Nut and slack have been practically given away, in many instances, for several weeks, but heretofore the domestic grades have held firm. That they have now given way to some extent is good evidence of the pressure on the trade. Indications are not lacking, however, that the industrial situation will improve within a few weeks, and that a like improvement may be looked for in the coal industry.

COKE

CONNELLSVILLE

Coke market absolutely stagnant, with consumption decreasing and no occasion for any new purchases, so that prices are practically nominal.

The Connellsville coke market is absolutely stagnant. Consumption is decreasing rather steadily and furnaces in operation are well covered by contracts, on which shipments tend to be excessive rather than otherwise, so that there is no contracting and no demand for prompt furnace coke. The foundries are mining somewhat lighter and foundry coke is also stagnant. Prices are practically nominal, former quotations having been: Prompt furnace, $1.65@1.70; contract furnace, $1.75@1.90; prompt foundry, $2.25@2.35; contract foundry, $2.35@2.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Sept. 12 at 250,955 tons, a decrease of 16,915 tons, and shipments at 255,865 tons, a decrease of 14,445 tons.

BUFFALO

It is still considered odd that the iron ore receipts by Lake are so large while the ore trade continues lifeless. It appears from these apparently conflicting reports that ore is going into consumption, while at the same time the consumer is in control of the price of coke. Quotations remain as before, on the basis of $4.25 for best 72-hour Connellsville foundry and $3.30 for stock coke.

BIRMINGHAM

There is no change in the coke market this week, the production being far in excess of the requirements, though prices remain about the same.

SOUTHERN

BIRMINGHAM

No large shipments being made but some tonnage is being exported. Lump coal rather quiet. Furnaces report heavy sales of pig iron.

The demand for steam coal is unchanged though many of the operators state that business has been better. While none of the large tonnages wanted for South American trade have been moved, several shipments of smaller size have been made. One steamer left this week for South America with 2900 tons of coal, and it is understood that another cargo of 7000 tons will leave either Pensacola or Mobile this week. Details regarding charters and finances for the larger export business have not yet been definitely settled.

Lump coal is just about the same as last week, with the production a little larger than the requirements. Blacksmith coal is in a satisfactory condition. Pig iron manufacturers report heavy sales and shipments of iron far exceed the production.

LOUISVILLE

Domestic sizes in good demand but the market is still glutted with the steam grades. Prices unchanged.

The demand for domestic coals is heavy but the retail dealers report they are not doing the business they would like to. Crops are much better than expected and the interior sections will take larger quantities of domestic coals than was anticipated.

The market is glutted with steam sizes, however, and there are large quantities on demurrage, with little in the way of immediate prospects for improvement in the demand. Labor is plentiful and there are some operations running on full time, with markets for all the coal they can produce.

Prices are virtually unchanged except as to the steam sizes, on which cuts are readily made.

MIDDLE WESTERN

INDIANAPOLIS

Larger movement of freight creates a stronger demand from the railroads. Both steam and domestic consumers doing some stocking. Mines working fuller.

The weather is not favorable to an increased coal trade, yet the retail yards of the state have been ordering the domestic grades freely, apparently in anticipation of the colder weather ahead. There has also been some accumulation by industrial plants for a like reason. Probably the most important feature in the trade now is the improvement in the demand from railroads. This is supposed to be due to the better ocean shipping which has started a larger movement of flour, grain and other commodities to the Atlantic and Gulf ports. Mines are running fuller and a good percentage of the larger operations are on full time. The screenings situation has not improved and low prices prevail in the open market; on this account prices on other grades are held stiffly. Retail prices are unchanged and the movement from the yards is about normal for the season. There are indications of improvement in the industrial situation.

ST. LOUIS

Advance in high-grade domestic coals has developed to spectacular proportions, but the steam coals have suffered a similar decline. Screenings can be obtained for the cost of the freight.

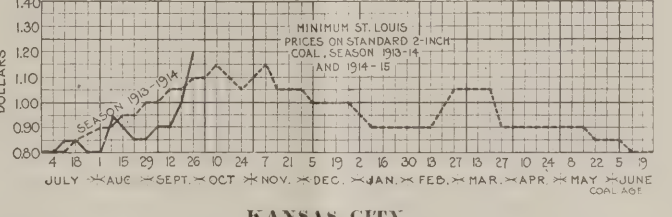
As has been predicted, the high-grade domestic market has experienced a spectacular advance, and the steam trade has gone to pieces. In the Standard field screenings are being given away for the freight, and there is no demand for lump at the price that the operator must have. Failure to move the smaller sizes in the high-grade field has brought about such a congestion at many of the mines that the railroads will not allow them to work until the surplus coal has been sold. This has reduced the working time from five and six days a week down to two days, and the lump and egg produced is not sufficient to care for the contracts alone, in addition to which there is much in the open market already sold. The result is that some mines are still behind on their August shipments of lump and egg, and it is almost impossible to buy these grades for prompt shipment on the open market.

The washed market is good, as far as sizes Nos. 1 and 2 are concerned, but the other grades are dragging. Screenings are down to 20 and 25c. In a general way conditions in the steam market will not improv until colder weather sets in, with a demand for the smaller sizes. There is no hope at all, to bring about a change as far as manufacturing interests are concerned.

In the Standard field the situation is absolutely hopeless. One or two operators in the Williamson County field are already storing their steam sizes close by.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump		....	$1.30	$1.20@1.30	$1.25
3-in. lump		....	1.40	....	....
6-in. lump	$1.75@2.00	....	1.50	1.35@1.50	1.50
Lump and egg	1.85@2.15	$2.25	....	....	1.15
No. 1 nut	1.40@1.60	....	....	0.75@0.80	....
Screenings	0.70@0.75	....	0.80@0.85	0.05	0.10@0.15
Mine-run	1.05@1.10	....	....	0.75@0.80	....
No. 1 washed nut	1.50@1.65	2.25	1.50	....	....
No. 2 washed nut	1.25@1.35	....	1.35	....	....
No. 3 washed nut	1.05@1.10	....	....	....	....
No. 4 washed nut	0.50@0.60	....	....	....	....
No. 5 washed nut	1.10@1.15	....	....	....	....



KANSAS CITY

Trade very quiet, the volume falling considerably below normal. Prices are mostly unchanged.

Retail coal trade in Kansas City showed a decided falling off last week. Reasons ascribed are the warm weather which revives recollections of the warm fall last year, and the continued uncertainty as to whether prices will rise materially. Severe storms hampered shipments, but the situation was relieved by the comparatively light demand. Some of the block coal producers have delayed longer than usual in beginning fall operations, and even at that are said to be ahead of the demand. Prices on block coal have advanced 10c. at the mines, but locally are unchanged.

The market is quotable as follows:

	Wholesale	Retail
Block coal	$2.50	$3.75 @ 4
Nut	2.70	3.75
Mill	2.30	3.25
Slack	2.05	3
Semi-anthracite slack		3.75
Semi-anthracite	5.00	6.00

PORTLAND, ORE.

High wood prices expected to increase the demand for coal. Car shortage developing. No coal expected by way of the Panama.

The outlook for this winter is brighter than for some time, that is providing coal will be obtainable without serious delays in transportation. Slab wood is higher than usual this year which is causing an advance to a price where coal will be found cheaper. Many are now placing orders for coal.

Grain is now moving steadily from the interior to the wharves here and on Puget Sound and as a result the railroads are not able to furnish cars promptly.

It is hoped here by the trade that prices will not advance as reasonable coal prices would give them opportunity to introduce coal and gain steady customers who heretofore have favored wood fuel.

PRODUCTION AND TRANSPORTATION STATISTICS

SAULT STE. MARIE CANALS

Coal shipments through the Sault Ste. Marie Canals for July and August were as follows:

	July			August		
	Canal			Canal		
	U. S.	Cana.	Total	U. S.	Cana.	Total
Anthracite	375,127	56,066	431,193	238,952	54,107	293,059
Bituminous	1,580,950	287,200	1,868,150	1,808,341	275,440	2,083,781

PENNSYLVANIA R.R.

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for August and eight months of 1913 and 1914, in short tons:

	August		Eight Months	
	1914	1913	1914	1913
Anthracite	805,585	713,451	7,153,407	6,851,626
Bituminous	4,299,810	4,562,339	31,821,349	33,396,286
Coke	792,656	1,161,484	6,867,676	9,731,462
Total	5,898,051	6,437,274	45,842,432	49,979,374

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during August and the past four months of the current year in short tons:

	May	June	July	August
Pocahontas Field	1,239,653	1,245,440	1,314,478	1,277,621
Tug River District	263,155	244,342	263,240	293,179
Thacker District	280,148	261,248	288,643	286,572
Kenova District	101,768	97,352	100,600	105,724
Clinch Valley District	150,916	156,028	140,751	134,408
OTher N. & W., Territory	2,596	2,337	2,735	4,211
Total N. & W. Fields	2,038,236	2,006,747	2,110,447	2,101,715
Williamson & Pond Creek R.R.	74,875	76,822	90,819	91,813
All other railroads	225,561	232,387	301,796	257,280
Grand total	2,338,672	2,315,956	2,503,062	2,450,808

Distributions of shipments for July and August compare as follows:

	July			August		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas	1,212,483	16,138	1,228,621	1,208,245	14,573	1,222,818
Tug River	260,141	3,099	263,240	289,223	3,956	293,179
Thacker	235,410	7,633	243,043	232,234	9,377	241,611
Kenova	89,953	10,647	100,600	94,494	11,230	105,724
Total	1,797,987	37,517	1,835,504	1,824,196	39,136	1,863,332

Shipments of coke, entirely from the Pocahontas field, amounted to 58,266 tons in August as compared with 62,097 in July.

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for July, 1913 and 14, in short tons:

	July			
Destination	1914	%	1913	%
Tidewater	262,060	15	238,638	17
East	186,613	10	191,791	14
West	1,218,181	68	866,872	62
Total	1,666,854		1,297,301	
From Connections				
Bituminous	133,497	7	93,402	7
Anthracite	878		1,571	
Total	1,801,229	100	1,392,274	100
Coke	25,033		29,945	

FOREIGN MARKETS

GREAT BRITAIN

Market feeling the effects of the curtailed output. Consumption and exports are heavily reduced.

Supplies are coming forward with greater regularity, and the traders are better able to deliver the arrears of coal on order. The low-priced offers to the Government have had a considerable influence upon public orders, and little new trade has been entered into lately.

The market is seriously affected by the restricted output, especially with the house coal collieries, for in many cases working is down to four days per week, and some less than that. Fortunately, however, the weather continues unusually warm, and the actual coal consumption is at its lowest minimum rate. The reports from the collieries all point to a distinct curtailment of labor during the coming winter, arising from the enrollment of so many men willing to serve in the war, and this enlisting is still going on, so that the short-handed feature of colliery labor is likely to become more acute as winter advances.

There are some, however, who prophesy that the export trade is so terribly crippled and is felt more keenly in the North, that there must shortly be a large number of the Durham collieries close down, whilst Yorkshire and Lancashire collieries will endeavor to find home markets for their output, even at reduced prices; and men from these districts are not unlikely to remove into the Midlands, where work is not so much affected by the cessation of the export trade.

Many of the factories along the Thames side—especially those who are dependent upon the import trade for the raw material—have either closed down, or are working very short time. But in other cases, where local industries have been required either for war material or to do with fitting up the various transports, the factories are working at high pressure.

The shipping danger has seriously crippled the oversea trade. Local consumers are taking contract supplies, but producers report a somewhat heavy stock on hand. The same may be said of the North Country coal trade. The demand is good, and especially for the Mediterranean coaling ports, but the difficulty of getting the cargoes safely away is causing a number of steamers to lay up. Freights are nominal, and contract boats and neutral tonnages are easily obtainable at very low rates. Strangely enough, the Humber ports return a very satisfactory tonnage. The market, however, is very quiet, largely on account of the uncertain condition of affairs in the North Sea. The South Wales coal is still largely held by government, and only a comparatively small quantity is available for ordinary sale on the open market.—"The Colliery Guardian."

British exports for August and the first eight months of the past three years were as follows:

	August			Eight Months		
To	1912	1913	1914	1912	1913	1914
Russia	674,546	769,794	169,353	2,515,825	3,794,188	3,049,527
Sweden	510,549	379,475	198,347	2,363,262	2,880,837	2,421,789
Norway	208,641	154,887	253,467	1,361,256	1,513,688	1,673,336
Denmark	282,101	248,746	243,019	1,687,562	1,937,492	1,861,470
Germany	866,437	798,177	132,026	5,213,106	5,950,248	5,256,765
Netherlands	183,044	168,862	165,296	1,182,927	1,389,990	1,181,071
Belgium	130,629	148,132	31,727	928,704	1,382,186	1,039,985
France	862,099	946,378	562,783	6,269,568	8,526,921	8,471,077
Portugal[1]	108,438	95,924	77,729	769,282	929,284	836,009
Spain and Canaries	264,492	259,847	172,578	2,132,394	2,474,504	2,231,177
Italy	850,129	665,618	444,779	5,693,589	6,339,031	5,859,577
Austria-Hungary	83,855	64,286	17,602	485,948	742,646	564,362
Greece	81,612	36,080	29,353	410,776	431,160	470,484
Roumania	19,271	23,283	14,437	114,075	119,414	218,218
Turkey	45,155	24,787	41,456	262,544	133,453	417,437
Egypt[2]	363,314	196,796	161,645	1,890,731	2,000,998	2,060,711
Algeria	88,723	116,754	28,647	615,961	885,736	740,894
Portuguese West Africa	17,187	13,390	15,013	201,136	171,458	115,462
Chile	38,863	21,039	17,720	447,605	430,437	352,351
Brazil	145,284	111,504	48,983	985,318	1,286,853	907,090
Uruguay	91,892	72,006	39,103	516,842	502,500	461,656
Argentine Republic	312,387	290,741	98,344	1,965,859	2,458,161	2,209,706
Channel Is	21,235	16,004	11,354	114,950	107,324	107,308
Gibraltar	18,604	29,161	15,544	218,092	239,851	214,759
Malta	35,832	39,292	19,418	231,846	470,112	297,392
Aden and Dependencies	30,491	17,684	.....	138,371	104,748	96,725
British India	9,614	10,057	1,646	82,666	117,005	118,039
Ceylon	12,795	7,037	5,232	152,292	148,757	205,068
Other countries	100,456	93,421	54,141	720,356	851,626	817,716
Coke	108,948	113,423	68,498	583,034	712,698	694,061
Total	6,729,653	6,072,863	3,209,399	41,246,156	50,396,630	46,276,159
Bunker	1,850,346	1,749,847	1,147,437	11,608,744	13,720,560	13,249,027

[1] Includes Azores and Maderia. [2] Including Anglo-Egyptian Sudan.

COAL AGE

Vol. 6 NEW YORK, OCTOBER 3, 1914 No. 14

Good Fellows

Written expressly for Coal Age by
BERTON BRALEY

THE barkeeps seem a pleasant lot, they greets yuh with a smile,
They sets the drinks before yuh in a most allurin' style,
And while yer money's plenty they will treat yuh like a king,
But when ye're flat an' busted—why, that's quite a diff'runt thing!



It's "Thank you, sir" an' "How de do?" an' "Won't yuh have a drink?"
An' "Here's to Mr. Miner" when yu've got a lot of chink,
It's "Welcome to our city!" when you've got a tidy sum,
But when the roll is squandered, it is, "T'row him out, th' bum!"

IT'S jolly when yu've finished with yer labor underground
To linger in the barroom where th' bunch is hangin' round,
Where the barkeep hollers, "Howdy" when yuh toss across a bill,
But it's quite another story when yer roll is in the till!

It's "Thank you sir!" an' "How's the boy?" an' "Mister" this an' that,
An' "Welcome to our city!" when th' roll is good an' fat,



It's "Welcome to our city!" when yu've got th' cash to pay,
But it's "Take yer shoes an' beat it!" when you've blowed the cash away!

SO you kin run with barkeeps just as often as yuh please,
But I will keep my distance from such tricky "friends" as these,
They're cordial an' they're merry when there's money in yer poke,
But they go an' call th' bouncer when ye're down an' out an' broke!

It's "Mister" this, an' "Mister" that, an' "Here's to YOU, Old Scout!"
But it's "Git, yuh dirty hobo!" when ye're broke an' down an' out;
It's "Welcome to our city!" when ye're quite amonied gent,
But it's "Bounce th' lazy loafer!" when yer little roll is spent!



A Sudden Squeeze in an Oklahoma Mine

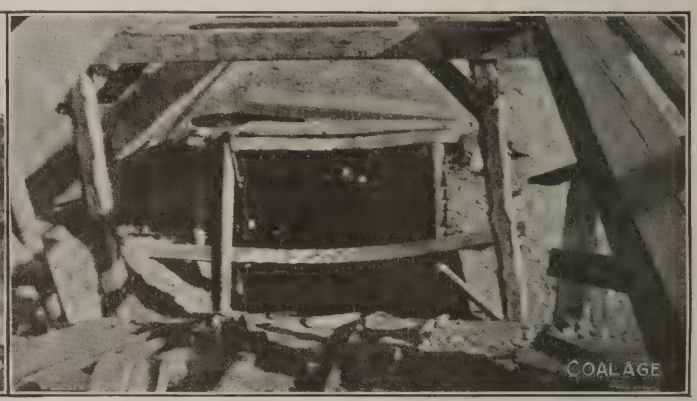
By Geo. M. Brown*

SYNOPSIS—A squeeze suddenly entirely closed an Oklahoma mine which was about to be abandoned, burying 13 men beyond all hope of recovery. An attempt to reach the workings through a neighboring mine completely failed and the bodies of the men will probably never be recovered.

On Friday afternoon, Sept. 4, 1914, an unusual, unforeseen and fatal squeeze took place in Mine No. 1 of the Union Coal Co., at Adamson, Okla., resulting in the death of 13 coal miners and the complete loss of the mine and underground equipment The men are probably buried under 700 ft. of earth and all hope of their rescue has been abandoned.



Mine No. 1 of Union Coal Co. at Adamson, Okla.



Mouth of Mine, Showing Dead-Line Marks

The mine had been driven down ten lifts and as the remaining coal could be gotten from Mines 4 and 2 on the west and east, respectively, it was to have been abandoned this fall. It was worked on the room-and-pillar double-entry system, chute rooms being driven up the pitch, the dip being about thirty degrees. The slope was driven down the dip and the entries on the strike.

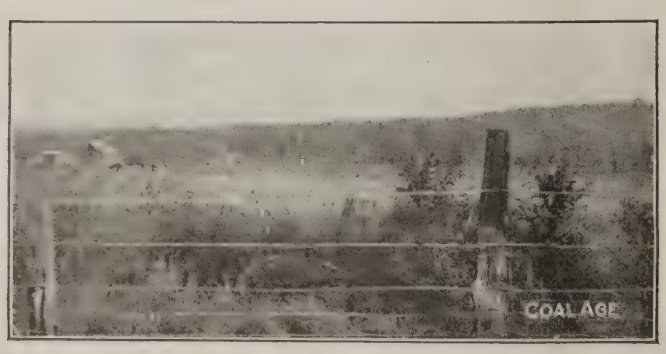
Owing to lack of coal the miners usually cleaned up early and went home. On that account, man-trips were run at noon, at two o'clock and at any time after three o'clock for individual miners. On this day, however, the men worked later than usual and the first man-trip was pulled at 3:53 p.m. These men noticed nothing unusual. The second trip went down to the eighth lift, the first having been to the upper lifts. The men started the mules ahead of the trip as is usually done in Oklahoma and the trip started slowly up the slope. These men noticed the caving down at the slope face but evidently thought of nothing serious. That trip got up at 4:20 p.m. The rope rider refused to go back with the trip, sending it back, however, unaccompanied. It stopped at the sixth lift, and, as the engineer could not move it, the caves had evidently reached that point.

Two Men Race with the Squeeze Successfully

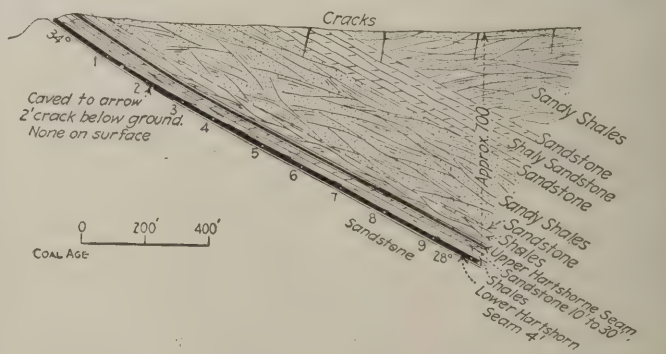
The escape of two of the men was indeed thrilling. The shot firer had gone down and was at No. 3 room on the eighth east entry. He heard the squeezing and ran for the slope, being joined there by a miner. This miner had been at the ninth lift and hearing the caving shouted to the men below to come on out. One man called "Candy Kid" shouted back, "You've got rabbit in you. We're going to wait for the trip. We won't climb out." The trip never came. The shot firer and miner climbed out and as they looked back could see the lights down below but the men had waited too long. At times the caves almost caught the two exhausted men but they finally won out.

Superintendent Mackinnon arrived at 4:30 p.m. and the exits out of the mine being blocked he set men to cut-

*Mining engineer, Osage Coal & Mining Co., McAlester, Okla.



The Lay of the Land North from No. 1 Mine



Cross-Section through Seam at No. 1 Mine

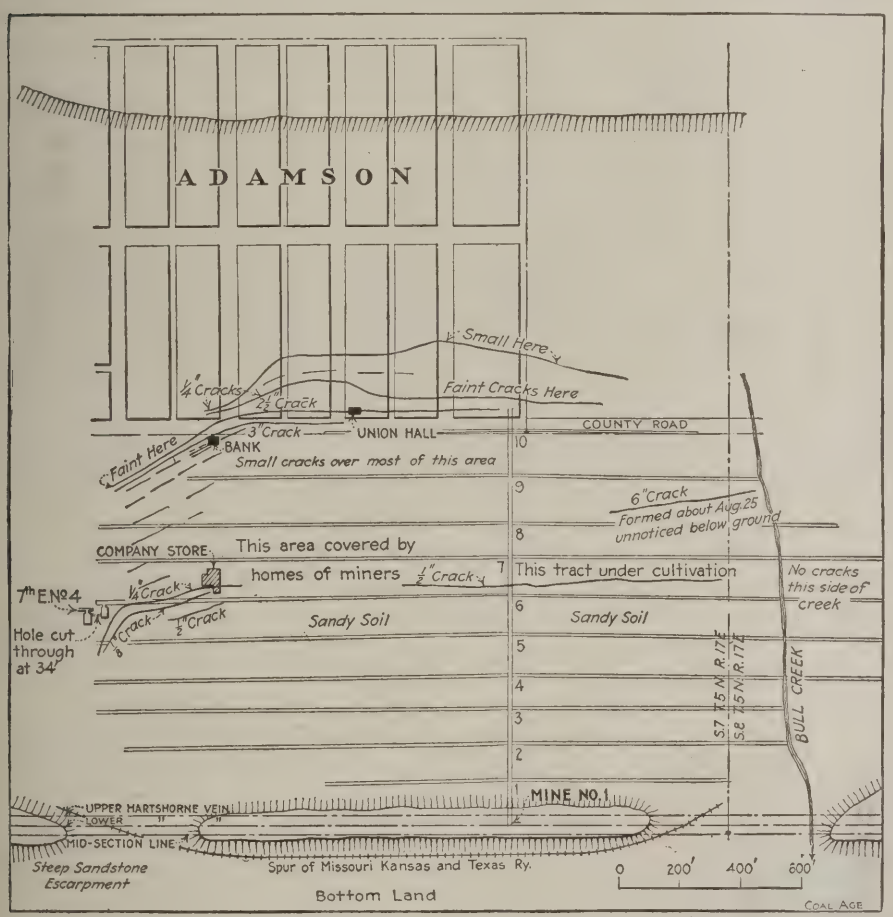
ting a hole through a pillar between mines Nos. 1 and 4. The maps showed 34 ft. of coal and were correct to the foot. The hole was cut through the next afternoon (Saturday). The last cutting brought through so much gas that helmets had to be used. These were brought from McAlester by a rescue party composed of J. J. Rutledge, J. R. Fleming, J. W. Koster and W. T. Burgess, all of the Bureau of Mines. The miners were willing volunteers and everything possible was done. W. E. Beaty, president of the company, was on hand and no expense was spared in pushing the work. The hole was finally widened out and entrance effected on Saturday night.

Rescue Unavailing and Is Abandoned

The rescue party got inside No. 1 mine only 25 ft. and were stopped by a solid wall of slate. The finding of large surface cracks led to the belief that rescue was hopeless and after further investigations by the chief mine inspector, Ed. Boyle, and District Inspector, Martin Clark, it was decided to abandon all hope as the gases released from an upper seam were such as to quickly suffocate the imprisoned men. It is the general belief that the men never got off the slope. The sudden squeezing of the strata would jam the mine doors on the partings so that it would be impossible to open them and the men would be trapped. Evidently there would be no retreating to the face of the slope as the first caves were reported there. The fans and air compressors were run continuously but as the air pipes in No. 1 were hung on timbers they were probably broken by the falling slate.

The condition of the mine was probably as good as the average mine in Oklahoma. The slope was safely timbered from top to bottom. The rooms were turned on 33-ft. centers with a room pillar of from 9 to 12 ft. The top is of sandy shale, 18 to 28 ft. thick, and is considered good. Above this is a stratum of hard sandstone and a little fireclay. Then comes the upper Hartshorne bed 47 ft. above the lower seam, the latter being worked by No. 1. Above the upper seam we find alternate layers of sandstone, sandy and ordinary dark shales.

The surface conditions are as follows: The Hartshorne seams as a rule outcrop along the top of a hill. At Adamson these outcrops lie east and west. The sandstone stratum below the lower Hartshorne bed at the Adamson mines forms a steep escarpment south of which lies low bottom land overflowed by Gaines Creek. North of the crop line the soil is sandy and lies probably twenty feet lower than the outcrops. This area is all more or less covered by timber. About one-half mile north of the mines there is another range of hills about one hundred feet high, composed mostly of sandstone lying below the McAlester seam.



Plan of Mine and Town of Adamson, Showing How Surface Cracks Are Exhibited in Vicinity of Caving



A Large Crack in Front of Union Hall, Adamson, Okla.

The Suddenness of the Collapse

We are accustomed to squeezes in Oklahoma, but generally they act slowly and give plenty of warning. This one, however, was so sudden that it gave scarcely any intimation, and mining men here are puzzled to account for it. It is possible that a fault in the face of the slope extended to the surface and formed a plane of cleavage as it were in the strata. This would throw the whole weight of the overburden on the pillars since there would

be no tendency of the strata to overhang the solid coal. The heavy layer of sandstone would not bend and would naturally prove troublesome. The existence of such a fault on the surface would be hard to find on account of the deep surface soil and sand.

However the accident seems to have been caused by some unusual condition in the overlying strata which mining men here cannot account for. A discussion of similar accidents no doubt will throw light on this unusual occurrence.

From W. E. Beaty, the president and B. E. Clark, the engineer, I received the mine maps and other data which were freely given without hesitation to all who sought for information, and I desire here to express my indebtedness to them for this assistance, without which this article could not have been compiled.

Fighting a Gob Fire by Surface Drilling

By D. H. Somerville and Tracy Garrett*

SYNOPSIS—Peculiar rock formations rendered fighting a gob fire from the mine of little avail. A hole was accordingly drilled from the surface through which water, sand and adobe mud are being poured. All indications point to the success of this method of attack.

At the Weaver mine of the Victor-American Fuel Co., in McKinley County, New Mexico, an effort is being made to quench an old gob fire by means of surface drilling. After years of endeavor, underground, to seal off the affected area and put an end to fire trouble, with no decisive result, it was decided to try a new method, one conceived by W. J. Murray, vice-president and general manager of the company, as early as January, 1911, but which was not attempted until March of this year.

A drill hole was put down from the surface to the fire zone, 291 ft. below, and through this hole tons of water, adobe mud and sand are being dumped. The work is not yet completed but, thus far the results have all been favorable to the new method and the indications are that the outcome will be a complete victory over the old enemy of the mine.

That there may be a thorough understanding of the conditions existing, the difficulties encountered and the work done, a brief description of the fields and coal may be of interest.



General View of Dredging Machinery at Bore-Hole

The mines in this field are working two different series of lignitic, noncoking coals, known as the upper and lower measures. Both are in the Laramie Cretaceous beds. The two measures are separated by from 500 to 800 ft. There are in the upper group five distinct veins, known as Nos. 1, 2, 3, 3½ and 5, but at no one point in the field are all of these veins workable.

At the Weaver mine, when it was opened, three of these veins were workable, but on going back into the field, but two of them can be operated, namely Nos. 3 and 5. Toward the outcrop, however, Nos. 3 and 3½ were worked extensively. The distance between the Nos. 5 and 3½ runs about 26 ft., while that between Nos. 3½ and 3 runs only about 6 ft.

The strata between these two veins are so thin that it has always been difficult to work out both measures successfully. If the upper of the two, the No. 3, was worked first, the lower measure would heave the bottom and, if the lower of the two, the No. 3½ vein, was worked first, the upper would cave the roof so that, in some cases, it was apparently necessary to leave much coal in the gobs.

The coal thus left in the gobs fired spontaneously, and this was the condition when the Victor-American Fuel Co., the present operator of the mine, took over the property from the former owners several years ago.

To Seal the Fire Off Was Difficult

As there is very little cover over the coal near the outcroppings and consequently many surface breaks, through which air could travel to support combustion, there has been no end of trouble, at different times, in endeavoring to seal off the burning area.

The roof over the No. 5 vein, in fact, the whole strata between it and the No. 3½ vein, is a mixture of sandy shale and fireclay. This increased the difficulties under which those engaged in the work of sealing off the fire were forced to labor. In some cases breaks in the roof of the No. 5 vein would extend through to the No. 3½ and No. 3 veins, which are now old workings.

At one point in the workings of the No. 5 vein, the fire traveled through these crevices and reached down into the lower measure. This happened in a crosscut between a pair of entries. A considerable part of the roof had fallen in this crosscut, almost to the upper vein where the fire was, before it was noticed.

Concrete walls were then built alongside of these entries and these were connected by similar walls built through the chain pillar at both the upper and lower ends of the side walls. The main entry was then arched and thus the fire in the No. 5 vein was confined to a comparatively small area. Considerable difficulty was, however, experienced in doing this and in shutting off the air,

*Victor-American Fuel Co., Gibson, N. M.

as the concrete would crack with the heat, making continual work, watching and expense.

It was then decided to attack the fire by surface drilling and arrangements were immediately made to sink a hole to a point directly over the caved area in the fire zone.

The point on the surface thus selected for operations was not readily accessible for heavy drilling machinery and a light, churn well drill was selected for the work, the power being a gasoline engine, the only rigging being a gin pole instead of a derrick. The drill was equipped with a wire cable instead of the hemp rope usually used on apparatus of this character on account of the heat to be encountered.

Drilling began on Mar. 6, and a 6-in. hole was put down. At 250 ft. the heat became decidedly noticeable and gave warning that the fire was not far below the bit of the drill. From this point on, steam and gases arose and, though a 1-in. stream of water from a pipe line that



Introducing a Charge of Adobe Mud into the Pipe

had been laid from the camp tanks, was continuously discharged into the hole, the bit, when pulled, was invariably too hot to handle without gloves.

A telephone line, connecting with the mine telephone system, was strung to the drill and the men on the surface kept constantly in touch with those on the inside. There was much speculation as to just what would happen when the drill went through onto the fire and when the first water and mud were poured into the hole. For this reason, it was thought best, in the interest of safety to keep all men, except those actually engaged in the work in the troubled area, out of the mine until it was definitely determined that there was no danger of an explosion of steam or a sudden spreading of smoke or gases. This was done, although, as it fortunately turned out, the precaution was unecessary.

The Drill Hole Was Cased

The 6-in. hole was cased with a 4½-in. casing, which was extended down to the cave. Into this casing a smaller pipe was inserted with packing around same and a valve at the top. A barrel, to act as a funnel, was placed on top of this latter pipe, a short nipple connecting the barrel with the valve. A larger pipe line was laid from the water tanks and a mixing box placed in such a position as to empty into the barrel by means of a suitable trough.

To prevent the air from reaching the fire by way of the hole, the plan followed was to make a mixture of sand, adobe and water in the mixing box, run this into the barrel until the latter was filled, keeping the valve closed, then, opening the valve, allow about three-fourths of the contents of the barrel to run through the hole, the mixture remaining in the barrel, shutting off the air until the valve could be closed again.

A large quantity of sand was used at first, but it was found that the sand did not mix and flow readily with the water and that adobe, when mixed very thin, flowed much better. Consequently a thin mixture of adobe and water has been emptied into the hole night and day for nearly two months, to the present writing, at the rate of about 12 tons of adobe in 24 hours.

Occasionally, the barrel would be filled with water only, several times in succession, and this allowed to run into the hole to wash away the adobe that would collect and cake at the bottom, owing to the great heat. Several times, also, it was found necessary to again drop in the drill to clear out the hole.

As the lower part filled up, the casing and pipe were raised until they reached the No. 3 vein. While a quantity of water comes through the roof and runs into the mine, the amount thus entering is not alarming, in fact not as much water is coming through as was expected and, though a careful watch is maintained both day and night underground, thus far there have been no ill-effects in the mine from the hundreds of tons of mud and water that have been poured down the drill hole.

Of course, at this time, it cannot be definitely determined whether or not this method of fighting the fire will be entirely successful, but, as the temperature in the troubled territory has been practically cut in half, there is every reason to believe that the final result will be all that can be hoped for.

In the accompanying illustrations, the nearer view shows the barrel used as a funnel and attached to the valve which, in turn, is attached to the pipe within the casing. The mixture of water and adobe is being poured into the barrel from the mixing box and the man at the valve is just opening it to allow the mixture to run into the hole. The other illustration gives a general view of the drilling machinery and engine.

Coal for Sicily

In the *Daily Consular and Trade Reports,* under date of Sept. 24, American Consul Samuel H. Shank, located at Palermo, Italy, in commenting on the Sicilian fuel needs says in part:

In the past, England has supplied almost all the coal for Sicily. In 1913, the total imports at Palermo amounted to 211,680 tons, of which 206,470 came from England. The United States supplied only 5210 tons.

Present indications, however, would seem to be favorable for American exporters to get a start here, which should eventually give them a share of the business. It is difficult to get consumers to change from one coal to another, but should the war continue, it may not be possible to get a sufficient supply from England.

Cardiff and New Castle coals are used more than any other. Some anthracite is shipped from Swansea. The greatest amount of coal is used for steaming purposes and for manufacturing gas. Very little coal is used by private individuals, as most of the cooking and heating is done by gas or charcoal.

The usual price of Cardiff coal has been $6.80 per ton, c.i.f. Palermo, and for New Castle $5.60. The freight from England has in the past been $2 a ton, and there is no duty.

Many inquiries have been made at this consulate, and one concern has cabled to the United States for prices. Persons interested in the matter should send analyses of their coal, and quote prices if possible c.i.f. Palermo. Proposals may be directed to this consulate, in which case they will be put into the hands of the parties interested.

Coal-Cutting Machines in the Anthracite Region

By M. S. Beddow*

SYNOPSIS—The chain undercutters used with success in bituminous coals had to be redesigned when subjected to the heavier stresses incident to operation in anthracite. These machines are, however, doing much to render profitable the working of thin coal measures.

Four or five years ago, had a person mentioned coal-cutting machines in connection with anthracite mining, he would have been laughed to scorn. These have, however, been given a fair trial and except for a few minor details have not been found wanting. Mechanical cutting of anthracite has ceased to be an experiment, as operators throughout the entire field have come to believe that it is the only successful way in which to mine the thinner, and hitherto unprofitable coal beds.

Nor is the use of mechanical cutting confined to coal measures of only 28 or 30 in. thickness, although it is quite true that it is here that the chief benefits are derived, due to the large amount of rock which formerly had to be removed as compared to the tonnage of coal secured.

After proving conclusively that chamber, or short-wall, mechanical cutting was perfectly possible, further experiments were conducted along the line of long-wall mining. Here also success was secured. Under the old method of mining some of the smaller coal beds, it was found necessary to remove four or five feet of rock in order to secure about half that thickness of coal. At the present time, however, this rock save in the gangways and airways is allowed to remain.

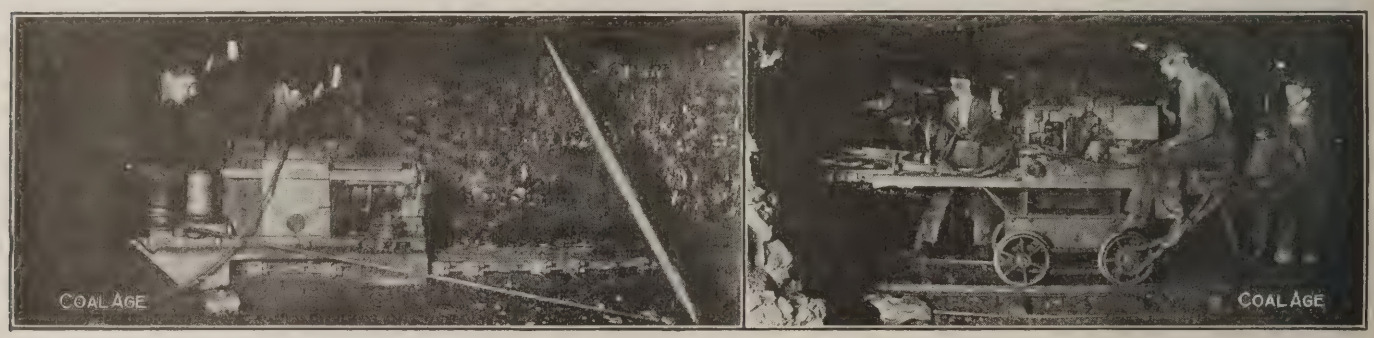
During the experimental stage when each coal-cutting machine manufacturer was anxious to "make good," it was discovered that if mechanical cutting was to prove a success, a number of changes would have to be made in the machine design. In other words, the coal cutters as they were turned out for use in soft-coal measures would not answer for use in the anthracite field.

In the first place, the chisel-pointed bit, which is exactly what its name implies, was found to take too great a bite in the coal, and was therefore liable to place an excessive load on the motor. The pick-pointed bit was then adopted, and is now doing effective work almost universally. Furthermore, the cuttings or "bug dust" made by a chain using this latter type of bit is not nearly as fine, as when chisel-pointed bits are employed and consequently contains a larger percentage of salable sizes.

This fact is apparently insignificant, but the smaller the coal which is produced at the working face, the less chance there is of its reaching the breaker where it is prepared for market, since, the small stuff, is lost through the crevices in the cars on its journey to the foot of the shaft. A large percentage of this dust, however, which does reach the breaker is made into buckwheat and smaller sizes, the profit from which is, to the producer, negligible.

The Cutter Bar Was Weak

The next difficulty encountered was with the cutter bar around which the chain carrying the bits above referred to revolves. In particularly hard measures, the bar as constructed for soft coals has been known to bend badly. This part of the machine was accordingly enlarged and its quality improved. Other alterations, such as stronger cutting chains, bits harder tempered, heavier gearing etc., were made before the mechanical end of the machine was satisfactory.



A Morgan-Gardner Mining Machine Making a Sumping Cut and Entering a Chamber under Its Own Power

It will be at once perceived that the above reinforcement would necessarily compel a corresponding change in the electric drive. A marked increase was shortly noticed in armature, field, controller and resistance troubles, but the remedy was not as simple and easy as in the former case, since it required more time and thought to alter a whole motor equipment and its accessories, than to strengthen a partially weak mechanical equipment.

The electric drive, had, like the cutter bar and chain, been originally constructed for operation in soft-coal measures, consequently, when it encountered the harder anthracite, the current taken by the motor increased in direct ratio with the increased difficulty in cutting. When it is considered that the heat generated in the armature and field winding increases with the square of the current, one is enabled to understand how much extra heat had to be dissipated, even supposing that anthracite cutting is only twice as hard as bituminous. An increase in motor rating from 30 to 50 hp. shows how the difficulty of cutting increased in passing from the soft- to the hard-coal regions.

*Scranton, Penn.

Two Methods of Cutting Employed

There are two methods of cutting in use in the anthracite field. These are the chamber, or short-wall, and the long-wall. In the former, the machine enters the working place, passing from the truck to the extreme right-hand rib. It then sumps the full depth of the cutter bar, the length of which ranges from 5 ft. 3 in. to 6 ft. When the sumping cut is complete, the machine is drawn across the face of the room to the opposite rib, this being accomplished by means of a cable or chain attached to a jack at the left-hand side of the room. The speed of cutting is from 12 to 18 in. per min., while the places vary in width from 26 to 30 ft.

As above stated, the actual cutting is done by a rapidly moving chain which carries a series of bits, which are turned at different angles to the plane of the cutter bar. The bits are so positioned that the width of the cut is slightly greater than the thickness of the bar so that the latter moves freely under the coal, placing no extra strain on the driving mechanism.

Cutter bars as now employed range in thickness from 2½ to 4¾ in. and the bits in order to give clearance for the bar cut a kerf slightly wider than this. After the undercut is complete, the machine pulls itself back onto the truck, and, under its own power, moves to the next room or chamber where the same operations are repeated.

After a place is thus undercut, and the machine and its operators have passed on, the place is turned over to the miner and his laborers who proceed to drill the necessary holes, blast down the coal and load it out into mine cars. The rock is then removed from a sufficient width and depth to allow the advance of the rails, cars, mules, or locomotives, as the case may be. This rock is also loaded into cars, or where there is sufficient room gobbed. In this respect, the long-wall method has the advantage, for the rock, save that in the gangway and airway, is here allowed to remain.

In the short-wall, or chamber method of mining, the track must follow the miner the complete length of the room. This necessitates the removal of sufficient bottom rock to give clearance for the car. It will, therefore, be easily seen that the cost of removing this dead material is sometimes enormous. Furthermore, this must be done in each chamber or working place in the mine.

There Is Less Dead Work with the Long-Wall Method

In the long-wall method of operation, the rock on the main gangway only is removed to give a total height of about 6 ft. The machine undercuts along a face 215 ft. in length, and this entire amount of coal is then drilled and shot down. An endless-chain conveyor driven by a 10-hp. motor is operated along the base of the broken coal. The latter is loaded into this conveyor, which transports it to a waiting car on the gangway.

When the conveyor is fully loaded, and the motor which drives it is running at its highest speed, a car can be filled in from two to three minutes, depending upon the car's size. Enough coal is undercut in the night shift to supply the loaders with plenty of work for the next day.

This performance is repeated day after day, a pillar of coal being left only when the roof becomes so unmanageable that the cribbing fails to hold it in check. In this event, the entire face of the long wall is removed to a point about 30 ft. in advance, the intervening coal being left to support the roof, which settles evenly on either side until it again finds a resting place.

It is not often that this inside disturbance is felt on the surface, for due to the system of cribbing employed the roof only settles for about 30 in. and that quite evenly. From 60 to 70 cars are obtained per day from a long-wall face of the length above mentioned.

In closing, I wish to bring out a thought which has not hitherto been mentioned in this consideration of methods of cutting anthracite coal; this is the evident decrease of accidents of all kinds which has acompanied undercutting as compared with shooting the coal from the solid. Formerly where coal was extremely hard, requiring heavy shots, large pieces were frequently blown for considerable distances, and sometimes carried destruction in their paths. With the present methods, the natural tendency of the coal is to fall from its own weight, and it is seldom that, even under the action of the explosive, it leaves the chamber proper.

I predict brilliant future success for coal-cutting machines and methods in the hard-coal fields.

Cables in Bore-Holes

By C. M. Means*

Bore-holes offer a safe and convenient method of transmitting electric power from the surface to the underground. Cables can be caried on the surface and down a bore-hole located at or near the point where power is actually required and at such voltages as best suit the conditions. Circuits having potentials up to 6600 or even 13,000 volts can be handled safely in this manner. To attempt to transmit power at these high voltages along headings underground would introduce an element of danger or the cost of installation would be prohibitive.

The advantages are in favor of a bore-hole for this purpose, as compared to any other method, whether the mine be a drift, slope or shaft operation. In small drift mines, this might not apply but if the mine covers any extensive area or requires considerable power, the bore-hole method of entering the workings with electric conductors is to be recommended.

Except in the case of great depths, a bore-hole should be used at shaft mines and should be so located that no main conductors would be near the bottom of the shaft, which is usually congested.

Cables supported in shafts introduce a certain element of danger from fire or accidental contact by persons working in their vicinity. Furthermore, the cables are in an exposed condition and subject to mechanical injury.

Cables properly installed in bore-holes offer a higher factor of safety and reliability than is secured by any other method. There have been a number of failures of cables in bore-holes, but in the cases investigated the difficulty was found to be due to improper installation and not defective cables. The manufacturers are in a position to produce cables with a high factor of safety, but all their skill and care in manufacture are lost if the bore-hole is not properly arranged for the service or the cables be not properly supported.

A cable in a bore-hole will have the same degree of reliability as a cable installed in a similar length of pipe or conduit on the surface, if a good bore-hole is provided, and the cables supported in a proper manner.

The casing in such a bore-hole should be of sufficient

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size to contain all the cables necessary without crowding and should be smooth on the inside so as not to cause abrasion of the conductors while they are being lowered into position. The casing should, therefore, be prepared in the same manner as iron conduit used on the surface for a similar purpose.

All joints should be made waterproof so that no water even under pressure can leak to the inside. Sufficient space should be left around the pipe to allow at least one inch of concrete to be placed between it and the inside of the drill hole. It is important that this concrete be continuous throughout the entire length of the pipe. Care should be taken around the bottom of the hole to see that the concrete shuts off all moisture and when the hole is complete no water should leak from the strata around the pipe.

The method of support will vary with different installations, depending on the depth of the hole and kind of cable used. With holes up to 500 ft. in depth, no difficulty should be encountered in securing a proper support for any cable, but beyond this length they should be specially designed for the work they are to do.

Cables insulated for the required voltage with good weatherproof covering have proven highly satisfactory where properly installed. Ordinary lead-covered cables have no place as conductors in a bore-hole because of the difficulty of support. Special armored cables are desirable for the higher voltages, but in every case should be designed for the particular work required of them.

The weight of low-voltage cables is largely represented by the conductor and this has sufficient tensile strength to support quite long lengths. If the factor of safety is not great enough with soft-drawn copper, this can be increased by using hard-drawn wire, aluminum or a steel center. For all low-voltage work, single-conductor cables are preferable.

In many cases, it will be found advantageous to use single conductor weatherproof covered cables for high-voltage installations, supporting their weight by the conductors themselves. Armored cables should be employed where multiple conductors are desirable and the armor utilized for supporting the weight.

If it is desirable to hang an armored cable at more than one point, the supports must be equalized so that there is no danger of the total weight coming on any single point of suspension. In general, the conductor should be designed for only one point of support and this can be accomplished by using a proper cable.

Cables in bore-holes should be subjected to frequent inspections, and examinations made for leaks or moisture, as it is important that the inside of the bore-hole be kept dry at all times. Air should not be allowed to circulate therein unless the temperature of the air going into the pipe is lower than that of the walls. Bore-holes can be dried out during the winter by allowing cold air to pass down the holes, as in expanding it will take up the moisture.

The use of single-cable conductors is suggested because of the ease of repairs. At the ordinary mine, material is usually kept on hand wherewith to make repairs to the ordinary insulated cable with weatherproof covering, but few operations have the facilities for repairing armored cables.

Inasmuch as a single bore-hole is often depended on for the entire supply of power to a mine, it is not only important to have a high factor of safety, but the entire design should be such as to admit of easy and quick repairs in case of an unusual accident.

Extracts from a Superintendent's Diary

Whenever I visit the city and am pursued by the numberless beggars flaunting deformities of every imaginable description, I am always reminded that I have yet to see my first beggar at a mining camp.

We have plenty of cripples and dependents, but the generous spirit of the community somehow always relieves these unfortunates from the necessity of begging. The same statement could probably be made of any restricted community. If all vagrant beggars could be persuaded to continue their residence in the place where misfortune overtook them and reduced them to a state of justifiable beggary, there would soon be no beggars. We have not yet become so niggardly that we neglect the unfortunate whose life history is familiar to us.

Some people use this line of reasoning to prove that all beggars are impostors, but I cannot agree with them. Unfortunates, like all other classes of human beings, sometimes are possessed by the wanderlust and naturally, when one who is unable to earn his living finds himself out of reach of kith and kin, he becomes a beggar automatically.

Such a one was buried in our town today.

Ten years ago Tom Flemming was an average coal digger. Then he walked back on a dynamite shot in his heading and found himself minus one arm and both legs, after the surgeons dismissed him from the hospital. The following year he received $2000 in court and remained on a spree for about six months. Within two months' reckoning from the day he became sober, he was penniless. But he was not compelled to beg. One of the small merchants on the edge of the camp decided to handle explosives and put Tom in charge of the sales on a commission basis. This was a strictly commercial proposition and it proved to be a good business deal for the merchant. For several years Tom's earnings were in excess of his previous earnings as a miner.

In the early part of his life, Tom had been a great wanderer and now that so much of his time was unoccupied, he thought often of his early experiences and the places he had visited and the people he had known.

If the men who bought their supplies from Tom could have read his thoughts during this period, the final tragedy in his life could probably have been averted, but they did not and so one fine spring morning Tom did not report for work, but instead, started off on a long journey.

For a time we had tidings from him in round-about ways, but eventually he got out of touch with everyone he had ever known.

Again he capitalized his deformities, this time as a common street beggar. Back home when the boys patronized Tom because of his infirmities, they did not allow him to feel that sympathy had any part in the transaction, but now his patrons had no scruples in the matter. In fact, they were constantly asking all kinds of questions and expressing all kinds of doubts before offering their pitiful pittances.

Poor Tom had only one hope remaining and that was to be buried back home.

Just how he managed to get back remains a mystery.

The Proving of Mine-Rescue Apparatus

By R. Dawson Hall

SYNOPSIS—An account of an instrument for testing the condition of mine-rescue apparatus, not in an emergency but at regular intervals.

The value of mine-rescue apparatus depends entirely on the condition in which it is kept. If it is allowed to get out of order, when the time comes to use it, it will not be available. The tests should be made, therefore, at regular intervals, and these should be more thorough than those used prior to actual mine-rescue work, which are necessarily hurried and superficial.

The meters illustrated below test all the parts of the breathing apparatus. Mounted on a common stand they

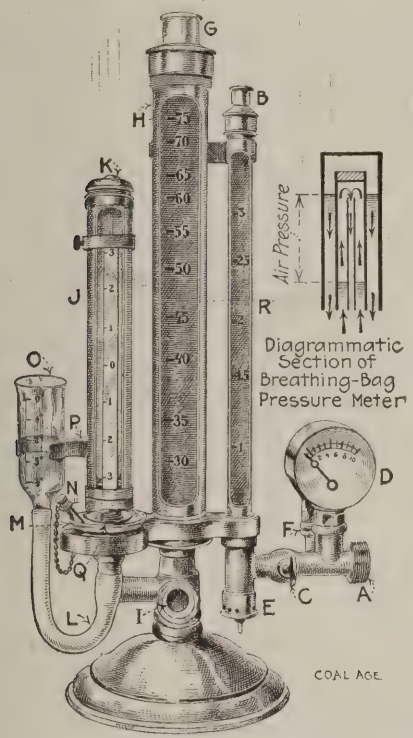


Fig. 1. Instrument for Testing Breathing Apparatus

are conveniently available; no parts are likely to be lost and no tests are apt to be overlooked.

The Quantities Needing Measurement

Such an apparatus should test (1) the quantity of oxygen which the reducing valve delivers, (2) the pressure at which the oxygen is delivered, (3) the amount of air which the injector will draw through the apparatus, (4) the pressure under which the air circulates, and (5) the pressure at which the relief valve of the breathing bag will lift. There is an appropriate meter supplied to prove all these various characteristics.

The tube *R* and the pressure gage *D* on the right, Fig. 1, are for the purpose of testing, not the working of the apparatus as a whole, but simply the action of the reducing valve of the oxygen cylinder, to ascertain whether that valve passes the needed amount of oxygen and delivers it at the correct pressure.

To prevent the reader from misapprehending the functions of the various parts, we have illustrated that section of the breathing apparatus which is tested with the part of the testing device by which it is measured, omitting all other parts. It may be stated, however, that the apparatus as built cannot be thus divided physically into various parts.

Volume of Oxygen Passing

The reader should now concentrate his attention on Fig. 2. The end of the air-supply hose where it normally enters the breathing bag is screwed on the connection *A* of the testing apparatus. The cap *B* is removed and the cock *C* opened wide. The opening by which, under normal conditions, air is admitted on the side of the injector, is closed by screw cap *S* and the valve is opened to the oxygen cylinders. The oxygen is thus

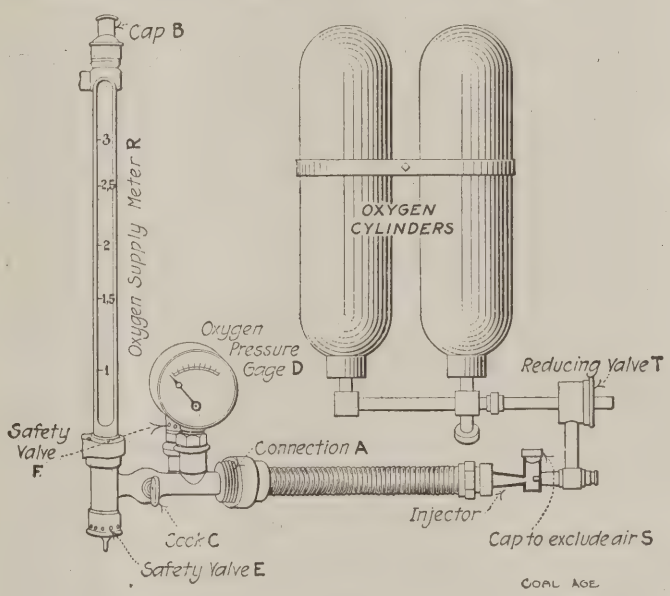


Fig. 2. Connections When Measuring Oxygen Supply and Pressure

able to pass from the oxygen cylinders, through the reducing valve *T*, the injector and the air-supply hose into the testing apparatus. It cannot, of course, in this passage augment its volume by drawing in air, because of the screw cap just referred to. This oxygen has sufficient volume to lift, in the oxygen-supply meter *R*, a small truncated cone, which measures by its rise the quantity of oxygen thus passing. The oxygen delivered should be two liters per minute and the spheroid should stop with its upper edge at the figure two. The tube of the meter is graduated so that the amount of oxygen passing when between one and three liters per minute can be accurately determined. It is absolutely essential that the cap *B* be removed, for the mensuration depends on the movement of the air and moreover the glass of the meter is not strong enough to sustain the full pressure

delivered by the reducing valve. There is, it is true, a safety valve at *E*, but the experimenter should not rely on it to remove this pressure.

Pressure of Oxygen as Delivered to Apparatus

For the next test, that of the pressure of the oxygen delivered, the arrangements are identical, but as the static pressure is far greater than that reached when the oxygen is allowed to pass away unrestrained, an armored tube, capable of sustaining a higher pressure, is used instead of the regular air-supply hose to lead from the injector to the connection *A*. The cock *C* should be closed. Be sure that the cap *B* is not replaced till the cock *C* is turned against the entrance of air. In fact the function of the cap *B*, which is to keep the apparatus clear of dust when the oxygen supply is not being tested should be kept in mind. It is no more an integral part of the apparatus than the box in which the whole device is packed.

The oxygen being prevented from escaping by the closing of cock *C*, the oxygen-pressure gage *D* shows the pressure supplied by the reducing valve in atmospheres. This should read about 6 and if it does not the reducing valve should be adjusted and the flow of oxygen redetermined.

Volume of Air in Circulation

The central tube of the metering device, Fig. 1, we are describing, measures not the oxygen but the air and oxygen combined, that is, the enriched air circulating in the apparatus. Fig. 3 represents the arrangements for such measurement. The cap *G* is removed on the top of the air-supply meter *H*, and the end of the air-supply valve is screwed to the connection *I*. The cap *S* which was placed in the first tests over the air inlet in the side of the injector is, of course, removed. The air and oxygen entering the glass air-supply meter *H* raises a truncated cone within it, which measures the quantity passing. This should be from 50 to 65 liters per minute, the glass face being graduated to read in those units. The test may be made with the entire apparatus connected up so that the air drawn in must pass through the exhalation and air-discharge hoses, the regenerator and the cooling tube. This will interpose some additional resistance and the injector will, therefore, provide less circulation.

Pressure Producing Air Circulation

The pressure in the breathing bag is measured with the same connections. The oxygen supply is first cut off, however, by closing the valve of the oxygen cylinders, and after removing the cap *K*, the meter *J* is filled with colored alcohol or colored distilled water to about its mid-position, and the cap *K* replaced. There are three concentric tubes in this part of the apparatus. The liquid enters the outer tube, and rises from the base of the middle tube till both are filled to the same level. This middle tube is closed at the top and the air escapes by the innermost tube, as shown diagrammatically on the right of Fig. 1. An adjustable scale is set to read zero at the water level. On opening the reducing valve, the air entering at the innermost tube presses the liquid down in the middle tube and raises that in the outer, the water column thus created balancing the pressure of the air. The readings above and below the zero added together give the pressure of circulation which should be about 3.9 in., or 10 cm. Similarly the suction can be determined by connecting the breathing-bag pressure meter with the discharge hose.

Why the Relief Valve Should Be Sensitive

It is important that the relief valve in the breathing bag prevent the air pressure from becoming too high or from discharging till the pressure reaches the required figure. For if the pressure at which the valve operates is too low, the breathing bags are liable not to be sufficiently filled with air and breathing will be difficult. Some claim that the pressure in the bag should not be too low or otherwise if there are any invisible leaks in the apparatus, carbon monoxide may pass in when the wearer

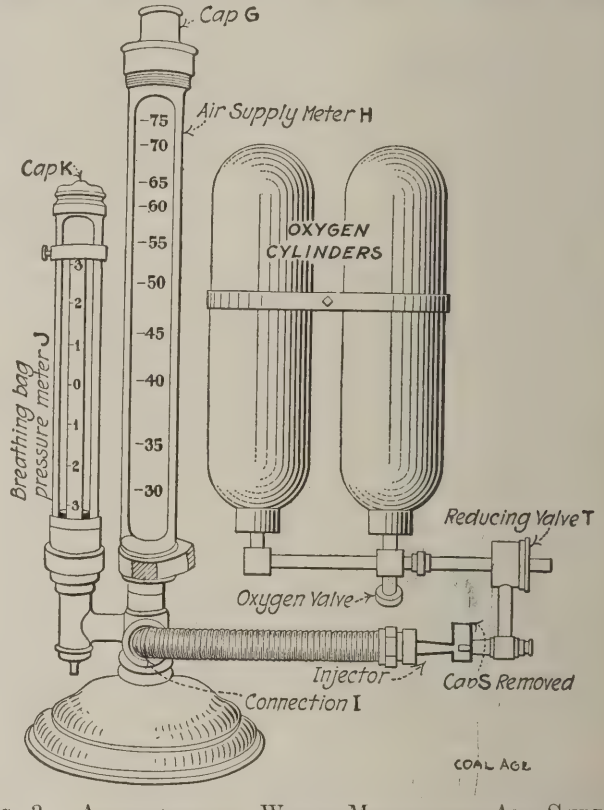


Fig. 3. Arrangement When Measuring Air Supply and Pressure

is working in an atmosphere where such gas is present.

Nor is excessive pressure desirable, as exhalation will be difficult and the effort will exhaust the wearer. It is desirable that he have the minimum resistance which is necessary for safety in breathing in and breathing out. The relief valve is intended to regulate this and its sufficiency as a regulator should be measured.

Testing the Relief Valve

To measure the pressure at which the relief valve will discharge, a relief-valve meter *O* is placed on the side of the apparatus. This is connected by a rubber tube *L* to a dish *M*. In the center of the dish projects the end of a metal tube *Q*, which is open at both ends. This tube is connected at its lower end with the rubber hose *L*. No connections are made with the apparatus. Only the relief valve is disconnected and tested when the meter is ready for operation.

The measuring glass *O* is lowered in the bracket *P* till the zero point of the scale on its side is level with

the upper edge of the bracket. Water is then poured into the glass until it flows out of the top of the metal tube *Q* into the basin. The measuring glass is then lowered slightly so that the water falls in *Q*. The relief valve from the breathing bag is then screwed over the end of the tube. Care should be taken that the valve seat is absolutely dry, as moisture may cause a false reading.

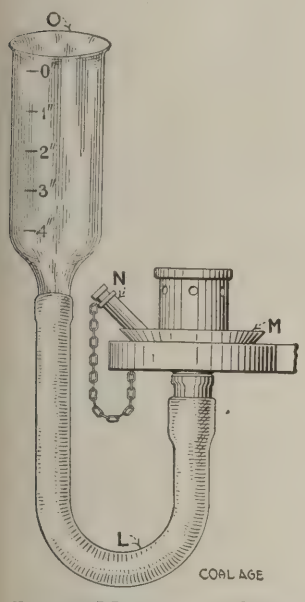


FIG. 4. MANNER OF TESTING PRESSURE AT WHICH RELIEF VALVE WORKS

The measuring glass is then slowly lifted until the water flows out of the hose in the upper part of the relief-valve casing. The pressure at which the valve releases will correspond with the number of inches the measuring glass is lifted. The water should begin to escape when the measuring glass has been raised about 1.2 in. (or about 3 cm.). The plug *N* can be pulled out and the water will thereupon run back into the measuring glass *O*.

This apparatus is made by the Maschinen-Fabrik Westfalia, at Gelsenkirchen, Westphalia, and is sold by S. F. Hayward & Co., 39 Park Place, N. Y. The device is suited to the testing of all forms of apparatus, except that the relief-valve meter is specially adapted to the proving of Westfalia apparatus, though it could be slightly modified so as to make it suitable for relief valves of other patterns.

Mine Regulations to Reduce Liability to Explosions

The following points in respect to reducing to a minimum the liability to mine explosions are sent by a mine foreman of long experience.

VENTILATION

1. Have exhaust system of ventilation.
2. Use explosion doors on fan.
3. Current must be neither too strong nor too weak.
4. Use 4- to 6-entry system, work in panels, keep air courses clear of obstruction.
5. Use overcasts instead of doors; if doors, use automatic.
6. Have stoppings substantially built of masonry and kept in good repair, check doors at necessary intervals so that ventilation reaches the face of workings.
7. Use separate splits freely, have all abandoned workings thoroughly ventilated.
8. Have ample ventilation exceed the requirements of the law if necessary.
9. Install duplicate fans and engines so that they can both be used together if necessary.
10. In all narrow work crosscuts should be driven at least every 100 ft., if driven every 200 ft., the limit, and canvas is blown down it will accumulate a dangerous body of gas.

SHOT FIRING

1. Employ skilled shotfirers acquainted with the extreme danger of gas and dust.
2. Use permissible explosives, copper bar and needle and clay tamping, fire one hole at a time with a battery when all men are out of the mine, commencing to fire shots, advancing against the air.
3. Do not shoot off the solid or holes drilled beyond the undercutting, shoot center hole first. If coal is 5½ ft. high and place 10 ft. wide shear one side or shoot in two layers.
4. Do not overcharge shots or use mixed explosives.
5. Holes must not exceed two inches in diameter.
6. Carefully inspect places for gas before shooting and after for fire, bad roof and gas.
7. Wet sides, roof and bottom for 80 ft. back before shooting.

DUST

1. Use sprays to wet the coal in the cars and spray empty cars outside or at the shaft bottom.
2. Keep rooms and haulage ways clear of dust by loading it out, keep coal below beds of cars.
3. Use water or exhaust steam for moistening dust.
4. Before shooting, wet sides, roof and bottom for distance of 80 ft.
5. Use tight wood or steel cars to prevent leakage of coal and clean it up regularly before it is ground into powder.
6. Dust is dangerous, because when acted upon by a flame, it generates carbon monoxide, it absorbs oxygen out of the air.

GAS

1. Do not allow mixed lights in a mine generating explosive gas.
2. Examine all places regularly and thoroughly for gas.
3. Do not allow accumulation of gas in worked-out portions of mine.
4. Consult the barometer for changes in the weather.
5. Employ competent and trustworthy firebosses and assistants.
6. Drawing stumps and pillars, take the coal out clean so roof can cave.

MISCELLANEOUS

1. Have good discipline in the mine.
2. Systematic timbering of working places to suit conditions.
3. Mine foremen, assistant mine foremen and firebosses must all be sober, competent and respected men and see that they observe fully the requirements of the mining law.
4. Have danger signals printed in all languages spoken at the mine.
5. Have accurate surveys made of the worked-out or abandoned sections of mine.
6. Instruct all classes in the danger of mining.
7. At least instruct all company men in First Aid and use of helmets.
8. Prohibit electricity in a gaseous mine and carefully guard its use in a nongaseous mine.

9. Use stone dust to deaden coal dust explosibility.

10. Work all rooms on retreating system.

11. Prohibit the breaking of large pieces of rock by laying dynamite on top of it, do not allow shots to be fired in air courses, headings and traveling ways unless wires are properly guarded, men warned and dust wetted.

12. In gaseous mines work rooms from one side only.

13. Shear and undercut coal properly before shooting.

Mine-Telephone Apparatus

The application of telephone systems to the mining industry is a comparatively recent one, but notwithstanding this fact the mine telephone has been highly developed. The requirements for constant and dependable service under all operating circumstances are exceptionally severe, in fact, it is safe to say they are unequaled by any conditions met with elsewhere in telephone operation. A brief review of these conditions and the manner in which they have been overcome in the design of modern mine-telephone equipment will be of interest to both the engineer and layman.

In general the greatest hazards to which telephone instruments employed underground are subjected are mechanical injury and the corrosive effects of acid mine waters and gases. Some of the mechanical sources of injury are falling roof materials, the concussion of blasting and rough handling by careless workmen. All these must be guarded against with a large factor of safety and each part must be given special treatment so that it will faithfully perform its functions.

A representative type of mine telephone as built by the Stromberg-Carlson Telephone Mfg. Co., is shown by Fig. 1. In this particular type of instrument, all of the apparatus is contained within a cast-iron box which has walls of ample thickness reinforced at the edges and corners to give adequate protection against injury. The operating parts are mounted inside an inner compartment, sealed by a door which is provided with a wide felt gasket. This compartment need not be opened except about once a year to replace the dry cells. As an additional safeguard against the entrance of air and moisture when the set is not in use, the outer door is fitted with a tubular rubber gasket which is compressed under the action of the door-lever mechanism.

The dome-shaped casting on top of the box shelters the gongs, gong mountings and armature assembly. The gongs are 4 in. in diameter so as to give a loud, clear signal and are triple zinc plated to render them corrosion proof. In mounting the ringers, so that no opening is made in the roof of the inner compartment, a unique scheme has been employed. By referring to the illustration, it will be noted that the ringer coils are inside the case with their magnet cores brought up through a brass plate.

As the clapper rod is mounted in a manner just the reverse of the usual arrangement it will be seen that there is no opening which might admit moisture. All of the ringer adjustment is made on one screw which is accessible by removing the dome.

Another feature which goes to show the importance of air-tightness is the manner in which the generator crank is brought through the inner door. The generator is equipped with a detachable coupling which separates when the inner door is opened. The section of the shaft which goes through the door itself is packed by means of a stuffing-box.

The equipment of these instruments includes the same operating elements as a regular magneto instrument, but the parts are in themselves especially designed for underground service and are consequently built heavier. The transmitter is of the long-distance type made up so as to be water-tight. The receiver is of standard form having a moisture-proof cord.

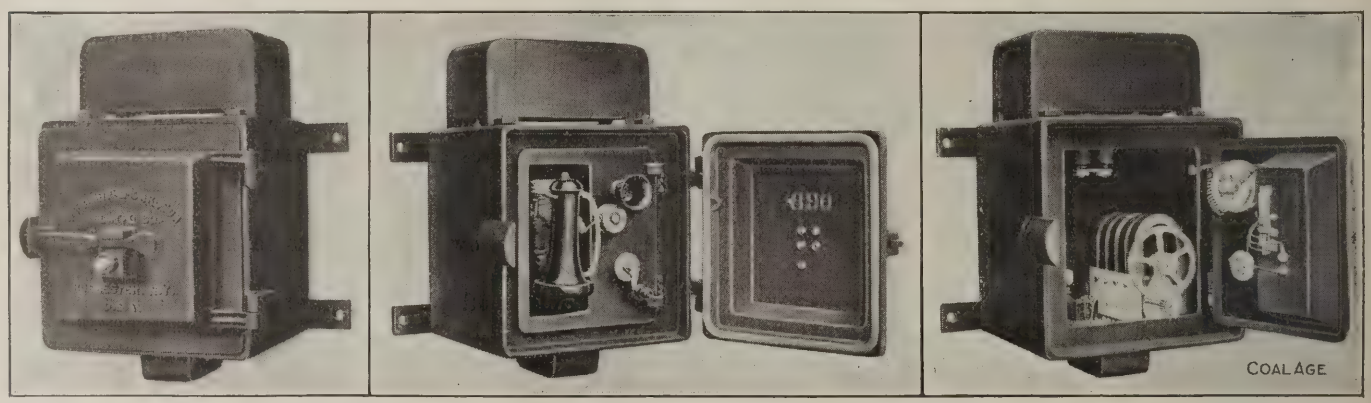


FIG. 1. THREE VIEWS OF A TYPICAL MINE TELEPHONE

A take-up device which is plainly shown in Fig. 1 draws the cord away from the door when not in use so that it will not be cut when the door is closed. A five-bar hand generator furnishes alternating current for ringing while the energy for talking purposes is drawn from two dry cells. The hook switch is not operated by gravity under the weight of the receiver but is actuated by wedging the receiver between the double jaws of the hook.

In general, all parts in the magnetic circuit of the set are made of iron which is given a zinc or copper plating. All other parts, including the screws, are of brass. Each coil is impregnated with a solid compound which successfully resists the action of mine gases and liquids and it is said that such mine telephones can be entirely submerged without injury to the apparatus.

The Nanticoke District Mining Institute, Nanticoke, Penn., will hold its fourth annual dinner at the State Armory, Saturday evening, Oct. 10 ,1914, at 7 o'clock. D. L. Morgan is secretary.

American Mine Safety Association

Special Correspondence

SYNOPSIS—The attempt of the American Mine Safety Association to hold a business meeting in New York City was a complete failure, but the meet at Terre Haute was an entire success and served to initiate an important safety movement through the State of Indiana. Teams attended from Pennsylvania and Illinois.

It is always difficult to forecast what will be the effect of a change in the method of conducting the business of a society and this was made distressingly evident in the recent attempted meeting of the American Mine Safety Association in New York City. Unfortunately the business session has always been too strictly business-like. There has been little deliberation regarding first-aid methods, almost none about mine rescue, and safety has been forgotten. Nearly all the discussion has been about organization and the most exciting part of the proceedings has been as to the person who should be presiding officer and to the time of paying dues.

Whenever anyone has suggested discussing first-aid methods, someone has objected to submitting matters of that kind to a mixed body of doctors and laymen, and there the matter rested. As none of the meetings really "tended to edification," if we may quote the evangelical formula, there has been a growing dissatisfaction with the business meeting, though the feeling had little to do with the real progress of the association.

No Discussion of Principles but Much Commendable Activity

In brief, the society has been short on dogma and quite long on practice. The first, as exemplified at the New York City session, was a failure, the second, as portrayed at Terre Haute, Ind., was, as usual, a success. When the meets were held in the same place as the business meeting, they served to help out the latter and give it a semblance of life which intrinsically it did not have.

But dogma is useful. We feel that first aid, and, in a lesser degree, mine rescue, also has need of much of it and safety has a literature which has not at all been extended by the society which calls itself a Mine Safety Association.

We need to discuss and define how first-aid work should be done, perhaps also we need to prescribe just how it shall be performed at contests. The teams are often demerited for doing "what the doctor ordered," and one judge will approve what another will condemn. Such a conflict is common in all branches of art and industry, but it is folly to subject men to a loss of credit because they have done something which they have been taught to do and performed some act which no definite regulations forbid.

If there is going to be criticism of "doctor's orders," we think it will show itself most forcibly where no method is prescribed by authority and if every doctor who acts as a judge is permitted to use his own judgment. The clashes of authority will be felt most severely if those who suffer from the conflict are those who can have no hand in the settlement. If the doctors proverbially differ, it is not well to make the first-aid men they train get the burden of the disagreement by demerits in the judgment of contests.

Why Not Some Interesting Papers?

Sometimes we wonder whether a few papers read before the association would not serve a good purpose. We are convinced that there are too many papers presented already at public gatherings, that many had better have never been penned and most had far better been penned than delivered, but if papers could be volunteered or the right man asked to deliver them, it seems that interest would be added to the meetings, and perhaps also, as the association appears to have forgotten it, it might be well to call the attention of the members to the fact that it is true of the association that "safety is its middle name." A few addresses on methods of making the mine safe would surely not come amiss.

The meeting met on Sept. 7, Labor Day, at the Waldorf-Astoria, the president and secretary and about a dozen others being present. The next day fifteen first-aid and



Vandalia Coal Co. Team No. 20, Linton, Ind.

rescue men of the Lehigh Valley Coal Co. made an excellent exhibition in the Waldorf-Astoria, at which about as many members as exhibitors were present.

The Lehigh Valley Coal Co. generously sent the Westmoreland team and the captains of the best teams in each of the five divisions in charge of Efficiency Engineer John Lloyd, and kept them in New York City three days, giving them a good opportunity to see and enjoy the town and paying their way to places of entertainment. The appreciation of the company for the good work of its men has made them most enthusiastic adherents of the safety movement.

On the 9th, the Delaware, Lackawanna & Western R.R. coal department sent a first-aid and mine-rescue team from the Central Mines, with the superintendent, T. J. Williams, and the rescue foreman, John A. Thomas, in charge. Owing to the fact that the meeting was called to an early close, this corps brought no equipment, but spent two days in New York City visiting places of interest.

Business Meeting at Terre Haute, Ind.

In the afternoon of Sept. 11, the executive board of the American Mine Safety Association met in the rooms of Terre Haute House, Terre Haute, Ind. The annual meet-



THE LINE-UP OF TEAMS AND OFFICIALS AT THE MEET OF THE

ing was held in the evening at the Chamber of Commerce with John P. Reese presiding. The principal officers elected for the succeeding year were President Dr. August F. Knoefel, chief surgeon, Vandalia Coal Co., Terre Haute, Ind.; First Vice-President, Joseph Fletcher, Cherokee-Pittsburg Coal & Mining Co.; Second Vice-President, F. W. Sperr, professor of civil and mining engineering, Michigan College of Mines, Houghton, Mich.; Third Vice-President, William Green, Secretary-Treasurer United Mine Workers of America, Indianapolis, Ind.

The other members of the executive committee are as follows: W. H. Aldrich, managing director, Inspiration Consolidated Copper Co., 14 Wall St., New York City; Dr. Ralph McHenry, chief surgeon, Penn-Mary Coal Co., Heilwood, Penn., and Albert Burch, general manager, Goldfield Consolidated Mines Co., Goldfield, Nev.

REPORT OF SECRETARY SHOWS PROGRESS

The business meeting opened with a report by Secretary-Treasurer H. M. Wilson. It showed that on Sept. 1, the membership of the association was 549 and represented practically every part of the American continent. The association has awarded 101 medals since October, 1913, comprising 5 bronze mine-rescue medals, 10 silver first-aid medals and 86 bronze first-aid medals.

It was decided to appoint an organizer, who will devote his time to increasing the membership and whose salary will be a certain percentage of the dues. The members concluded to hold the next annual meeting at Philadelphia, Penn. A medal was voted to John C. Davidson, now an employee of the J. Wooley Coal Co., of Evansville, Ind. Mr. Davidson risked his life to save others at Starkville, Colo., Aug. 10, 1910, and again at Dawson, N. M., at an explosion which occurred Oct. 22, 1913.

J. W. Paul, engineer in charge rescue department, Bureau of Mines, Dr. R. F. McHenry, chief surgeon, Penn-Mary Mines, and A. M. Ogle, president and general manager, Vandalia Coal Co., Terre Haute, Ind., were appointed on the general auditing committee. Dr. August F. Knoefel and Prof. E. W. Sperr were appointed a committee to audit the books of the secretary-treasurer. Dr. Knoefel, retiring chairman of the first-aid committee, recommended the adoption of the Shaeffer method of respiration in place of the Slyvester, and the recommendation was adopted. After much discussion, it was decided to give special medals to the "subjects" of all teams to which first-aid medals are awarded.



JOHN C. DAVIDSON, WHO RECEIVED MEDAL FOR REAL RESCUE WORK

EVENTS ARE PREANNOUNCED

At 10 a.m., on Sept. 12, the field contests began in the Central League Baseball Park. Music was furnished by the American Federation of Musicians' Band, from Local No. 25.

The events had all been published before the contest. It is quite customary to publish the list from which the judges choose and this was done in this particular case, but strange to say, the events of the contest chosen for performance were all set forth at length in the morning papers before the meet commenced, so everyone had warning of what to expect.

LIST OF THE COMPETING FIRST-AID TEAMS

The teams competing were as follows:

Indian Creek Coal Co., Bicknell, Ind.; J. K. Dering Coal Co., Clinton, Ind.; Bunsen Coal Co., Westville, Ind.; Bunsen Coal Co., Universal, Ind.; Superior Coal Co., Gillespie, Ill.; Penn-Mary Coal Co., Heilwood, Penn.; O'Gara Coal Co., Harrisburg, Ill.; Vandalia Coal Co. No. 82, Terre Haute, Ind.; Consolidated Indiana Coal Co., Sullivan, Ind.; Knox Coal & Mining Co., Bicknell, Ind.; J. Wooley Coal Co. No. 2, Paxton, Ind.; J. Wooley Coal Co. No .1, Paxton, Ind.; Western Indiana Mining Co., West Terre Haute, Ind.; Lower Vein Coal Co., Terre Haute, Ind.; Green Valley Coal Co., Jasonville, Ind.; Sugar Camp Coal Co., West Terre Haute, Ind.; Vandalia Coal Co. No. 69, Terre Haute, Ind.; Vandalia Coal Co. No. 10, No. 1 team, Dugger, Ind.; Vandalia Coal Co., No. 20, Linton, Ind. (two teams); Vandalia Coal Co. No. 10, Dugger, Ind.; Monon Coal Co., Sullivan, Ind.; Vandalia Coal Co. No. 9, Linton, Ind.; Clinton Coal Co., Clinton, Ind.; Cambria Steel Co., Johnstown, Penn.; Superior Coal Co. No. 3, Gillespie, Ill.; Superior Coal Co. No. 2, Gillespie, Ill.; Calora Coal Co., Jasonville, Ind.; O'Gara Coal Co., Harrisburg, Ill.

The one-man event was: Treat a simple fracture of the right collar-bone and a simple fracture of the lower jaw. Time allowed, 20 min.

The two-man event required: Treat left leg lacerated by machine, flesh torn loose and bone exposed. Time allowed, 10 min.



American Mine Safety Association, Terre Haute, Sept. 12, 1914

In the three-man event, the left ear of the patient was supposed to be torn off, the left shoulder dislocated and the left leg had a compound fracture. The time allowed was 25 min.

Unnecessary Torture to Patients and Subjects

There were, as before, many who put the torniquet on the thigh instead of at the knee, which is not the right place. They also tightened it. The pressure on the artery may be necessary or it may not. It is best to put the torniquet in place so that it can be tightened at any time. It is true that bleeding may occur and the first-aid man should be always prepared for it, but it is a mistake to say that a compound fracture always involves hemorrhage. It rarely does, according to the statement of physicians of experience, and the torniquet should be tightened only when necessary.

Consequently, first-aid men should learn to leave that instrument of torture loose if for no other reason than that the subject is apt to suffer no little pain if the judges are slow and the pressure severe. It is important to make the contestants realize that a torniquet is tightened not to *guard* against the possibility of bleeding, arterial or capillary, but only to prevent severe hemorrhage when it actually occurs. A loose torniquet should score always a better mark than a tight one.

The four-man event consisted of the resuscitation of a patient found unconscious from gas inhalation, with right forearm broken. A stretcher was improvised and the patient was carried 50 ft. The time allowed was 25 min.

Did Not Know if Man Was Drowned or Suffocated

It is perhaps permissible to call attention to the fact that some of the teams treated their subjects as if the misfortune which had come to them was that of drowning. Not by any manner of means can lifting a man up and lowering him down by a grasp of his waist be said to be performing the Shaeffer treatment. There is, of course, some value in such a method of procedure; some tidal air enters and leaves the lungs, but there is not nearly the pulsating effect produced by pressure at the right point.

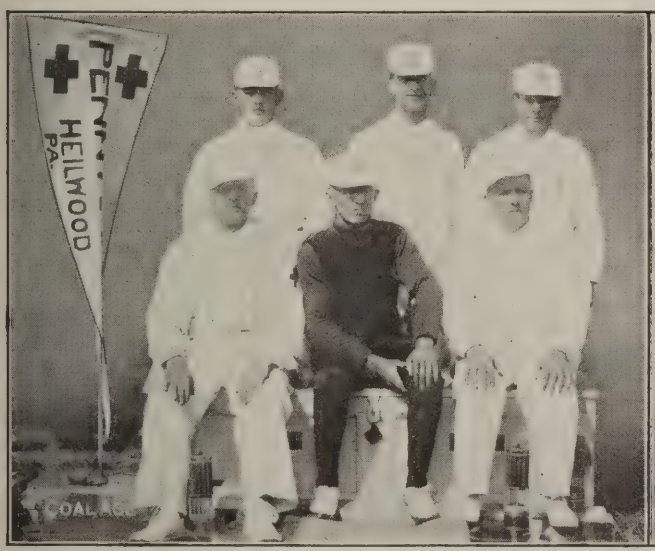
The first full-team event illustrated the treatment of a man found lying on a live electric wire, unconscious, with back burned at the waist line. Three methods of removal were to be portrayed and the man was to be treated and carried on a stretcher 50 ft. The time allowed was 30 min.

The Penn-Mary Treatment of a Broken Back

The crowning exhibition was the treatment of a broken back by the full team. Time allowed, 25 min. The Penn-Mary team performed this feat as at the Pitsburgh meeting and the work excited general interest. But, altogether aside from the merit of the work from an anatomical point of view, and apart from the ingenuity of the dressing and the perfection of the bandaging, the action of the team was admirable from start to finish.

A little roughness with a man with a broken leg or a scarified arm may do but little harm. In fact, the chance to be rough and careless is not so manifest. But in preparing to bring a man out who has broken his back, there is every chance to be rough and clumsy without intention, and there is the greatest of danger to the patient if that awkwardness is manifested, and here again does first-aid become essential.

For this is essentially a full-team event. No physician could turn the trick alone. He is obliged to have a number of assistants, and we are confident he could not train them in the few minutes prior to the transference of the



First-Aid Team of the Penn-Mary Coal Co., Heilwood, Penn.



One of the First-Aid Teams of the Cambria Steel Co., Johnstown, Penn.

patient from the ground or the car to the splints. Only by taking his nurses into the mine could he give the patient that tender, considerate care which the first-aid men exhibit. The deftness of the Penn-Mary men was remarkable. There was a remarkable coördination of movement, the like of which one rarely sees.

When, however, 3F black blasting powder of equal deflective force, tamped with 2 lb. of dry fireclay, was used instead of the aforementioned explosive, the explosion was violent. It was evident that the coal dust which was again placed after the first experiment, took part in the action. Flame burst from the mouth of the gallery and



TWO SCENES IN MINE-RESCUE CONTEST

Rescuing a victim — Crossing over an overcast

Several illustrations are shown of the patient being dressed. It will be noted that it is anticipated that he will be found face down, whereas the general supposition as staged is that he will be discovered lying on his back—a most unlikely condition. The idea of the Penn-Mary dressing is to put the weight of the legs and arms on the splints and to carry these parts a pick is placed between the legs, other picks are placed in the arm pits and they are all deftly and securely attached to the splints.

THE GALLERY DEMONSTRATION

Not a little interest was shown in the steel gallery, which had been erected to show the dangers inherent in the use of black powder. In few places is the need of such a demonstration of the value of short-flame explosives more evident than in the State of Indiana. In the mines of that state, shotfirers are engaged, coal being largely shot from the solid and black powder seems universal. Thus the dangers of coal dust cannot be too strongly emphasized.

As at other meets, a shot of permissible explosive, having a deflective force of one ½ lb. of 40 per cent. straight nitroglycerin dynamite, was tamped with 1 lb. of dry fireclay. This was fired from a cannon in the end of a long gallery in the presence of bituminous-coal dust 100-mesh fine. The explosion resulting was not severe and was evidently due to the powder only and entirely unaided by the ignition of the coal dust.



THE COAL-DUST EXPLOSION RESULTING FROM THE USE OF BLACK BLASTING POWDER

was followed for a long time by a heavy smoke, which also poured from the safety valves along the top. The picture gives a vivid representation of the large quantities of smoke formed and no one could doubt that the coal dust had done its part in producing the loud detonation, the livid flames and the great clouds of smoke, so unlike that formed by powder.

MINE-RESCUE WORK

Meantime the first-aid teams were working off their ties and the mine-rescue teams were being examined and put through their drill. Rescue teams are numerous in Indiana. The full list of the competing teams will prove that; there were 11 in all of these, yet only one came from outside the state.

The list follows: Superior Coal Co., Gillespie, Ill.; Vandalia Coal Co. No. 82, Terre Haute, Ind.; Knox Coal & Mining Co., Bicknell, Ind.; J. Wooley Coal Co., Paxton, Ind. (two teams); Bunsen Coal Co., Brazil, Ind.; Clinton Coal Co., Crown Hill team, Clinton, Ind.; Vandalia Coal Co. No. 69, Terre Haute, Ind.; Vandalia Coal Co. No. 20, Linton, Ind.; Vandalia Coal Co. No. 9, Linton, Ind., and Vandalia Coal Co. No. 10, Dugger, Ind.

THE SMOKER AND AWARD OF PRIZES

In the evening, a smoker was held in the banquet hall of the Terre Haute House, at which all the teams and guests were present. H. M. Wilson was toastmaster. The speakers consisted of Donn M. Roberts, the Mayor of Terre Haute, who delivered the address of welcome; John P. Reese, the past president of the association; William Houston, president of United Mine Workers Union, No. 11; Edgar A. Perkins, chief of the Indiana mine inspectors' bureau; Carl Sholz, president of the American Mining Congress, and Dr. A. F. Knoefel, the incoming president. William Houston declared that the union should back safety and first-aid work with the utmost vigor and declared that he believed that the existence of unions promoted safety.

Dr. Knoefel presented the prizes. The list is extremely lengthy and must necessarily be abbreviated. The special resuscitation prize, a silver cup donated by S. F. Hayward & Co., was presented to the Penn-Mary Coal Co., of Heilwood, Penn., for the second time, and now becomes their permanent property.

The team consists of J. Fleming, captain; T. E. Engle, subject; Harry Davis, John Stone, Gottlieb Stone and William Stout.

The team scoring the highest general average was that of the Bunsen Coal Co., Westville, Ill. The names of the members of the team are: John Krainok, captain; C. Newman, subject; J. De Barker, Steve Shaffer, Charles Elliott and

places in the order named: Vandalia Coal Co., Mine No. 10, No. 1 team; O'Gara Coal Co., Harrisburg, Ill.; Monon Coal Co., Cana, Ind.; Vandalia Coal Co. No. 20, Linton, Ind.; Indian Creek Coal & Mining Co., Bicknell, Ind.; Sugar Valley Coal Co., West Terre Haute, Ind., and Knox Coal & Mining Co., Bicknell, Ind. The prizes awarded were of a miscellaneous character, including Hirsch and Wico electric safety lamps,



PENN-MARY TEAM OPERATING ON MAN WITH BROKEN BACK

Transferring patient onto long splints

Securing picks between the legs and under armpits

Stull Boots. As a reward, they received $100 donated by the Indiana Coal Operators' Reciprocal Organization, Terre Haute, Ind. Also, the Colliery Engineer Challenge Cup, which now passes from the Penn-Mary Coal Co. team, which held it last year. Each member of the team received American Red Cross bronze medals and American Mine Safety Association silver medals.

The Penn-Mary Coal Co., of Heilwood, Penn., received second place and were presented with a Burroughs-Welcome Tabloid First-Aid Case, American Mine Safety Association bronze medals and American Red Cross certificates.

The team of the J. K. Dering Coal Co., Oak Hill mine, Clinton, Ind., secured third place, receiving American Red Cross certificates and medals donated by the Indiana Operators' Reciprocal Organization.

The following teams secured fourth, fifth, sixth, seventh, eighth, ninth, 10th, 11th, 12th and 13th places, respectively, and received medals donated by the Indiana Coal Operators: Vandalia Coal Co., No. 9 mine, Linton, Ind.; Clinton Coal Co., Clinton, Ind.; Superior Coal Co. No. 2, Gillespie, Ill.; Superior Coal Co. No. 1, Gillespie, Ill.; Calora Coal Co., Jasonville, Ind.; Superior Coal Co. No. 3, Gillespie, Ill.; Vandalia Coal Co., No. 82 mine, Terre Haute, Ind.; Cambria Steel Co., Johnstown, Penn.; Bunsen Coal Co., Universal, Ind., and J. Wooley Coal Co. No. 1, Paxton, Ind.

Prizes were also given to the following, who obtained an electric coffee percolator, a Johnson & Johnson first-aid cabinet, a carafe and several bottles of liquid soap.

PRIZE FOR EFFICIENCY IN IMPROVISING DRESSINGS

The Calora Coal Co., of Jasonville, Ind., received a special prize for proficiency in improvising material and dressings. Each of the teams received a Baldwin acetylene lamp. The team scoring the highest number of points in the one-man event was that of the O'Gara Coal Co., No .1 mine, Harrisburg, Ill. The team received a Westinghouse electric fan and two bicycle tires.

The Penn-Mary Coal Co., Heilwood, Penn., received subscriptions to some engineering papers in recognition of its supremacy in the two-man event.

The Colliery Engineer Challenge Cup was won by the mine-rescue team of the J. K. Dering Coal Co., of Clinton, Ind. The members of the team are: Scott Amour, captain; Matthew Kerr, George Waters, George Wilson and Stanley Howell. The other contestants scored as follows: (2) J. Wooley Coal Co. No. 1, Paxton, Ind.; (3) J. Wooley Coal Co. No. 3, Paxton, Ind.; (4) Superior Coal Co., Gillespie, Ill.; (5) Bunsen Coal Co., Universal, Ind.; (6) Vandalia Coal Co., Terre Haute, Ind. The winners of second place received medals from the Indiana Coal Operators, a Koehler aluminum safety lamp, an American safety lamp and other prizes.

The smoker was followed by a vaudeville performance and some moving pictures, including a presentation of the first safety meeting in 1911 and some scenes in the interior of the United States Coal & Coke Co.'s mines in Gary, W. Va.



THE PENN-MARY AND MONON COAL COS.' DRESSINGS FOR BROKEN BACK

The recorders for the first-aid contests were D. M. Duncan and T. S. Martin, both of Terre Haute and E. C. Lee, Harrisburg, Ill. The recorders of the mine-rescue events were E. C. Lee, J. T. More, Denver, Colo., and A. I. Young, Pittsburgh, Penn. Among the judges was Dr. Tuthill of the Copper Queen Consolidated of Morenci, Ariz.

On Monday, Sept. 14, there was a practical exercise for all the mine-rescue teams at the mine of the Glen Ayr Coal Co. This mine had been closed for some time and was full of blackdamp. As a result of the helmet work and other care taken, no one was affected by the operations in the mine except Dr. A. F. Knoefel, who was nearly drowned in the sump.

The Susquehanna Meet

SYNOPSIS—At the Susquehanna meet all the contestants solved the same problems. The awards were not based on average efficiency, but prizes were given for the first and second-best team in each event. A safety exhibit and a breaker boys' team were important new features.

This year the Susquehanna and Lytle Coal Cos. have 44 teams enrolled as against 42 a year ago, and the enthusiasm for first-aid work has increased rather than diminished. In making his speech Morris Williams, the president, referred with pleasure to this growing interest, which was really not expected by anyone. A few years ago everyone predicted that the interest was one which would pass like a fad.

But, as a matter of fact, the study of first-aid is continually growing, not only in new places, but at its point of origin in the United States—the anthracite region. The study is expected to invade the schools shortly, and the children will enter the mines endoctrinated with safety notions and prepared to render first-aid. Then the whole attitude of the mining population will change for the better. In fact, as Mr. Williams declared, to doubt that the movement will grow and spread is to question the humanitarianism of the miners and operators, and is not creditable to those who indulge in such pessimism.

The contest, which was held on Saturday, Sept. 26, was the fifth of the series It was held as before at Edgewood Park near Shamokin, Penn., special trains being run to carry the men to that point. The judges were Dr. J. B. Rogers, of Pottsville, Dr. D. H. Lake, of Kingston and Dr. James W. Geist, of Wilkes-Barre. The surgeons of the company were in charge, but they had nothing to do with the judging. They are Drs. J. M. Maurer, G. M Stites, B. C. Guldin and J. H. Hughes.

It may be pointed out that all the three judges examined the work in every event when completed. Each made a separate estimation of the award due to each team, and the averages of these were credited to the various teams. In this way, the utmost care was taken to evaluate the character of the completed work.



Safety Exhibit at the Susquehanna Meet



Breaker Boys in Two-Man Event

Improvement in Work Manifest

Perhaps this method does not invite such a scrupulous attention to the care of the patient. The end is apt to be kept in view rather than the means. But it is said that the training of the last year has improved the men immensely in this particular, and the litter work showed a great improvement. Some teams, however—a few only be it noted—carried their litters nonchalantly, and a box of tools would have been better carried by such bearers than an injured man. For the most part, however, the first-aid men broke step and walked slowly, and the rhythmic movement of the springs was not in general visible to the eye of a spectator in the grandstand. The bandaging appeared more than usually good.



Breaker-Boy Team



Spread under the Trees

THE EVENTS IN DETAIL

The first event for one man only was as follows: Sprain of left ankle. Make a one-man rescue and carry to station (wrist carry). Dress with short splints. Time, 6 min.

The first prize in this event went to No. 1 and No. 5 slopes of the Pennsylvania Colliery, Mt. Carmel. The teams comprised the following: William Matthews, captain, motorman; Robert Kendtner, pumpman; Andrew Saduskie, footman; Andrew Zigray, footman; Felix Fifer, driver, and Albert Evans, subject, motor conductor. The second prize went to the team of No. 6 tunnel, Colliery No. 6, Glen Lyon.

The second event was for two men only and ran as follows: "Man found unconscious on road with right hand in contact with electric wire. Rescue, revive with artificial respiration by Sylvester method. Dress burn on hand. Carry 10 ft. with four-handed seat."

The first prize in this event was also secured by the efficient team from No. 1 and No. 5 slopes of the Pennsylvania Colliery, Mt. Carmel, Penn. The second prize fell to No. 4 slope of Colliery No. 5, Nanticoke, Penn.

The third event was for three men. The patient had a simple fracture of the right knee cap, a lacerated wound of the left shin bone and a fracture of the fifth and sixth ribs on the right side. The bandaging of the team of No. 2 shaft of Colliery No. 5, Nanticoke, Penn., was awarded the first prize. The team consists of the following members: Ernest Bleith, captain, shoer; John Wadzinski, timekeeper; David Edwards, driver-boss; Frank Riefski, head runner; Arthur Gething, timekeeper, and Michael Weiss, subject, runner. The next best team was that of the outside men of Richards Colliery, Mt. Carmel, Penn.

The full team event required the bandaging of a broken jawbone, of a fracture of the left collar bone and of a compound fracture of the right arm and a fracture of the pelvis.

The winners of this, the principal event, were the No. 1 team of Williamstown. The men comprising that team are as follows: Joseph Llewellyn, captain, footman; James Byerly, breaker boss; William Smith, fireboss; H. Troutman, machinist; John Gittings, inside timekeeper, and Felix Samuels, subject, breaker clerk.

The second prize for the full-team event was awarded to the Richards Colliery, outside team, Mt. Carmel, Penn. As they also secured a second prize and distinguished themselves in this, the main event, we give their names: D. P. Burke, captain, breaker machinist; Jacob Hollister, fireboss; Charles Dietz, carpenter; Ralph Bickel, blacksmith helper; Herold Brokenshire, timberman, and George O'Donnell, subject, machinist helper.

The winners in the first three events received French bronze medals while those who won in the full-team event obtaining first prize were awarded a silver cup and medals of gold bronze. A silver medal was given, in recognition of his able directorship, to Dr. G. M. Stites, who trained the team.

The prizes were handed to the winners by nurses from the State Hospital at Shamokin. They were interested spectators of the events throughout the day. Reference is made in our editorial columns this week to the speeches delivered after the presentation of prizes.

AN EXHIBIT OF SAFETY METHODS

The exhibition of safety methods at the gate was extremely interesting and attracted much attention. It is a pleasing addition to first-aid meets, for however desirable first-aid may be, safety always stands one notch higher, as prevention is always better than cure. It is perhaps not so easy to exhibit these strivings for safety as it is to demonstrate first-aid work, but whatever can be done should be attempted. The pay statements which were exhibited with safety maxims printed across their faces are valuable aids to safety, especially seeing that the Susquehanna Coal Co. changes these maxims on the occasion of every pay, so that new admonitions are continually presented.

The Meet of the Philadelphia & Reading Coal & Iron Co.

SYNOPSIS—The methods of conducting the Reading meet are different from those pursued by most other companies. Their roller-bandage work is marvelous and the labors of the first-aid corps together with certain preventive measures have reduced accidents markedly.

The Reading company meet is always regarded as one of the leading events in the anthracite region and the roller-bandage work done by the teams of the company is conceded to have no equal. One of the interesting features is that the teams of each district draw numbers in the elimination contest, and according to these drawings they are set to perform some one of a series of problems.

Those who perform these with due skill enter the final contest which is a single problem, announced beforehand, and the same for all teams. The work done in this final event is therefore merely a test of skill for it may be assumed at once that every team entering will have the necessary *knowledge* to enable it to earn 100 per cent. from the judges.

This year the winner was the team of the Draper Colliery. Everyone regarded the Wadesville dressing with



THE TEAMS WHICH, IN PROBLEM 2, TREATED THEIR PATIENTS FOR COMPOUND FRACTURE OF JAW AND LACERATION OF RIGHT EAR



Treatment for Dislocation of Knee, Laceration of Thigh and Severe Hemorrhage



Contestants in Final, and Roller Bandages for Which the Reading Teams Are Famous

much favor and perhaps it appealed also to the judges but doubtless the ruling on the program weighed in the result and the Wadesville team had violated it. This admonition runs: "The dressing of all injuries is to be done with material issued for the purpose."

The Problems Presented

The meet was held at Lakeside Park, East Mahanoy Junction as usual and on Saturday, Sept. 19. The corps of each district drew one of the following 10 problems:

1. Handling by one, two and three and litter. Cross-obstruction and load ambulance. Time allowance, 12 min.
2. Compound fracture of jaw. Laceration of right ear. Two 2-in. bandages. Time allowance, 5 min.
3. Compound fracture of right forearm. Simple fracture of left forearm. (Dress arms at same time.) Five 2½-in. bandages; one torniquet; three pieces of gauze; two triangular bandages. Time allowance, 10 min.
4. Dislocation of knee. Laceration of thigh with severe hemorrhage. (Opposite sides.) Six 2½-in. bandages; two gauze compresses; one torniquet. Time allowance, 6 min.
5. Artificial respiration, Shaffer and Sylvester methods. Use of oxygen trunk, inhalator and pulmotor. Time allowance, 10 min.
6. Burns. Left forearm, arm, head and face. Four 2½-in. bandages; six gauze squares. Time allowance, 8 min.
7. Dislocation of elbow, with laceration of fingers. Four 18-in. splints; four pieces of gauze; four 1-in. bandages; two 2½-in. bandages; two triangular bandages; one torniquet. (Dress both injuries at same time.) Time allowance, 15 min.
8. Rescue from electrical contact. Patient unconscious. Examine for injuries. (Dress one injury.) One 2½-in. bandage; one piece of gauze. Time allowance, 6 min.
9. Heat exhaustion. Falls, fractures skull. Resuscitate and dress fracture. Two gauze bandages; one piece of gauze. Time allowance, 6 min.



The Teams Competing in Problem 6, in Which the Subject Is Burned on Left Forearm, Arm, Head and Face



These Teams Demonstrated How to Treat a Man Exhausted by Heat, Who Has Fallen and Broken His Skull



View of the Field in the Final. Bandaging Foot, Knee, Leg, Thigh and Hip



Winning Team from Draper Colliery and Bandage Awarded First Prize

10. Fracture of spinal column, and dislocation of shoulder. Nine 4-in. bandages; two 3-in. splints; one blanket. Time allowance, 6 min.

After the contest it was ascertained the scores were as follows: Tunnel Ridge, 97 per cent.; Turkey Run, No. 1, Inside, 96 per cent.; Potts, Inside, Primrose Slope, 96 per cent.; Lincoln, 95½ per cent.; Maple Hill, Inside, 95 per cent.; Draper, Outside, 95 per cent.; Otto, 95 per cent.; Alaska, 94 per cent.; Wadesville, 93 per cent. and Bear Valley, Inside, 93 per cent.

The Excellent Deportment at First-Aid Meets

The company had sent to the field over night a train-load of colored waiters and cooks and a sumptuous repast had been prepared. It was creditable to the assembled crowd that the caterers had not hesitated to provide the best of equipment and their judgment was well founded. Such dishes as were used on the table would not have been furnished in any but the best of hotels. In fact, not only the Reading meet but all those in the anthracite region are marked by the excellent deportment of the participants. There are none of the unfortunate incidents which occasionally slightly mar the banquet sessions of some of our mining associations, where managers, foremen, engineers and salesmen constitute the personnel.

In the afternoon, the final problem was performed, with the result that Draper colliery received 98 per cent. So close was the decision that five additional physicians were called into consultation with Dr. T. C. Fegley, of Tremont, Penn., and Drs. A. J. Baur and L. M. Knauber, of Wilkes-Barre, Penn.

Improvement in Safety

The pennants and prize ribbons were presented by Miss Lorraine Richards, Miss Majorie Koch, Miss Hazel Quinlan, Miss Eleanor Powers, Miss Frances Mortimer and Miss Helen Richards. After the awards were announced, Judge Richard H. Koch, of Pottsville, congratulated the winners in a short speech and read a letter from James E. Roderick, the chief mine inspector to the president, W. J. Richards. Mr. Roderick stated that in the first six months of 1913, the accidents inside the Reading mines were 47 in number as against 21 in the same period in 1914. Outside the mines there were 11 accidents in the first half of 1913 and 4 in 1914. Thus the improvement was 55 per cent. underground and 64 per cent. on the surface or 57 per cent. as an average. Much of this improvement, the judge said, must be ascribed to first-aid work.

The importance of the meet can be judged from the fact that 77 teams comprising 503 men were entered in the contest. About 1600 people were on the field and three bands lightened the business-like character of the occasion. There was a small exhibition of mine-rescue work in a smoke room and in the test probably a half-dozen men took part. The Reading has 1740 men trained to wear mine-rescue helmets.

Next Annual Meeting of the American Mining Congress

The seventeenth annual session of the American Mining Congress will be held at Phoenix, Ariz., Dec. 7, 8, 9, 10 and 11, 1914.

The same plan will be followed as that of last year: namely, all the leading papers will be printed and distributed in advance of the convention. This plan gives better opportunity for direct discussion of the papers presented and facilitates reaching intelligent conclusions. The printed pages will be distributed to members and the author given ten minutes to make any desirable supplementary statement. Two or three speakers will be asked to make ten-minute addresses and then the discussion will be open to all delegates.

Among the subjects which will be discussed are the following: Western Mining Conditions, Mine Manufacturing, Mining Investments, Safety, Federal Aid in Mining, Federal Aid to Mining Schools, Water Power Development, Conservation, Workmen's Compensation, Development of Minerals in Reservations, Rights-of-Way on the Public Domain, Mine Taxation, Revision of Mining Laws and Compulsory Arbitration.

While the entertainment features will be so planned as not to interfere with the work of the convention, more time than usual will be allowed from the regular sessions. The local entertainment committee will be ready to make enjoyable every minute not occupied by the business of the Congress. President, Carl Scholz; Secretary, J. F. Callbreath.

The Muckle Cup Contest

SPECIAL CORRESPONDENCE

First-aid corps from 18 of the collieries in the Wyoming and Lackawanna Valleys gathered at Valley View Park, near Wilkes-Barre, on Saturday, Sept. 19, to compete for the Mrs. John S. Muckle cup. This contest is conducted annually under the auspices of the American Red Cross. About 1500 people from the stretch of coal territory lying between Mayfield on the north and Nanticoke on the south attended the meet.

Each year the intercompany meet is the cause of spirited rivalry but there is always evident that spirit of fairness and that desire on the part of all the contestants to see the best team win. This year's event was no exception to the rule, and while each team took the field with the determination of carrying off the coveted trophy there was no dissension when the judges had completed their work. The various companies which had teams in the meet declared a half holiday in order that every man might avail himself of the opportunity of witnessing the teams in their annual contests.

Owing to the fact that Major R. U. Patterson has gone to Europe to render services to the injured in the great war, Dr. M. J. Shields, field agent of the American Red Cross, is now in general charge of American Red Cross work and in that capacity conducted this meet. He declared that the contest was one of the best in the history of the competition for the Muckle cup.

Four problems were given each team and the percentages of the four events were averaged and the team with the highest average was declared the winner. The first-aid teams were so carefully trained and drilled, and showed such an expert knowledge of first-aid work, that after the last event was over it was discovered that the Central colliery team of the Delaware, Lackawanna & Western R. R. Co. Coal Department, and the Lackawanna colliery team of the Temple Coal Co. were tied with a perfect average, each team having scored 100 points in each of the four events. But further proof of the proficiency of each team came when the judges announced that the lowest average made by any team in the contest was 94.

The Old Forge team of the Pennsylvania Coal Co. carried off the cup last year but while it did excellent work in this contest, its general average of 95 made it tie for thirteenth place.

In order to decide the cup winners it was necessary for the Central colliery and the Lackawanna colliery teams to work out an extra problem. The judges carefully watched their work in the final contest and rigidly marked them, but these teams displayed such a wonderful knowledge of first-aid relief that the judges debated over their standing for some time and finally decided that the Lackawanna team was entitled to a mark of 99 for the extra event and the Central team was entitled to a credit of 98½. This made the Lackawanna team the cup winners and gave the Central team second honors in the contest. Besides having possession of the cup for one year, each member of the Lackawanna team was given a Red Cross medal. The events were as follows:

Event No. 1—For one man—Treat a lacerated wound of the forehead and a like wound of the right hand. Ten of the teams scored a perfect mark in this event.

Event No. 2—For two men—Left leg lacerated by machine bits, flesh torn loose and bone exposed but not fractured. Nine of the teams had a perfect score in this event.

Event No. 3—For four men—Fingers and left hand lacerated, bright red blood, compound fracture of right forearm. Eight teams had a perfect score in this event.

Event No. 4—For full team—Simple fracture of right thigh; fifth and sixth ribs on left side broken; compound fracture of right wrist with bright red bleeding. Five teams had perfect scores for this event.

Extra Event—For full teams of Lackawanna and Central



THE WINNING TEAM FROM LACKAWANNA COLLIERY

Standing from left to right: Harry Sax, captain; Leon Williams, Thomas Maggs, J. F. Rosengrant, instructor; Thomas Schultz, Harry E. Oberts, Reese Sax, and seated, Steve Wargo, subject.



THE OFFICIALS IN CHARGE OF MEET

Left to right standing: Dr. M. L. Bailey, Dr. S. S. Shields, Dr. M. J. Shields, Dr. J. A. Snyder, Dr. John B. Mason, R. I. Vail, and kneeling, Dr. J. W. Grant, Garfield Angwin and Edgar Weickel.



THE BLISS COLLIERY TEAM OF DELAWARE, LACKAWANNA & WESTERN R.R. COAL DEPARTMENT



TEAM FROM OLD FORGE COLLIERY, THE HOLDERS OF THE MUCKLE CUP IN 1913

collieries only—Man overcome by gas; rescue and apply artificial respiration for one minute; place on stretcher and carry 25 ft. The judges watched carefully every move of the teams and finally declared the Lackawanna team the winners by one half point.

The judges awarded points as follows in the different events:

Colliery	Company	No. 1	No. 2	No. 3	No. 4	Average
Lackawanna	Temple Co.	100	100	100	100	100
Central	D., L. & W.	100	100	100	100	100
Harry E.	Forty-Fort Co.	100	94	100	100	98
Pine Brook	Scranton C. Co.	98	100	100	96	98
Forty-Fort	Forty-Fort Co.	100	96	98	100	98
Mt. Lookout	Mt. Lookout Co.	100	100	100	88	97
No. 9 Breaker	Penna. Coal Co.	100	100	95	93	97
Bliss	D., L. & W.	95	98	100	95	97
Brisbin	D., L. & W.	100	100	96	94	97
Jermyn	Jermyn & Co.	100	100	90	100	97
Sterrick	Sterrick C'k Co.	93	100	95	95	96
Coray Slope	Penna. Coal Co.	100	94	94	95	96
Ewen	Penna. Coal Co.	100	94	95	95	96
Storrs	D., L. & W.	94	90	100	95	95
Mayfield	Hillside Coal Co.	95	100	94	90	95
Old Forge	Penna. Coal Co.	94	98	91	98	95
Dunmore No. 2	Penna. Coal Co.	94	92	100	90	94
Taylor	D., L. & W.	94	96	93	94	94

Mrs. John S. Muckle is a resident of Philadelphia and the cup for which the teams competed was donated in 1909 and its holders have been as follows:



CENTRAL TEAM OF THE "LACKAWANNA" CO.

1909, Avoca team of Pennsylvania Coal Co.; 1910, Woodward colliery team, Delaware, Lackawanna & Western R.R. Coal Department; 1911, Brisbin team, Delaware, Lackawanna & Western R.R. Coal Department; 1912, Pine Brook colliery, Scranton Coal Co.; 1913, Old Forge team, Pennsylvania Co.; 1914, Lackawanna colliery, Temple Coal Co.

The officials were as follows:

Judges—Doctors S. S. Shields, M. L. Bailey, J. W. Grant and J. B. Stinger. Secretaries—R. I. Vail, Edgar Weichel, J. G. Angwin. Managers—Dr. M. J. Shields, American Red Cross; C. E. Tobey, general manager, Delaware, Lackawanna & Western R.R. Coal Department; F. H. Coughlin, secretary, Pennsylvania Coal Co.

The personnel of the five best teams was as follows:

Lackawanna colliery outside—Harry Sax, captain; Thomas Maggs, Thomas Shultz, Reese Sax, Harry Oberts, Steve Wargo, subject.

Central colliery—Joshua Taylor, captain; Perry Clark, Joe Reid, Ivon Jones, Evan Davis, John Tompkins, subject.

Harry E. colliery—Isidor Horchester, captain; John Psolko, Frank Psolko, John Zinn, John Bigger, Frank Rosnick.

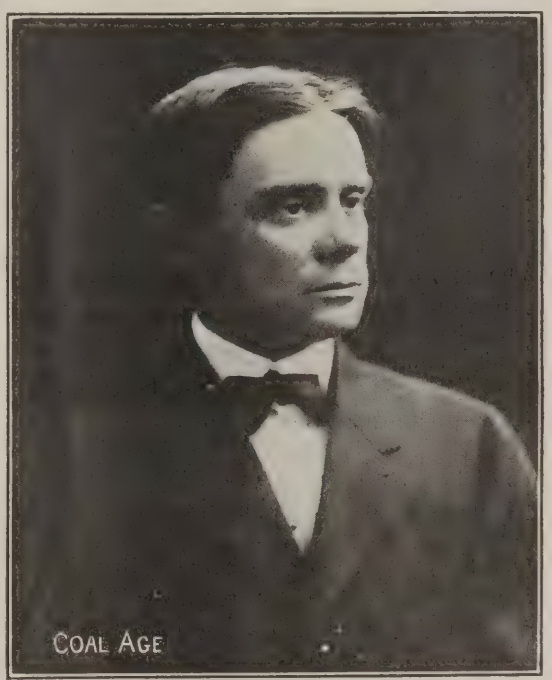
Pine Brook colliery—John Joyce, captain; Dennis Duffy, W. Morgan, Joshua James, Steve Slangan, Douglas Williams, subject.

Forty Fort colliery—Phillip Williams, captain; George Mathews, Frank Romanpomski, Andrew Tebush, Walter Jones, John Casbern, subject.

Charles S. Keith

Everybody interested in coal mining from Chicago to Salt Lake knows Charley Keith. It would be difficult to pick a man in any of our western fields who better typifies the mining industry of our central and Rocky Mountain country than he does. Mr. Keith is the embodiment of those qualities that tend to success in the great and difficult industry he serves. He is resourceful and a human dynamo of energy. In addition, he is possessed of a rare species of tact so necessary in the handling of thousands of men of differing race and habits.

Like many other successful men, Mr. Keith not only started at the very bottom, but planted himself in one particular spot and refused to budge either sideways or backward, only consenting to move in an ascending direction. No one who knows Mr. Keith doubts that the elevator which has carried him from the sub-basement to the palm garden on the roof was of his own manufacture and operated by motive power supplied by himself, for



CHAS. S. KEITH

himself. But best of all, and notwithstanding his rise in altitude, he has not forgotten his many old friends on the floors below and has not been spoiled by the broad view afforded him by the high elevation he has attained in the business world.

With it all Mr. Keith is still a very young man, having been born in Kansas City in January, 1873. His early education was secured in the public schools of Kansas, which preparatory training was followed by a college course at Fordham University. At this latter institution he obtained a "B. S." degree in 1891.

On leaving college, Mr. Keith immediately connected himself with the Central Coal & Coke Co., a corporation which he had already served as office boy. His rise was rapid, and is not ended yet, for each succeeding year tells a story of his greater achievements and increased influence.

Charley Keith is the type of man who is not content simply to measure up to a job, but rather the kind of fellow who makes the position fit himself. The remarkable record of growth of the Central Company is evidence of

his ability as an instrument of industrial expansion. His aim is to make his corporation not just a big concern, but the biggest of all.

Mr. Keith is rather an active citizen, and a useful member of practically all the organizations in his home town. At present, he is serving as president of the Kansas City Commercial Club; president of the Interstate Coal Operators Association and a member of the U. S. A. Chamber of Commerce. His business interests are mostly in lumber and coal. Aside from serving as president of the Central Coal & Coke Co., he is president of the Louisiana and Texas Lumber Co.; president of the Delta Lumber Co.; director of the Fidelity Trust Co. and director of the Metropolitan Street Railway Company.

In the social life of the Middle West, Mr. Keith figures prominently: He retains membership in the Kansas City Club, University Club, Midday Club, Commercial Club, Kansas City Country Club, Mission Hills Club, Blue Hills Club, Mercantile Club in St. Louis and Chicago Athletic Club.

Safety in Charging Dynamite

By H. N. Freeman*

There are many instances on record of dynamite going off with disastrous results when being inserted into the hole. This might be attributed to any one of the following causes:

1. The hole may not have been cleaned properly, and a small piece of coal remaining may break the cartridge and allow the powder to become distributed along the hole. This is liable to be and often is exploded either by forcing other cartridges into the hole and grinding the stray powder or by the friction of the tamping bar.

2. If the powder is not properly thawed, it will leave small particles of nitroglycerin on the sides of the hole, which are liable to be exploded by the friction of the tamping rod.

3. The hole may have been bored with drills that are not of the same gage. These leave a collar in the hole, so that when the powder is being inserted, it will jam against one of these collars.

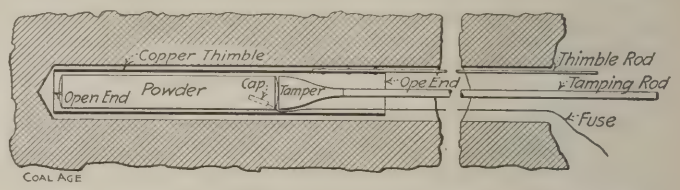
4. There is a practice prevailing among miners to force the powder, thereby causing the premature explosion of the charge.

5. It frequently happens that in his hurry a miner may neglect to put the first stick of powder to the back of the hole. He then puts in the primer and forces it on to the powder, driving the charge back a couple of inches or more. This is a common practice among miners and a large percentage of accidents may be attributable to this cause.

The accompanying figure illustrates a device that should, I think, prove a great benefit to miners in both quartz and coal. I claim it will enable one to place his powder to the back of the hole without its coming into contact with the sides of the bore.

The charger consists of a light copper tube or thimble with a rod or handle of ⅜-in. round copper riveted to the side of the tube. The thimble is made ½ in. larger in diameter than the cartridge, and ½ in. less than the diameter of the hole. A slot is made in the tube to accommodate the fuse. The charger is open at both ends, thus enabling the tamping bar to be inserted next the powder and preventing undue pressure. Both charge and tamping bar are inserted into the hole, at the same time.

After the charge has been delivered to the back of the hole, the charger is withdrawn over the tamper, and the powder is pressed into a solid mass in the back of the hole. Some miners make a practice of splitting the paper cartridge and compressing the powder to the full diameter of the hole. This can be done more safely with the charger, as the split cartridge does not come into contact with the hole, at any point, thus eliminating those causes for premature discharge to which I have previously referred.



Section through Drillhole, Showing Charging Thimble and Charge of Powder

The chargers can be made for about 10c. each; and, if properly used, are time savers in tamping a shot, all the powder being placed in the charger before it is inserted into the hole. They are especially useful when charging a hole drilled on an angle, as the full charge may be put into the hole at one time; while, otherwise, something must be used to keep one stick in place, when preparing to insert the next one.

*Manager, The Vancouver-Nanaimo Coal Mining Co., Nanaimo, B. C., Canada.

Who Knows?

He is indeed a bold prophet who pretends to forecast either the probability or improbability of future usefulness of any raw material. As has been illustrated by the radium mineral carnotite, the mineralogic curiosity of one decade may become the valuable ore of the next. Again, the principal ore of aluminum, bauxite, was not even mentioned in a list of useful minerals published by the U. S. Geological Survey 25 years ago.

Cement Gun in Coal Mines

The Bureau of Mines in February shut down its experimental mine near Bruceton after completing the second series of tests, in order to make the annual repairs and to prepare for a new series. It is expected that coal dusts from various sections of the country will be sent to the mine in order that their explosibility limit may be tested, when the dusts are admixed with shale, clay or sand. Consequently, it is necessary that part of the explosive passages of the mine should be lined to prevent dust from the roof and coal ribs from entering into the explosion tests and affecting the results.

To line the entries with massive or reinforced concrete would be beyond the pocketbook of that part of the Bureau's work, but it occurred to the chief mining engineer that as the roof and ribs to be covered were well in the interior of the mine, that if a thin coating of cement could be placed over them, sufficiently bonded to the natural strata, every purpose would be served. Accordingly a cement gun was rented, and about 750 lineal ft. in all of the entryway has been completely coated. While the tests have not yet begun, the bonding to the walls and roof, even to the draw-slate, appears even better than ex-

pected. It was especially gratifying to note that the cement mortar appears to stick tightly to the draw-slate, which is practically clay.

If a lining like this will stay permanently, it offers great possibilities in mining. The chief mining engineer thinks the gun will be of great value around any mine, as a fireproof stopping can be quickly made, and despite the rapidity of the work, the stopping will be tight and will exclude air.

The gun is arranged on wheels and is self-contained, being drawn by a small gasoline motor, except that compressed air must be furnished from outside or else a portable compressor used.

The lining will doubtless be examined by the members of the American Institute of Mining Engineers with great interest on the occasion of their visit to the experimental mine on the afternoon of Oct. 9, to witness an explosion experiment primarily to test the efficiency of various rock-dust barriers developed by the Bureau engineers.

Colorado Operators Reply to the President's Proposition

SYNOPSIS—The operators in Colorado declare that the truce proposed would be broken like the former one and assert that any concessions to disorder are derogatory to the national government whether made to corporations or to miners. They urge that, in regard to picketing, the new agreement is less satisfactory than the state law. They point out that the new commission to be appointed by the President would have far more power over the coal corporations than any of the bodies of regulation having congressional authorization.

The letter following has been addressed to the President from Denver, Colo., by a number of Colorado operators and is dated Sept. 23, 1914.

Sir: Your letter of Sept. 5 and draft of "Tentative Basis for the Adjustment of the Colorado Strike" has been submitted to us by the parties to whom it was written, at a meeting to which the operators of all the coal mines of the State were invited.

We are in complete accord with the sentiments expressed in your letter, and appreciate the interest you have taken in the "Colorado situation."

We realize that, with the multitude of more important matters constantly engrossing your time and thought, you are, to a large degree, dependent for your information concerning the Colorado strike on the representatives of the Government of the United States who, you state, "have been actively engaged in the investigation of the whole situation and in trying to reach a dispassionate conclusion."

It is to be regretted that the character of the investigation and the previous records of these representatives selected by Secretary of Labor Wilson justify the belief that they are partisans of the men who have made necessary the presence of the Federal troops in the strike district. One of the representatives, William Fairley, was a member of the National Executive Committee of the United Mine Workers of America for Alabama, and, according to their Treasurer's report, was on their payroll during the year ended Nov. 30, 1913, and was actively engaged as an organizer and agitator in the Colorado strike in 1904.

The New Truce as Easy to Violate as the Old

The utmost sought to be accomplished by the tentative plan is the establishment of a three-year "truce" presumably between the coal-mine owners of this State and the organization known as the United Mine Workers of America, which instigated and has conducted and financed the strike.

For many reasons, we deem it unwise to enter into engagements of any character with this particular labor union, especially an agreement dependent upon a cessation of armed hostilities upon its part.

The Governor of this State, some months since, entered into an agreement of truce with the leaders of this organization, and, in utter disregard of their obligations, the striking miners, under the direction of these identical leaders, continued with renewed vigor to destroy our properties and kill our workmen. It would be imprudent to again place any reliance upon the good faith of these men.

We feel, furthermore, that a mere "truce," even if it could be enforced against the voluntary, unincorporated association and its irresponsible leaders, is but a palliative measure and can lead to nothing other than what the term itself implies—a renewal of trouble at its termination.

No reference is made nor consideration given in the "tentative plan" to the large body of men, some 9500 in number, who are now peaceably at work in the mining districts of the State, who have caused no disturbance of any kind, and whose only desire is that they be permitted to continue at work without interference from any outside source. As a matter of justice their desires should be ascertained and given full consideration. It is this body which has continued industriously at work during the last year, thus saving the public from the loss and discomfort which would have resulted from a scarcity and excessive price of coal.

A Concession to Disorder

Again, the plan proposed involves, in effect, a contract or agreement between the operators and the strikers or their leaders that both will keep the peace and obey the law for the period of three years. It appears to us that the plan is subject to fair criticism in that it implies the helplessness of government to maintain law and order and secure to every citizen his constitutional rights without the consent and approval of those evilly disposed.

We believe that a large majority of the people of Colorado agree with us that the sole issue at the present time is the preservation of law and order in the strike districts and the maintenance of the constitutional right of every man to work when, where, for whom, and upon such terms as he sees fit.

It would be fatal to the preservation of government, either national or State, for either to discuss with offenders of any character the terms upon which the laws should be obeyed and acts of lawless violence be discontinued.

Whether the blame for what has taken place in Colorado is chargeable to the operators or to the striking miners and their leaders, the plan proposed involves a bargain between government and law on the one side, and violators of the law on the other.

Operators Readily Agree to Three Propositions

Not as a matter of contract or "truce" with the United Mine Workers of America or the strikers, but with a desire to meet your views so far as possible, we will adopt and coöperate in putting into effect three of the six suggestions in the "tentative plan," and the fourth with necessary, and, as we believe, reasonable modifications.

1. "Enforcement of mining and labor laws of the State."

We have not wilfully violated any of the laws of the State, and will render every possible assistance to the civil authorities in their enforcement.

3. "Intimidation of union or non-union men strictly prohibited."

We agree to this without reservation, but the "tentative plan" provides no way of enforcing the rule.

4. "Current scale of wages, rules, and regulations for each mine to be printed and posted.

This practice is already in force in many of the mines in the State, and we will at once put the suggestion into effect at all our mines.

Employment of All But the Convicted

2. That all striking miners who have not been found guilty of violation of the law shall be given employment by the employer they formerly worked for, and where the place of the employee has been filled, he shall be given employment as a miner at the same or other mines of the company."

We are and have been willing to employ as many of the strikers as possible, without discriminating against them

for having laid down their tools, and we believe that we can give work to a very large majority of those remaining in the State. But it is quite impossible for us to agree to employ all striking miners who have not been found guilty of violence. Whether those who have participated in violence are prosecuted and found guilty or not, we cannot agree to give them employment in the mines operated by us.

In six of the counties of the State 332 of the strikers, including officers of the United Mine Workers of America, are under indictment for murder and 137 for other felonies. None of them have been tried, therefore none have been found guilty, and much time may elapse before they are tried. The personal safety of our present employees and their families, to say nothing of the protection of our property, demand that we exercise the greatest possible care in employing men from the ranks of the strikers, who have been banded together to drive our employees from our mines and to destroy our property.

The coal mines of Colorado last month (August, 1914), employed approximately 9500 men, or nearly 80 per cent. of the number employed during the corresponding month of last year—the month immediately preceding the calling of the strike. The present force of men can probably produce sufficient coal to meet the requirements of the Colorado public during the coming winter, and it is certain that no shortage can occur if the orders under which the Federal troops are acting can be so modified as to permit the many idle men who apply for work to be given employment without the limitations or restrictions now enforced by the Federal troops.

Some "Strikers" Have Never Yet Mined Coal

Some of the larger companies have closed a number of their mines, and under existing business conditions they will undoubtedly remain closed for a considerable period of time.

Many of the strikers have left the State and found work elsewhere. A considerable number have returned to work at our mines from time to time, ever since the strike was called, so that of those who originally went out on strike but comparatively few remain. Many of the men now in the strikers' camps have never worked in the mines of Colorado, but have been imported by the United Mine Workers to keep up the semblance of a strike.

Grievance Committee Mischievous

5. "Each mine to have a Grievance Committee, Etc."

This is a favorite method of the United Mine Workers' organization to foment trouble and provoke strife, although they have in many cases, notably in West Virginia, waived this demand.

In practice, it has been found that such committees have a damaging effect on the interests of both the employee and employer. The tendency of such committees is to magnify trifling and unjust complaints into great grievances, and interfere with the discipline necessary for the safety of the employees and company property, and to destroy the authority of the officers responsible for the operation of the mines.

Our employees have never asked for such a committee and we are strongly opposed to this feature of the "tentative plan."

We have always listened to and have been ready to correct any substantial grievances of our employees. There are surprisingly few complaints, except in times of strike, and such complaints are principally after-thoughts of the strikers. But to remove every possible cause for criticism we have been for some time and are now working on a plan (which we had taken up with the Governor prior to the receipt of your letter) to protect our employees against any possible injustice on the part of mine bosses, and to investigate and correct real or dissipate imaginary grievances, if any such exist. This plan, we believe, will satisfy our employees without destroying the necessary authority or influence of our superintendents and without depriving us of the reasonable control of our business.

A Commission with Unequaled Powers

Clauses five and six provide for a commission which "shall serve as adjusters or referees in all disputes (whether individual or collective) affecting wages, working and social conditions." "The decisions of the commission shall be final and binding on employers and employees." "Willful violation of any of these conditions will be subject to such penalties as may be imposed by the commission."

The unlimited authority of this proposed commission of three persons to be appointed by the President of the United States practically puts the entire control of the most important department of our business in its hands. Its power to control the conduct of our business far exceeds any of the demands of the United Mine Workers of America. A commission with such powers has never before, to our knowledge, existed or been suggested. The Interstate Commerce Commission, with all of its extensive powers for the regulation of railroads and railroad business, has no such variety or scope of authority as this proposed commission, while the decisions of the Interstate Commerce Commission are subject to review by the courts under established rules of law.

The power to regulate the wages of our employees individually and collectively, as often as demands are made, would prevent us from making any estimate of the cost of production on which to base our contracts for the sale of coal, and could be used to destroy existing competitive conditions.

The power to adjust all questions affecting working conditions will destroy the discipline necessary for the safety not only of the men but of the property.

The power to regulate social conditions would destroy the personal liberty of individuals, and is a more sweeping and comprehensive control than is claimed by either Church or State.

The decisions of this commission could not be enforced against our employees, who, if dissatisfied with the award, could leave our employ and seek work elsewhere, whereas, to the extent of our financial responsibility, the award could be enforced against us.

An unwise or unjust exercise of the powers of this commission might result in the financial ruin of any operator.

It is unfair to place our business in a position where it can, under any circumstance, be subjected to the unappealable mandates of any men or body of men however well meaning and experienced.

Operators to Agree to a Violation of State Laws

We regret our inability to agree to this suggestion of the "tentative plan."

6. Paragraph "D." "There shall be no picketing, parading, colonizing, or mass campaigning of representatives of any labor organization of miners who are parties to this truce, which will interfere with the working operations of any mine.



How the Former Truce Was Observed at the McNally Mine on Apr. 27, 1914



House at Piedmont of Rocky Mountain Fuel Co., Blown Up by Strikers, Nov. 11, 1913

Picketing is prohibited by State law, and that law can be enforced by the civil authorities. The limitations placed on the observance of this rule, as above emphasized, could be made a pretext for its constant violation.

Paragraph "G." "The suspension of a mine over six consecutive days by the company may be authorized for a cause satisfactory to the commission, but not pending any dispute."

This rule totally disregards possible market conditions and other industrial contingencies, which, in the ordinary course of the business, frequently make it necessary to suspend operations for considerable periods of time—under some conditions for a month or even longer.

The Involuntary Check-Off

"On account of the mutual benefits derived from the 'truce,' employers and employees should each pay one-half of the expenses of the commission."

Our present employees, who have not been considered in the "tentative plan," should not be asked to contribute to the maintenance of such a commission. Neither do we see how we as operators can agree that our employees will contribute to this expense except by their individual consent.

Necessity for Federal Troops

It is not our purpose to take up your time with a history of the strike and the circumstances leading up to it, nor to discuss whether the operators or strikers were responsible for the past violence, but we wish to call your attention to the fact that since you sent the Federal troops into the strike districts there has been nothing in the attitude of the coal operators to make the presence of the troops necessary, and, except for the attitude of the strikers, the Federal troops could be withdrawn at any time without endangering the peace of the district or the safety of the strikers.

On the arrival of the Federal troops in the State, the coal operators promptly complied with your proclamation by delivering up all of their arms and dismissing their guards.

On the contrary, the strikers defied your authority, gave up only a few of their arms and still gathered together in camps with arms readily available for the purpose of attacking our mines as soon as the Federal troops are withdrawn.

Our employees being now unarmed and our property defenseless, if the Federal troops are withdrawn, great destruction of life and property will surely occur.

Suggestions for Creating Peace

We respectfully suggest that the Federal troops can safely be withdrawn from Colorado when the officers and agents of the United Mine Workers of America cease to incite the strikers to lawlessness and cease to support them in idleness; or when the strikers surrender their arms and ammunition and the Governor of the State puts into effect by proclamation and enforces the law passed at the special session of the State Legislature held last May relating to the shipment, sale, and possession of arms and ammunition in the strike districts.

We shall be glad to coöperate with you in any practical measures having for their object the termination of the unfortunate labor conditions which, to some extent, still exist in this State. It is our firm conviction that the result universally desired can be obtained by a strict and impartial enforcement of the laws affecting alike strikers and operators. To this end, we take the liberty of suggesting that there be such concurrent action upon the part of the Federal and State authorities as will enable the Governor to immediately put into effect, within the limits of the disturbed district, by proclamation, the laws recently enacted by this State relating to the sale and possession of arms and ammunition, and to repeat our frequent requests that the orders to the officers in command of the Federal troops in this State restricting the mine operators in the employment of labor be so modified as to permit the employment of workmen as in normal times. Respectfully,

VICTOR-AMERICAN FUEL CO., J. C. Osgood, Chairman.
ROCKY MOUNTAIN FUEL CO., D. W. Brown, President.
BROOKS-HARRISON FUEL CO., James E. Brooks, President.
PALISADE COAL AND SUPPLY CO., Henry Denman.
PRIMROSE COAL CO., H. B. King, President.
NATIONAL FUEL CO., H. Van Mater, President.
ROYAL FUEL CO., H. Van Mater, President.
GORDON COAL CO., Wm. Dick, President.
NEW MAITLAND COAL CO., J. T. Thompson, President.
WILLIAMSBURG COAL CO., Simon P. Smith, President.
ROYAL GORGE COAL AND FIRECLAY CO., E. G. Bettis, President.
EMPIRE COAL MINING CO., R. D. Marthens, Treasurer.
BIG FOUR COAL AND COKE CO., P. M. Peltier, President.
HAYDEN BROS. COAL CORPORATION, Lewis A. Hayden, President.
GARFIELD MINE LEASING CO., E. Horstman, President.
CONSOLIDATED COAL AND COKE CO., C. L. Baum, President.
ALLIANCE COAL CO., D. A. Cannon, President.
CEDAR HILL COAL AND COKE CO., D. M. Harrington, President.
PATTERSON & SONS COAL CO., El Paso Co., Alex. Patterson.
PIKE'S PEAK FUEL CO., John Tait Milliken.
SANTA FE COAL CO., S. S. Murphey, President.
TURNER COAL CO., James B. Dick, President.
RUGBY FUEL CO., George D. Kimball, General Manager.
WALSENBURG COAL MINING CO., George Fruth, President
BALDWIN FUEL CO., H. E. McElwain, President.
BREEN COAL CO., J. P. Breen.
AZTEC COAL MINING CO., J. S. Autrey, President.
YAMPA VALLEY COAL CO., P. M. Peltier, President.
FREDERICK FUEL CO., D. M. Simpson, President.
ROUTT COUNTY FUEL CO., E. L. Prentiss, President.
CHICOSA FUEL CO., J. V. Sickman, President.
UNION COAL AND COKE CO., Jas. V. Bowen, President.
HUERFANO COAL CO., S. S. Murphey, President.
SUNNYSIDE COAL MINING CO., W. F. Oakes, President.
SOUTH CAÑON COAL CO., H. F. Nash, General Manager.
OAKDALE COAL CO., William B. Lewis, President.
MUTUAL COAL CO., S. S. Murphey, President.
TEMPLE FUEL CO., F. R. Wood, President.
NORTHERN COLORADO COAL CO., J. S. Siple, General Manager.
GRAND JUNCTION MINING AND FUEL CO., H. M. McNeil, Secretary and Treasurer.
NEW FOX COAL CO., D. E. Evans, President.
MOFFAT COAL CO., S. M. Perry, President.
LEYDEN COAL CO., S. M. Perry, President.

The undersigned operators, who have made agreements with the United Mine Workers of America and are employing union labor, join in the views expressed in the foregoing letter in relation to the "tentative plan" therein referred to:

RAPSON COAL MINING CO., W. W. Curtis, President.
CARBONADO COAL MINING CO., J. B. Hutchinson, President.
MINNEQUA COAL CO., E. F. McGowan, President.
P. K. HARMON.
BLACK CAÑON FUEL CO., Talton F. Crane, Secretary.

Don'ts for Rescue Corps

Note—From book of instructions of Susquehanna Coal Co., Wilkes-Barre, Penn.

1. Don't fail to notify the man in charge of apparatus at once in case of trouble.
2. Don't tamper with the apparatus. It is ready for service.
3. Don't use old batteries in your lamp.
4. Don't hurry when using the apparatus.
5. Don't put the apparatus on alone and go into the danger zone without having someone make a thorough inspection of the apparatus. Don't go into the danger zone alone.
6. Don't use old cartridges in dangerous work.
7. Don't fail to look at pressure gage before going into the danger zone.
8. Don't fail to inspect all connections before putting the apparatus on.
9. Don't fail to keep in communication with the other helmet men.
10. Don't take helmet off in danger zone.
11. Don't forget that the rescue of men is the first consideration.
12. Don't forget to send for the first-aid immediately.
13. Don't chew tobacco in the helmet.
14. Don't disturb too much wreckage on first inspection It might start something.
15. Don't fail to note conditions.
16. Don't fail to report conditions noted.
17. Don't fail to report any abnormal behavior of the apparatus.
18. Don't forget to return immediately if you think apparatus is not working properly.
19. Don't take chances—PLAY SAFE.
20. Don't fail to follow instructions.
21. Don't go into a strange mine without a guide.
22. Don't expect to be able to work as hard or as fast with the apparatus on as without it. You are carrying a load.
23. Don't, under any consideration, when exploring a mine in which electricity is used, get in contact with bare wires, unless you are sure the current is off.
24. Don't fail to take extra electric lamps with you from the rescue station—some may not work properly.
25. Don't forget the apparatus is only good for two hours.

Editorials

Buy a Bale!

The cotton growers say, "Let every one buy a bale of cotton so as to enable the cotton farmers to go on raising crops during the war." And it is an extremely popular movement, but it will probably result in a glut of cotton and if no one buys the crop, the land next year will be devoted to something else and serve an almost equally useful purpose.

But if the war causes bad times and the demand for coal becomes slack as is likely to happen, will everybody buy a dozen tons of coal so as to keep the miners busy who otherwise would be idle? Is not their idle labor as much an economic loss as the cotton farmers' idle land, if it really becomes idle? Is their lack of wherewithal any less distressing than that of the cotton growers? Is there, in short, anything more logical in "Buy a bale" than in "Buy a cellar-full of coal?"

We think not, but we are not surprised at the argument in the opposing direction; for our care of the farmer has exceeded our care for any industry except in the matter of tariff. In that one direction of glaring discrimination, we have more than made up for all our false sentiment and tender solicitude for the farmer.

Compensation in Pennsylvania

The Susquehanna Coal Co., with its affiliations, mines about 5½ million tons of coal per year. It has perhaps as large a number of first-aid teams per thousand of tons of production as any company in the anthracite region, and we might add in United States, for the first-aid teams in the hard-coal mines are easily leaders in numbers and efficiency. At the recent meet at Shamokin, the Susquehanna had 44 teams in the field.

The recent contest at Terre Haute, Ind., was considered by everyone a marvelous success, yet only 29 teams competed. There is no question about the energy with which the Susquehanna employees, with Morris Williams and Robert Quinn at their head, are striving for safety.

Last year the company spent $50,000 for safety inspectors alone, and there is evidence that the expenditure was not without its reward in the saving of life and limb. A year ago the address of the president of the company, Morris Williams, was on the introduction of safety inspection. This year his talk was mainly on compensation for injuries.

He stated that a prominent coal operator had remarked to him that it was a conscienceless nation which would send its men into the battle and not provide for the widows and orphans and it was an industry without shame which would send its men into danger and not protect, by compensation, the dependents of those who might be killed at their daily task. Mr. Williams believed that a compensation bill should be passed at once which would protect the wives of miners and others from the prospect of closing their lives over the steam of a washtub.

A few years from now, such remarks will be merest platitude, so fast do we move forward. But today, Mr. Williams' remark is regarded a. a bold statement. We trust that many other operators will support Morris Williams in his stand for workmen's compensation. In this connection, it is interesting to note that in 1912, at the summer meeting of the Coal Mining Institute of America, H. S. Endsley, counsel for the Cambria Steel Co., also advocated this provision.

It is true that in many other states, operators have come forward and prepared compensation bills, but in most cases they were face to face with conditions which threatened to bankrupt the companies. Unreasonable juries were bringing in verdicts unfair to the coal corporations and which threatened to drive them out of business. Any compensation bill was an improvement on the conditions existing.

But in Pennsylvania, a compensation enactment will replace a condition whereby the operator is almost entirely relieved of responsibility and the company which advocates the passage of such a measure has nothing but its conscience to direct it.

The Coal Trade and Requirements of Peru

We have heard much of the expected changes that would be wrought in American shipping and trade by the Panama Canal. There is perhaps no portion of the world which will be more strongly influenced than the western coast of both North and South America, while probably no commodity will be more vitally affected than coal.

So far as South America is concerned, the countries lying east of the Andes, with the possible exceptions of the United States of Colombia, and Venezuela, produce practically no coal of their own. West of this mountain range, however, and included therein, the countries are a little more fortunate in their natural fuel supplies. Both Chile and Peru produce coal, but neither country is sufficient at the present time to its own needs.

In Peru, while it is well known that certain regions have considerable coal deposits, these districts lying less than 100 miles from the coast, but two mines have been operated during recent years. These were worked by the Cerro de Pasco Mining Co., at Goyllarisquisga and Quishuarancha, producing between 600 and 800 tons per day. This coal, however, finds its use in the blast and reverberatory furnaces of the company, and during 1913, there were imported into Peru from foreign countries, 150,660 metric tons (166,074 American short tons) of coal and coke.

The principal obstacle, in the way of developing the coal properties of the land, appears to be limited railroad facilities, and the heavy constructional expense involved in building the same in the rough and mountainous coal-bearing districts.

The value of the coal and coke importations into Peru in 1913, and the countries of their origin, are as follows: Australia, $106,630; Belgium, $38,259; Chile,

$27,933; Germany, $318,198; Netherlands, $45,266; Great Britain, $768,424; United States, $111,544; total, $1,466,227.

That Great Britain has a long established trade between the west coast of South America and Wales, accounts in large measure for the heavy importation of English coal. The vessels bringing this fuel return with sugar, cotton or nitrate, from either Peru or Chile.

The prices paid for Welsh coal alongside in lighters at Callao ranges from 46s. to 50s. or from $11.17 to $12.16 per ton, according to the prevailing freight rate. The importation from Germany consists almost exclusively of coke, which is used by the various mining companies for smelting. The German products alongside at Callao cost about 42s. ($10.20) per ton.

The importations from Australia are of low-grade or gas coal, used mostly by the local gas companies. This costs from 37s. to 40s., or from $9 to $9.72 per ton, f.o.b. Callao.

There are ample facilities for discharging coal at Callao, either to lighters or barges, or upon the docks, the latter, however, costing about 72c. per metric ton. The port charges are: Tonnage dues, 10c. per registered ton; hospital dues, 2c.; dock-companies dues, 6c.; light dues, 1c.; stevedore, loading and discharging, 10c.; ship's broker entrance, $30; clearance, $20. There is no duty upon coal.

Few if any briquettes are now being employed in this country, and within the past 12 months or thereabouts, the Peruvian Corporation, which operates and controls approximately 80 per cent. of the country's railways, has burned oil instead of coal in its locomotives, large quantities of the former product being now produced in this country.

With the opening of the Panama Canal and therewith the ability of many American coal producers to send cargoes direct to the west coast ports from such American shipping points as New Orleans, Mobile and Newport News, it would appear that many of these shippers would be able to successfully compete in this market with European or Australian producers. Certainly American operators receive a lower price for their product at the mine's mouth than do those of Great Britain or Continental Europe, while the distance that the American coal would be required to travel in order to enter the west coast ports of South America is shorter by some thousands of miles than the distance from the European or Australian sources of supply.

Evolution in Trade Conditions in Indiana

Eastern coals for a long time completely predominated the Indiana markets, and it is only in recent years that the local product has come into any extensive use. As a result of an aggressive educational campaign on the part of the Indiana operators, consumers were prevailed upon to give the local fuel a thorough test, with the result that these have, in many instances, been adopted for permanent use.

The Indiana coal has had the reputation locally of being somewhat "dirtier" than other fuels. To overcome this prejudice, operators have been careful to hold their best grades for these markets. As a result of persistent and well directed efforts, the local fuels are now displacing the higher-priced Eastern coals, such as the Hocking Valley, sales of which have been materially reduced. It is now estimated that the Indiana mines furnish from 50 to 75% of all the domestic fuel consumed in the state. A careful estimate made in Indianapolis a few years ago, showed that about 30 per cent. of the sales there were of Indiana coal, and it is conservatively estimated that these have at least doubled since that time. In the southern part of the state about 90 per cent. of the consumption is the local product, but on the eastern border, where the freight rates are more favorable to the Ohio, Pennsylvania and Virginia coals, there is still a moderately large consumption of these grades. As regards the steam coals, the Indiana mines have a practical monopoly of these markets.

Prevention of Accidents from Hoisting

A serious accident at a large colliery has drawn attention to the necessity of adopting precautionary measures in hoisting men from new shafts during sinking operations. An investigation committee recommends that always during sinking, the hoisting engineer should be protected from inclement weather by the erection of a permanent structure over him. They further suggest that overwinding apparatus should always be in use; that portable lamps should be provided instead of carrying an electric cable down the shaft with a single globe lamp attached to it. It is further advised that two sets of engines for raising men be provided, so that one hoisting outfit will always be ready in case of emergency. The provision of roped ladders is likewise recommended.

Inflammation Limits of Gaseous Mixtures

It is interesting to note that British investigators have proved conclusively that minute sparks can be passed through an explosive gaseous mixture without exploding it, although the temperature of the spark is above the generally accepted ignition temperature of the mixture. It was observed, however, that some slight combustion took place in the path of the spark. When the intensity of the spark was increased, the gases exploded.

These experiments would seem to indicate that gas mixtures differ considerably in their ignition temperature. In other words, a gaseous mixture diluted with inert gas, or under reduced pressure, requires a hotter spark to fire it than when it exists under normal conditions. Methane (the chief constituent of firedamp) differs from hydrogen in having a higher ignition temperature and a more prolonged process of oxidation for complete combustion. It is for this reason, in all probability, that in the case of an inflammable mixture containing methane, the source of heat necessary to inflame the mixture must be more intense and must be longer in contact with it than in the case of a hydrogen mixture.

The question of using the energy of large quantities of coal by other means than as a steam producer will have to be faced by coal operators in the not distant future. The truth of this statement is supported by the increasing use of oil for fuel purposes. Why can't we devise a successful method for extracting fuel oil from our coal seams?

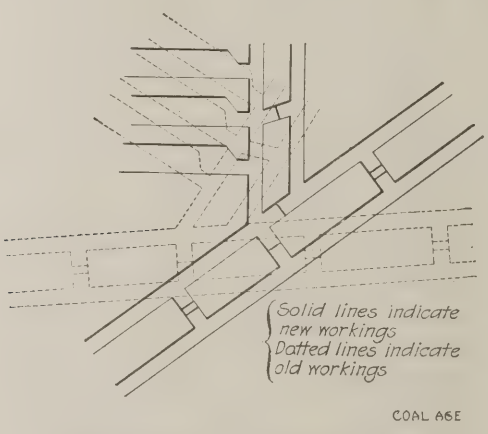
Discussion By Readers

Method of Working Underlying Coal Seam

Letter No. 2—Referring to the proposition submitted by Mr. Lyman, COAL AGE, Aug. 29, p. 357, asking for a discussion of the best method of working a 4½-ft. seam of coal, underlying a 9-ft. seam that had been previously worked out and abandoned, I would say that the method he suggests of driving the entries to the boundary and then working out the coal on the room-and-pillar retreating system, appears to me to be the most favorable, from an economical standpoint.

In the absence of any reliable data in regard to the exact location of the pillars still remaining in the old workings and which would prove a menace to the successful working of the lower seam, I would suggest the following as a precautionary measure:

In order to prevent, as far as possible, an excessive roof weight along a line of least resistance in the new workings, these should be laid out in such a manner that the lines of the entries and rooms in the lower seam will



A PROPOSED PLAN OF WORKING

make an oblique angle with similar lines in the old workings. I have attempted to illustrate this idea in the accompanying sketch, in which the new workings in the lower seam are indicated by the full lines, while the dotted lines represent what may be assumed to be a general plan of the old workings in the seam above. By this means, much of the danger that would otherwise be encountered, owing to a general correspondence of the lines of weakness in both seams, would be avoided. To still further minimize the danger, I would suggest that all openings be made as narrow as possible, consistent with economy and safety, and that larger room-and-entry pillars be provided than would otherwise be necessary.

However, should it be impossible to obtain such a general plan or knowledge of the old workings and it became necessary to develop the lower seam independently, I think that any undue roof stress, owing to unfavorable conditions in the seam above, could be detected by careful observation of their effect in the new workings. I believe, that, by carefully observing the effect produced upon posts, timbers and ribs, it would be possible to adopt precautionary measures, in the way of reinforcing the supports in the lower seams or changing the line of working, so as to overcome the difficulty.

I. C. PARFITT.

Jerome, Penn.

Letter No. 3—In answer to the request for a full discussion of the difficulties presented in the mining of an underlying seam of coal, under the conditions described by Mr. Lyman, COAL AGE, Aug. 29, p. 357, I would suggest that this seam be worked the same as though the coal lying 40 ft. above it was still solid or as though the upper seam were never there. I consider that if the coal in the upper seam has been worked out anyway clean, it will not endanger the work in the seam below.

Under the conditions existing at the present time in coal mining, I do not approve of the method often suggested of driving the entries to the boundary line before starting rib-work; or, what is called the "retreating plan." In order to put out coal at a reasonable cost, there must be a certain amount of rib-work. If the mine is properly laid out, no danger or loss of coal will result by robbing the pillars as the work is advanced. The retreating plan means a large investment for entry driving, track and timber that pays no dividends.

In considering this question at the present time, it may be assumed that the mine is to be equipped with electrical mining machines, which will concentrate the work. The seam being 4½ ft. thick, it is fair to estimate on using a short-wall chain machine capable of producing 100 tons of coal per day, and to determine the number of these machines that will be required for the desired output of the mine. Also, the style of gathering motor to be used in this low seam can be determined and the method of haulage properly planned.

With this information in hand, it is possible to lay out the mine intelligently, with respect to ventilation, haulage and drainage. I would suggest the adoption of the three-entry system for the face headings, using one for haulage and making this the intake airway, another for the return airway and the third for drainage. I would drive the butt entries 250 ft. apart and turn face headings off these, on 120-ft. centers; then open the rooms on the butts, driving them 12 ft. wide, on 25-ft. centers. With a 7-ft. cutter-bar, the ribs could be taken out in two slabs.

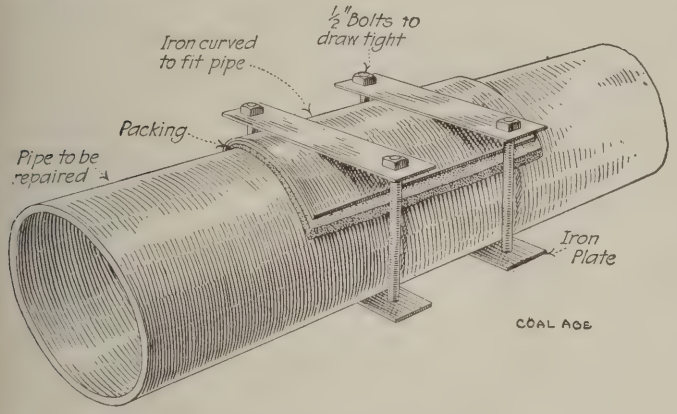
Knowing the required output of the mine, it is possible to estimate the required number of flats and the number of butt rooms that should be working on each flat; and to estimate the necessary volume of air for the ventilation of the mine. As the work progresses, and the roof conditions become known, it may be possible to modify this plan by driving wider rooms or in other ways that will produce better results.

PENNSYLVANIA ENGINEER.

Oliphant Furnace, Penn.

Repairing a Cracked Pipe

N. G. Near's clever method of repairing cracked and dented pipe as described in COAL AGE, Sept. 12, p. 425, calls to mind a method I have often employed to repair a leaky pipe, and which is illustrated in the accompanying figure. This method, on a low-pressure line or where the leak is small, may be regarded as giving results that are practically permanent.



THE PATCH IN PLACE

The blacksmith, taking as a model a pipe the size of the one to be repaired, hammers a small piece of sheet iron into a curve to fit the pipe. A piece of packing is then placed over the crack, the curved iron laid on the packing; and yokes are used on the curved iron and on the pipe on the opposite side from the leak. The patch is then drawn tight by ½-in. bolts, until the leak is stopped.

I have secured good results from this method, and it may be applied quickly and easily from materials always at hand, about the mine.

GEO. N. LANTZ.

New Straitsville, O.

The Ohio Situation

In COAL AGE, Aug. 29, p. 354, Coal Operator, writing on The Ohio Situation, objects to the 47c. rate asked by the miners for run-of-mine coal. He states as follows:

> However, the injustice of this lies in the fact that the Hocking Valley miners have been reduced 2½c. per ton, while an advance of 2½c. per ton has been placed to the credit of the eastern Ohio miners, which allowances, as far as the operators are concerned, certainly give the Hocking Valley operators an advantage of 5c. per ton over last year's prices.

Granting that a state-wide uniform scale, in the present instance, secures to the Hocking Valley operators a slight advantage, it must be remembered that in the past the eastern Ohio operators enjoyed a similar advantage through the operation of a uniform scale. I will endeavor to prove this advantage by the use of Coal Operator's figures.

In making his estimate, he states that last year's price was 69.5c. per ton for screen coal; and that the percentages of slack, for the Hocking Valley, Cambridge and eastern Ohio districts, were 28, 34 and 36 per cent., respectively. The corresponding percentages for screened lump, in the same respective districts would therefore be 72, 66 and 64 per cent. Therefore, for every ton of run-of-mine coal, the eastern Ohio operators paid $0.64 \times 0.695 = \$0.4448$; while the Hocking Valley operators paid for the same, $0.72 \times 0.695 = \$0.5004$. The difference in favor of eastern Ohio was $0.5004 - 0.4448 = \$0.556$; or, approximately, 5½c. per ton.

Considered from a miner's standpoint, the basic justice of the measure is apparent. It requires the same labor to produce a ton of coal, regardless of the percentage of slack; and the miners feel that *equal labor demands equal compensation.* It is this principle that induced the Hocking Valley miners to sacrifice 2½c. per ton for the benefit of the eastern Ohio miners.

GEO. N. LANTZ.

New Straitsville, Ohio.

The Foreigner in Mining

The contrast in tone of letters Nos. 3 and 4, COAL AGE, Sept. 12, p. 440-1, is very striking. These letters relate to the education and treatment of the foreign element in mining.

In letter No. 3, Mr. Parfitt depicts a class utterly void of inherent virtue. He describes them as possessing "a dominant characteristic that is the result of centuries of association with a type of civilization wholly un-American" and a menace to the country. The tone of Mr. Hogarth's letter, No. 4, on the contrary, is optimistic. It teems with encouragement for the mine official and hope for the foreign miner, recking not his foreign birth, ancestors and doctrine.

While one of these writers would debar the foreigner from the liberty he seeks and condemn him for characteristics that are the results of previous environment and for which he is obviously not responsible, the other takes him by the hand and welcomes him to the enjoyment of a freedom, which, it may be assumed, he appreciates, having fled the tyranny and injustice of his own country. While one writer declares this element incapable of improvement and the time and labor devoted to their education as wasted, the other says, "The better they are treated, the better men they become." While one writer is narrow, illiberal and unjustifiably harsh in his judgment, the other is broad and humane; his expressions bubble over with the milk of human kindness.

Personally, I am pleased to be in a position to testify to the loyalty of the foreign miner toward his employer, generally; also, to his ability to mine and load coal or perform any other task in regard to which he has been properly instructed. Experience has taught me that, instead of the time spent in teaching and instructing these men being wasted, it is well spent and productive of good results. Close observation of what many of these men have accomplished only strengthens one's admiration for them, in view of their dominant characteristics, which are described by the first writer as "cunning, subterfuge and duplicity." I am free to confess that these qualities more often describe members of our "pit committees," who have been born and bred in freedom and should possess higher qualities.

Many mine officials can endorse the statement of the second writer, in reference to taking these men "as they come from the old country, fresh from following the plow and watch them grow to be good miners and good citizens generally." And, I doubt if any mine official can recall a foreign miner declaring his belief that "earthly rulers exercise their authority by divine appointment." In-

stead of portraying such a belief, the evidence at hand points most emphatically to the other extreme. The tragic deaths, in recent times, of the kings of Greece, Portugal and Italy, and lastly the assassination of the Crown Prince and Princess of Austria, bear ample testimony that the mind of the foreigner is not "indelibly impressed" as described.

There is still another aspect to this discussion, which the first writer has seemingly overlooked. Whatever the foreign miner is or is not, we know, certainly, that he *is* a first-class man for loading coal. His ignorance of American institutions is excusable and a thorough knowledge of them dispensable, as far as the work in hand is concerned. Indeed, it would be a calamity if this class of immigration were to be replaced by a more highly educated type. We may ask, what would be the effect on the coal industry if none but the "morally educated" and "mentally developed" were admitted to our shores. It should cause no surprise that the foreign miner, for a time, fails to appreciate and often misjudges the privileges that are his in this country. Transported suddenly from his environment of ignorant superstition, which is intensified by the combined efforts of king and clergy to limit his freedom, it is only natural that the lifting of this load should cause the man to rebound accordingly. The fact reveals the wealth of vitality awaiting development under the kind heart and willing hand of a Hogarth to direct it aright.

The foreigner coming to this country judges of its laws and customs by the treatment he receives. His personal contact with people is to him the best and only interpretation of the laws of the country. The harsh treatment of an employer develops a corresponding line of conduct in the workmen. To the credit of this class of immigration, it may be said that the immigrant of a few years ago now sees his sons occupying important positions of honor and trust in all branches of industry throughout this country, notwithstanding the handicap of their dominant characteristics. Experience at the Ellsworth collieries has proved that it pays to educate and instruct the foreign element and to assist him to acquire both the language and a knowledge of what constitutes true citizenship.

In closing, allow me to suggest that all superintendents who are desirous of generating and fostering a proper spirit toward their foreign employees should carefully read Mr. Hogarth's letter and then present a copy of the same to each foreman in his charge, with the instruction that its contents should form the keynote of their conduct toward this class of labor.

CHARLTON DIXON.

Pittsburgh, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Cube Root, Direct Method—(For illustration, $\sqrt[3]{14{,}706.13}$).

Rule—Beginning at units place, divide the number into periods of three figures each, completing the right-hand period of a decimal, if necessary, by adding ciphers.

$\overline{14}\ 706.130$

Observe the greatest perfect cube contained in the first period on the left and write its root as the first figure of the required root.

$2^3 = 8$; $3^3 = 27$; *hence*, $\sqrt[3]{14} = 2+$ . . . $\overline{14}\ 706.130\ (2$

Subtract the cube of the root found from the first period on the left, and to the remainder annex the second period to form the first dividend.

$14 - 2^3 = 14 - 8 = 6$ . . . *1st dividend*, 6,706

For the first trial divisor, take three times the square of the root found.

$3 \times 2^2 = 3 \times 4 = 12$ *1st trial divisor*, 12

To find the second figure of the root, divide the first dividend, exclusive of the last two figures, by the first divisor. Now, cube the root, and if the cube exceeds the first two periods, diminish the last figure found.

$67 \div 12 = 5+$; $25^3 = 15{,}625$, *high* . . . *partial root*, 24

Subtract the cube of the root found, from the first two periods, and to the remainder annex the third period to form the second dividend.

$14{,}706 - 24^3 = 14{,}706 - 13{,}824 = 882$ . . . *2nd divd.*, 882,130

For a second trial divisor ,take three times the square of the root found.

$3 \times 24^2 = 3 \times 576 = 1728$ . . . *2nd divisor*, 1728

To find the third figure of the root, divide the second dividend, exclusive of the last two figures, by the second divisor. Then, cube the root, and if the cube exceeds the first three periods, diminish the last figure of the root found.

$8821 \div 1728 = 5+$; $245^3 = 14{,}706{,}125$, *low* . . . *root*, 24.5+

Observe the position of the decimal point in the root corresponds to its position in the given number.

Following is the manner of performing the operations:

$\overline{14}\ 706.\overline{130}$ (24.5+ *required root*

$2^3 = 8$

$3 \times 2^2 = 12)\ 67|06$

5 $25^3 = 15.625$, *high, write* 4 *in root*

. . . . . .

14,706

$24^3 = 13{,}824$

$3 \times 24^2 = 1728)\ 8821|30$

5 $245^3 = 14{,}706{,}125$, *low*

. . . . . .

14,706,130

$245^3 = 14{,}706{,}125$

5 *last remainder*

The Coal Age Pocket Book

Fifth Root, a Practical Method—The following is a simple and practical method of extracting the fifth root of a number. The method can be applied to any degree of approximation desired, and is correct as far as it is carried.

Numbers Less Than 100,000—The fifth root of the number is less than 10, and the integral part of the root is a digit. To find this digit, proceed as follows. (For illustration, $\sqrt[5]{23{,}415}$).

Rule—Fnd the two consecutive digits whose fifth powers embrace the given number. The lesser of the two digits is the integer of the required root.

$7^5 = 7 \times 7 \times 7 \times 7 \times 7 = 16{,}807$

$8^5 = 8 \times 8 \times 8 \times 8 \times 8 = 32{,}768$ . . . *integer of root* 7

To find the first decimal figure of the root, take the greater digit four times as a factor, and the lesser digit once. If the product of these five factors exceeds the given number, take the greater digit one less times and the lesser digit one more: and continue thus till the product of the five factors is less than the given number. Divide the sum of these five factors by 5, and the quotient will be the required fifth root of the number to the first decimal.

$8 \times 8 \times 8 \times 8 \times 7 = 28{,}672$, high

$8 \times 8 \times 8 \times 7 \times 7 = 25{,}088$, high

$8 \times 8 \times 7 \times 7 \times 7 = 21{,}952$, low

$\frac{8 + 8 + 7 + 7 + 7}{5} = 7.4$ . . . . root, to one decimal, 7.4+

To find, in turn, succeeding decimal figures of the root, divide the given number by the fourth power of the root already found; add the quotient to four times that root: and divide by 5.

$(23{,}415 \div 7.4^4 + 4 \times 7.4) \div 5 = 7.48$ . . . *root to two decimals*

$(23{,}415 \div 7.48^4 + 4 \times 7.48) \div 5 = 7.478$ . . . *root to three decimals*

Numbers Greater Than 100,000—The fifth root of the number is greater than 10, and the integral part of the root will then contain two figures. (For illustration, $\sqrt[5]{722{,}180}$).

Rule—Find, by trial, two consecutive numbers whose fifth powers embrace the given number. The lesser of these two numbers is the integer of the required root.

$14^5 = 14 \times 14 \times 14 \times 14 \times 14 = 537{,}824$

$15^5 = 15 \times 15 \times 15 \times 15 \times 15 = 759{,}375$ . . . *integer of root*, 14

To find, in turn, succeeding decimal figures to complete the root, divide the given number by the fourth power of the root already found; add the quotient to four times that root; and divide by 5.

$(722{,}180 \div 14^4 + 4 \times 14) \div 5 = 14.9$ . . . *root to one decimal*

$(722{,}180 \div 14.9^4 + 4 \times 14.9) \div 5 = 14.85$ . . . *root to two decimals*

Fifth Root of Decimals—(For illustration, $\sqrt[5]{2.58}$).

Rule—Complete any decimal period, if necessary, by adding ciphers till the period contains five figures. Then, disregarding the decimal point, follow the rule for integers.

$2.58 = 2.58000$ . . . *as integer*, 258,000

Finally, pointing off as required, $\sqrt[5]{2.58} = 1.208+$

Inquiries of General Interest

Comparison of Coal and Oil as Fuel

Will you kindly answer the following questions relating to the comparative value of coal and oil when employed as fuel in the production of steam:

1. What weight of coal is used, under ordinary conditions in practice, to vaporize 1 lb. of water; or, in other words, under ordinary conditions in boiler practice, what weight of water will be vaporized by the burning of 1 lb. of coal?

2. What amount of commercial oil is required, in ordinary practice, to vaporize 1 lb. of water?

3. What arguments, if any, are there in favor of burning coal and against oil, for the production of steam, assuming that it were possible to obtain heat units at the same cost, in each case?

In this connection, I have under consideration an apparatus that I hope may revolutionize the methods of steam production.

H. N. Freeman, Mgr.,
Vancouver-Nanaimo C. M. Co., Ltd.
Nanaimo, B. C., Canada.

In answering these questions, it must be remembered that much will depend on the character of the coal or oil used, with respect to their respective calorific values. For the purpose of estimate, the calorific power of good bituminous coal may be taken as, say 14,000 B.t.u. The calorific power of petroleum suitable for fuel purposes varies with the specific gravity of the oil, from 18,000 to 21,000 B.t.u. Also, in boiler practice, very much depends on the adaptation of the fuel burned to the particular type of boiler in use. This is true whether coal or oil be employed as the fuel.

With a fair coal and good boiler, it is usual to estimate a consumption of 4.5 lb. of coal, per hp., per hr. Then, since 1 boiler hp. is equivalent to the evaporation of 34.5 lb. of water, from and at 212 deg. F., it may be estimated that 1 lb. of bituminous coal will evaporate $34.5 \div 4.5 =$ say 7½ lb. of water, from and at 212 deg. F.

It is estimated, further, that 1 lb. of crude oil (Beaumont, Tex.) having a specific gravity of 0.92 and a calorific power of 19,000 B.t.u. per lb., when properly burned under a boiler, will evaporate 14.8 lb. of water per hr.

Now, assuming that heat units can be purchased for the same price, in the case of both coal and oil, the ratio of heat values, oil: coal, is 19: 14; but the ratio of evaporation, oil: coal, is 14.8: 7.5. Therefore, on this basis, every dollar invested in oil will only purchase, by weight, $^{14}/_{19}$ of what the same money would buy if invested in coal, but the oil will evaporate 14.8/7.5 times as much water. Hence, the relative values of these two fuels, on this basis, is

$$\frac{14}{19} \times \frac{14.8}{7.5} = 1.38$$

That is to say, every dollar of investment in oil yields, in this case, an evaporation 1.38 times as great as a dollar invested in coal.

A Gaseous Mine

There seems to be much confusion in regard to the question as to what is a gaseous mine, in the meaning of the Bituminous Mine Law of 1911 (Pennsylvania). There are numerous references in the bituminous law, making certain requirements in mines "wherein explosive gas is being generated in such quantities that it can be detected by an approved safety lamp." These references would seem to make it clear that, in the meaning of the law, every mine is a gaseous mine, in which gas is generated in quantities sufficient to be detected by an approved safety lamp.

There seems to be serious doubt, however, as to whether this would be a correct answer to the question, "What is a gaseous mine," if such a question were to be asked in a bituminous mine examination. The doubt as to the correctness of this answer arises from the reading of Sec. 2, Art. 28 of the law, which is as follows:

> The provisions of this act as to mines, or portions of a mine generating explosive gas in quantities sufficient to be detected by an approved safety lamp, shall not apply to any mine wherein explosive gas is being generated only in live entries.

Again, Sec. 3 of the same article reads:

> The provisions of this act shall not apply to any mine employing less than 10 persons inside the mine, in any one period of 24 hr.

These sections of the law make it clear that, unless gas is generated elsewhere than in "live entries," in quantities sufficient to be detected by an approved safety lamp, the mine is not to be classed as a gaseous mine, in the meaning of the law; and is not subject to the restrictions and regulations required by previous sections of the law in relation to the generation of gas in mines. Also, a mine employing less than 10 persons underground is not to be classed as a gaseous mine, in the meaning of the law, regardless as to whether such mine is or is not generating gas in sufficient quantities for detection on the lamp.

This is an important matter, not only because the question may be asked at examinations, but more particularly because there are many mines, in the bituminous region of Pennsylvania, that are being worked as gaseous mines and fulfilling all the requirements of the law, in reference to safety lamps, shotfirers, permissible explosives, etc. I am not saying that these mines should not adopt these precautions; I believe they should. But, according to the clearly defined meaning of Sec. 2, Art. 28, they are not required by law to adopt the precautions they are using of necessity.

James T. Reynolds, Fireboss,
Pine Run Co.
Vandergrift, Penn.

[A full discussion of this question is invited by mine inspectors, mine foremen and firebosses.—Ed.]

Examination Questions

Wyoming Questions (1912)

(Answered by Request)

Ques.—Why does gas sometimes fire in a safety lamp and not explode the gas in the air surrounding the lamp?

Ans.—Under different conditions, degree of explosibility of the gas-charged air and the use of lamps of different construction, the firing of the gas may fill the entire chimney of the lamp with flame; or small balloons of flame may form and rise in quick succession within the chimney; or sharp crackling sounds or reports may be heard. The cooler metal of the gauze prevents the passage of the flame outward by cooling the small streamlets of gas and air passing through the mesh, below the point of ignition of the gas.

The flaming of a lamp shows a more or less uniform gaseous condition of the atmosphere in the combustion chamber. The explosive condition is not as acute, in this case, as that producing a crackling noise or sharp explosive reports in the lamp, which fact indicates a less uniform gaseous condition and a higher degree of explosibility of the gas-charged air. The explosion of the mixture, in this case, presumably requires a greater intensity of the igniting flame, resulting in explosions occurring only in direct contact with the flame of the lamp.

Ques.—What is the water gage corresponding to a ventilating pressure of 7.8 lb. per sq.ft.?

Ans.—The corresponding water gage is $7.8 \div 5.2 = 1.5$ in.

Ques.—Find the ventilating pressure in pounds per square foot, when the water gage reads 2.5 in.

Ans.—The unit of ventilating pressure, in this case, is $2.4 \times 5.2 = 12.48$ lb. per sq.ft.

Ques.—With the fan at a constant speed and the airways of equal length, which will pass the greatest amount of air: four airways, each 4x5 ft. in section or one airway, 8x10 ft. in section; and why?

Ans.—A constant speed of fan means, approximately, a constant power on the air. For a constant power, all the airways being of equal length, the quantity of air in circulation is directly proportional to the total area of passage and inversely proportional to the cube root of the perimeter. In other words, the quantity ratio is equal to the area ratio multiplied by the cube root of the inverse perimeter ratio.

In the present case, the total areas and perimeters are as follows:

Four airways, 4x5 ft.;

$a = 4\ (4 \times 5\ ) = 80\ sq.ft.;\ o = 4 \times 2\ (4 + 5) = 72\ ft.$

One airway, 8x10 ft.;

$a = 8 \times 10 = 80\ sq.ft.;\ o = 2\ (8 + 10) = 36\ ft.$

The total areas being equal, the area ratio is 1, and the inverse perimeter ratio is $^{36}/_{72} = 0.5$; hence,

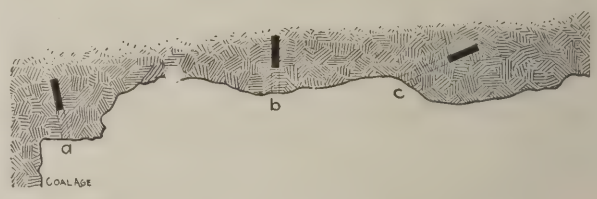
$$quantity\ ratio = 1 \times \sqrt[3]{0.5} = 0.793$$

That is to say, four airways, each 4x5 ft., will only pass 0.793 of the quantity of air the same speed of fan will circulate in a single airway, 8x10 ft., all the airways being of the same length.

Ques.—What are the dangers of shooting off the solid in dry and dusty mines, and what precautions would you take to prevent accident?

Ans.—The practice of shooting off the solid frequently causes what is termed by the miners a "tight shot." When the method is properly employed, there is no danger in its use, except under exceptional conditions where the coal is extremely friable or inflammable and the seam is generating gas. In many cases, the coal is not mined; it is never sidecut; and too often the shot is bound by projecting tops or bottoms, which give the powder little or no opportunity to perform its work of breaking down the coal.

In the accompanying figure are shown a rib-shot, at *a*; a "dead" shot or hole, at *b*; and a "grip" shot, at *c*. The two shots last named are employed in the practice of



BLASTING AT THE FACE OF A ROOM

shooting off the solid. Commonly, the miner selects a favorable place in the face of the coal, as at *c*, where a grip shot, if not too deeply laid, will perform good work. The temptation is too strong, however, to locate the charge too deeply on the solid; or even to put in a dead hole drilled normal to the face of the coal, as at *d*.

The tendency, in the past, has been to use too heavy a charge; depending on the strength of the powder to blow down the coal, and not assisting the shot to perform its work by properly undermining the coal. The result is a tight shot that blows out its tamping, without breaking down the coal. Almost the entire energy of the powder is, in this case, expended on the air, which produces a heavy concussion and raises a cloud of dust. The blast is accompanied with a volume of flame that is projected from the hole with great force, igniting the cloud of dust and causing a local explosion that may, and frequently does, develop into a mine explosion involving the entire underground workings. To prevent such occurrences, miners should use a limited charge of powder sufficient only for the work it must perform in breaking down the coal. In every case, the coal should be properly mined or the shot so located that it is free to perform its work.

Ques.—What useful purposes do overcasts and undercasts serve, in mine ventilation; and which of these do you prefer, and why?

Ans.—Overcasts and undercasts are two forms of air bridges or air crossings employed to carry one air current over or under another. They serve as a means of ventilating cross-headings, without the use of doors. Overcasts are generally preferred as they cannot be flooded and are easier to keep air-tight.

Coal and Coke News

Harrisburg, Penn.

Testimony was presented in the Dauphin County Court on Sept. 25, by the United Mine Workers' organization of the Schuylkill and Lehigh regions, that some men returned by the Examining Boards of the several districts as eligible for mine foremen's and assistant mine foremen's certificates had never been employed in the actual cutting of coal at the face, and that others had been so employed only a short time.

The testimony was given in the mandamus proceedings brought against the Chief of the Department of Mines to restrain the issuing of certificates of eligibility to some of the men recommended by the boards, and the case brought by the union officials against the issuing of certificates to certain men, who they allege never had had actual experience at the face.

Involved in the action is the question whether the term "five years' practical experience as a miner" means five years' employment inside the mines or five years in the actual cutting of coal. For years it has been alleged that men were returned as competent to act as mine foremen and assistant mine foremen who did not possess qualifications for these positions, and some months ago the mine workers' union brought suit mentioning the names of men who, it was declared were not experienced in digging coal.

Some of these witnesses were heard. Mine inspectors and an expert employed by the Philadelphia & Reading Coal & Iron Co. to ascertain the efficiency of miners, testified as to the understanding of the term "miner" in the anthracite coal region, saying that it meant the man who gets out the coal, but they did not confine their opinion strictly to the cutting or blasting of that mineral.

The Attorney General's department has held in two opinions on the language used in the law that the five years' practical experience meant employment in the mine, not necessarily that a man had to be a digger of coal for the period of five years. And it was on the strength of this opinion that many of the candidates appearing before the examining boards took the oath that they were miners before entering the examinations.

It was the opinion of the mine inspectors, that the term, "five years' practical experience as a miner" should include not less than two years at actual cutting or blasting coal at the face, for in that time any intelligent man could become an expert at this part of mining and about three years' experience at setting timber and double timbering, building brattice, batteries, removing gas, track-laying, etc., but, that such occupations as driving, door tending, tending foot or top of shaft or slope should not be considered in the term of "practical miner." It was also brought out that it is the men with general experience that make the best foremen, for it was pointed out that a man might work at the face for 20 years cutting coal, and never know how to brush gas, place a double set of timber, or lay a good track in his place which he is supposed to do or timber a locality where a fall has occurred. It was stated that with but few exceptions it was the men with general all around experience that stood the examination.

It was argued that the number of persons competent for filling such important positions as foreman, and assistant mine foreman in the first place is very small. It was shown that a mine foreman or assistant foreman should be a person somewhat acquainted with geology, so as to know the formation surrounding the locality where he is employed. He should understand and know something about mine maps; while it isn't necessary for him to be a chemist, he should know the different gases met with in the anthracite coal mines. He should also have some knowledge of engines, for today most of the coal is being transported by air or electric locomotives; mine pumps he should be well acquainted with; also the sinking of shafts and slopes; ventilating fans and the method of operating the same; he should also be familiar with track laying.

He should be able to timber shafts, slopes, and gangways; in fact, he should be an all around miner. He should be acquainted with all the different seams of coal, so as to determine the size of pillars to support the roof, according to the nature of the coal and the depth of the mine. In case of an accident he should be cool-headed and determined in carrying out his instructions and a fair judge of human nature. There is no doubt that it would add greatly to his success to know how to mine coal properly in the different seams and on different pitches, but the great question is, "can enough men be selected from the face of breast or gangway to meet with those requirements, which are necessary to make a successful mine foreman or assistant mine foreman?"

If the parties back of this case are sincere in dealing with a question of practicability, why advocate things that might be detrimental to the same cause, for at the last two sessions of the legislature a great pressure has been brought to bear on the mines and mining committee to pass a law making all mine foremen eligible for mine inspector without standing an examination.

Final argument will be heard on Oct. 12.

PENNSYLVANIA

Anthracite

Hazleton—While many towns in the anthracite field have suffered serious results from the prolonged drouth, Hazleton and vicinity have not yet felt its effects. None of the local collieries or factories have curtailed operation on account of a scarcity of water.

Shenandoah—The No. 12 washery at Coal Dale has resumed operation after being idle almost all summer undergoing extensive alterations.

Bituminous

Pittsburgh—The H. C. Frick Coke Co., as noted in our issue of last week, has completed a remarkable working model of the Phillips plant of the company. This shows the mine tipples, power plant, boiler houses, machine shops, lamp houses, and even the bath house. This exhibit will be included with other displays of the U. S. Steel Corporation at the Panama-Pacific Exposition next year, showing various methods adopted to prevent accidents in the corporation's safety-first campaign.

Church Hill—The Dutch Hill mine of the Hedstrom Coal Mining Co., of Buffalo, situated in the Allegheny Valley, Church Hill post office, has been sold to the Church Hill Mining Co. It has a capacity of about 300 tons a day, and has been in operation most of the time of late. The new company is controlled by the Monterey Coal Co., and will be superintended by A. J. Watson of that firm.

WEST VIRGINIA

Elverton—Determined to capture the men who on Sept. 10 fired from ambush on unarmed workmen and the manager's residence, the Branch Coal & Coke Co. has recently increased the amount of the reward offered from $1000 to $5000.

Charleston—The first definite results of a failure of a labor employing corporation in West Virginia to come under the provisions of the Workmen's Compensation Division of the Public Service Commission Act and pay its premium was recently made public. The Piney Mining Co. elected to come under the provisions of the statute last October when it first went into effect, but has never paid any of its premiums. One of its employees, Antonio De Francisco, was awarded a pension for permanent disability for injuries received in this company's mine in the sum of $7.98 per week for life. The Commission found, however, that the mining company has never paid its premium and the pension could not be paid. Francisco brought suit, and secured a judgment of $5000. It is said that the company's total premiums for the year would not have exceeded $2500.

Bluefield—Official figures covering shipments of coal from the West Virginia fields over the Norfolk & Western R.R. during August have been published in detail, showing a slight decrease in business as compared with the preceding month. From the various fields covered, shipments for the month totaled 2,450,808 tons, divided as follows: Pocahontas, 1,227,621 tons; Tug River, 93,179 tons; Thacker, 286,572 tons; Kenova, 105,725 tons; Clinch Valley, 134,408 tons; Miscellaneous, 4210 tons; Williamson and Pond Creek connection, 91,813 tons, and other railroad connections, 257,280 tons.

ALABAMA

Birmingham—The Alabama Co., one of the largest producers of coal, coke and iron in the state, has completed its improvements at Ironton, this work including the relining

of No. 2 furnace. While the furnace was idle the company rebuilt and improved its washers and constructed a concrete dam to provide an abundance of water. All of the coal mines are running, and the ore mines, with one exception, are running full time.

Clanton—In boring for water for the use of the local water-works company, contractors have struck oil and coal. New machines are on the ground and are now boring for these products instead of water. It is reported that the coal is of good grade and thickness, and further investigations are being rapidly pushed.

TENNESSEE

Oswego—Representatives of the United Mine Workers of this section are meeting here in connection with a committee representing the operators in the Jellico district. Satisfactory results have been reached at all conferences held heretofore and it is trusted that an agreement will be reached without difficulty.

Knoxville—Large numbers of miners and others interested in that industry are expected to gather here on Oct. 15, for the proposed miners' field day which is being prepared for conditionally. J. M. Webb, officer in charge of the local station of the Federal Bureau of Mines, is awaiting further instructions from headquarters before proceeding with preparations for this event.

KENTUCKY

Owensboro—Damage superficially estimated at $1200 was done to the superstructure of Malinger's mine, operated by Frank Schultz, near here, recently when fire broke out in the buildings on the surface. A quantity of powder in kegs was exploded and it was several hours before any attempt could be made to extinguish the flames, the heat was so great. It is as yet impossible to estimate the damage down in the shaft, though the upper timbers were badly burned. Repairs will be made immediately. There was no insurance.

Whitesburg—Coal shipments from the new operations at Wayland and Weeksbury, on Beaver Creek, north of here, have been doubled and production is at the rate of 40 cars a day and still larger increases are promised for the immediate future.

Pineville—The mines, leases and all other property of the Big Hill Coal Co., of Bell County, were knocked down for $1100 to H. B. Hauger, of Richmond, Ky., representing the bondholders, at a sale held here by the commissioner of the Federal court recently. The price named is so small, it is expected here that the Court will hardly confirm the sale, as the property of the company is understood to be worth many thousands of dollars. The company's holdings include about 1000 acres of coal land on the left fork of Straight Creek and the mine equipment is said to be exceptionally good and installed at heavy expense. The mines at one time were operated with much profit and their failure is attributed to inefficient management.

OHIO

Columbus—While it is only a little over a month since the new mine-run system of paying for coal mined in Ohio has been in force, some of the operators are speculating on the question if it has increased the cost of mining. Some are of the opinion that it has not increased the cost while others say that an advance of approximately 8 per cent. in the cost of producing coal has resulted from the changed conditions.

Martins Ferry—It has been announced that the Blockhouse mine at Brilliant has resumed work. This operation was ordered by the Federal Court on May 20 to operate under the 47c. rate and was immediately closed down because it could not make money.

Considerable excitement has been created by the circulation of a rumor to the effect that the Lorain Coal & Dock Co. is contemplating dismantling one of its largest mines and moving the equipment to the Hocking district. Officers of the company refuse to discuss this matter.

INDIANA

Terre Haute—Mines in this vicinity which make a specialty of coal for domestic use have been working full time for some weeks past. Other mines depending mostly on orders for steam coal, especially screenings, are running on an average of about four days per week. There are more than enough cars for the output, and railway officials say they have so planned ahead that there will be no shortage of cars this winter.

Vincennes—An unidentified man was killed under a fall of coal and two others severely burned in a gas explosion at Indiana Creek recently. Three hundred men were in the mine at the time of the explosion, and it took half an hour to effect their rescue.

Brazil—The Association of Block Coal Operators recently declined to have a conference with the mine workers officials of their district over the discharge of a miner at De Camp mine No. 4 for the alleged reason that he did not patronize the company store. This is the first time for several years that the miners have raised the company store question. There are few of these stores in the mining districts of the state now.

ILLINOIS

Pana—A fire which recently broke out in the Tower Hill coal mine east of Pana, threatened the mine's destruction with enormous loss to the owners. This fire was started from a gas explosion in an entry caused by a blown-out shot. The flames spread rapidly, but all the men were gotten out safely.

Marion—The Illinois Hocking mine, which has been idle since the workings caught fire about 18 months ago, was recently sold by the receiver to Jacob Goodall. It is understood that the price paid was $6000, the property being subject to the miners' wages, which are still held against it. It is believed that an effort is being made to reopen the property.

Millstadt—The High Prairie mine, the largest open strip pit in southern Illinois, which has been idle for the past seven months, is expected to open up in the course of the next 10 days.

Murphysboro—Blair mine No. 1 on the M. & O. is practically worked out, and unless some arrangements now under way are perfected, whereby some additional acreage can be secured, the mine, it is expected, will be abandoned within the next 30 days.

COLORADO

Denver—Of the number of men indicted by the Las Animas County grand jury in conection with the coal strike war, 78 have been arrested. John R. Lawson is charged with 12 murders and with one case of arson. It is recommended that Deputy Attorney-General West represent the state in the prosecution, for the reason that the district attorney is in such sympathy with the striking miners as "must inevitably embarrass him to be called upon to prosecute these cases."

UTAH

Salt Lake City—The coal producers of Utah have united in requesting the United States Government to construct at the naval coaling station on San Francisco Bay, a terminal that will make it possible to deliver Utah coal to the Pacific fleet at that point. The local operators have received some encouragement from the government and are confident that coal used by the United States Government on the coast will be supplied by Utah. This will mean an added production of about 100,000 tons to the annual output of the state.

PERSONALS

J. W. Reed, of Jenkins, Ky., has been appointed instructor in mining machinery at the Kentucky State University School of Mines, at Lexington, to succeed T. J. Barr, who has been made professor of mining engineering.

W. K. Kavanaugh, president of the Southern Coal, Coke & Mining Co., of St. Louis, is at the present time on an extended trip along the Atlantic Seaboard of South America. He is now in Venezuela, looking into a future market in South America for Illinois coals.

G. A Gent, for many years an operator in Williamson County, Illinois, and until recently a resident of St. Louis, and well known in coal trade circles throughout this section, has leased for development 2500 acres of coal lands from the Crystal Block Collieries Co. The property is in Eastern Kentucky.

PUBLICATIONS RECEIVED

Department of the Interior, U. S. Geological Survey. "The Manufacture of Coke in 1913," by Edward W. Parker. Sixty-five pages, 6x9 in.; unillustrated.

Department of the Interior, Bureau of Mines. "Electric Lights for Use About Oil and Gas Wells," by H. H. Clark. Eight pages, 6x9 in.; unillustrated.

The University of Texas, Bureau of Economic Geology and Technology. Bulletin No. 363. Scientific Series No. 28. "The Deep Boring at Spur," by J. A. Udden. One hundred and nine pages, 6x9 in.; illustrated.

Department of the Interior, Bureau of Mines. "Report of the Committee on Resuscitation from Mine Gases," by W. B. Cannon, Geo. W. Crile, Joseph Erlanger, Yangell Henderson and S. B. Meltzer. Thirty-six pages, 6x9 in.; illustrated.

Department of the Interior, Bureau of Mines. "Monthly Statement of Coal Mine Fatalities in the United States," July, 1914; with revised figures for preceding months. Compiled by Albert H. Fay. Twenty-one pages, 6x9 in.; unillustrated.

Department of the Interior, Bureau of Mines. "The Origin of Coal," by David White and Reinhardt Thiessen; with a chapter on the Formation of Peat, by Charles A. Davis. Three hundred and eighty-one pages, 6x9 in.; with many illustrations.

Department of the Interior, Bureau of Mines. "Supplementary List of Permissible Explosives." A single sheet, 6x9 in., listing the permissible explosives tested by the Bureau of Mines between Jan. 1 and Aug. 1, 1914. This sheet is intended to supplement Technical Paper No. 71.

TRADE CATALOGS

C. C. Hatfield, Duquoin, Ill. "The Loading Boom that Loads to Perfection." Six pages 5½x8½ in. illustrating and describing the Hatfield loading boom.

The C. L. Smith Co., 3200 Hadley St., Milwaukee, Wis. "The Smith-Chicago Mixer." Sixteen pages, 6x9 in.; illustrating and describing the Smith-Chicago mixer.

The A. F. Daum Co., Pittsburgh, Penn. "The Daum Refillable Cartridge Fuse Shells for Electric Light and Power Circuits." Sixteen pages, 3½x6 in.; illustrated.

RECENT COAL AND COKE PATENTS

Mine Door—J. F. Dillon, Dante, Va., 1,107,045, Aug. 11, 1914. Filed Feb. 6, 1914. Serial No. 816,977.

Boiler. W. H. Wood, Media, Penn., 1,106,908, Aug. 11, 1914. Filed Oct. 18, 1913. Serial No. 795,862.

Smoke Preventer. T. W. Langan, Albany, N. Y., 1,104,909, July 28, 1914. Filed Apr. 22, 1913. Serial No. 762,766.

Furnace Cleaner. C. F. Hahle, Riverside, N. J., 1,106,093, Aug. 4, 1914. Filed Nov. 4, 1912. Serial No. 729,340.

Furnace Grate. O. H. Erdman, Birmingham, Ala., 1,105,636, Aug. 4, 1914. Filed Feb. 9, 1914. Serial No. 817,397.

Grate for Furnaces. P. Von Zeipel, Duquesne, Penn., 1,105,054, July 28, 1914. Filed July 2, 1910. Serial No. 570,103.

Fire-Box Construction. J. M. McClellan, Everett, Mass., 1,105,526, July 28, 1914. Filed June 23, 1910. Serial No. 568,507.

Furnace Wall Construction. N. E. Maccallum, Phoenixville, Penn., 1,106,725, Aug. 11, 1914. Filed May 13, 1913. Serial No. 767,305.

Water Circulator for Boilers. J. Tait, Dunedin, New Zealand, 1,106,749, Aug. 11, 1914. Filed Mar. 7, 1912. Serial No. 682,082.

Steam-Boiler Construction. J. A. Wolmer, Indianapolis, Ind. 1,106,066, Aug. 4, 1914. Filed Dec. 24, 1913. Serial No. 808,598.

Apparatus for Promoting Combustion in Furnaces. E. C. Read, Franklin, Penn., 1,106,583, Aug. 11, 1914. Filed Feb. 2, 1911. Serial No. 606,100.

Process of Manufacturing Artificial Coal from Peat. F. C. Osius, Grand Rapids, Mich., 1,105,206, July 28, 1914. Filed Apr. 22, 1911. Serial No. 622,786.

Method of Working Coke Ovens. H. Koppers, assignor to H. Koppers Co., Chicago, Ill., 1,105,522, July 28, 1914. Filed Nov. 15, 1913. Serial No. 801,107.

Anthracite-Burning Grate for Furnace. W. McClave, assignor to McClave-Brooks Co., Scranton, Penn., 1,105,572, July 28, 1914. Filed Mar. 21, 1913. Serial No. 755,939.

Superheater. G. H. Emerson and H. Yoerg, assignors to Locomotive Superheater Co., a corporation of Delaware, 1,105,633, Aug. 4, 1914. Filed Dec. 18, 1909. Serial No. 533,955.

Division Wall for Water Tube Boilers. W. F. Sellers and H. B. Bradford, assignors to Edgemoor Iron Co., Edgemoor, Del. 1,105,213, July 28, 1914. Filed Sept. 10, 1912. Serial No. 719,512.

CONSTRUCTION NEWS

Hazard, Ky.—The Hazard-Dean Coal Co. has just completed the installation of its $15,000 electric power plant, to supply the power used in the company's workings. F. J. Walcott superintended the installation of the plant.

Youngstown, Ohio—Plans have been prepared by the Carnegie Steel Co. for the construction of a byproduct coke plant. The plans provide for 56 Koppers ovens having a capacity of 16 tons each daily. The byproducts will consist of tar, gas and amonia sulphate.

Hartshorne, Okla.—Plans have been prepared by the Rock Island Coal Mining Co., covering electric hoists and electric equipment for shafts Nos 9 and 10, to be installed next spring. At No. 10 the hoist shaft is now down 600 ft., and the air shaft 400 ft. At mine No. 9 at Alderson the hoisting shaft is down 680 ft., and slope 42 it is now down to 1000 ft.

Coshocton, Ohio—The local directors of the Ohio Cannel Coal Co., as well as capitalists from St. Louis, Mo., are contemplating arrangements for the development of the company's mine in Bedford Township. Those owning a controling interest in this project are S. C. Priest, of Walhonding; George P. Heckle, of St. Louis; John Orr, of Warsaw, and Simon Ashcraft, of West Carlyle.

Athens, Ohio—The Hocking Power Co., which is erecting an immense power plant at Floodwood, Ohio, for the purpose of supplying coal mines in this vicinity with electric current has closed a contract with the city of Athens, by which it takes over the city electrical plant at $16,000. The company has also secured a franchise from the city government to furnish current for a period of 25 years.

Charleston, S. C.—The Southern Ry. has awarded the contract for the construction of modern coal dock facilities at Charleston which will enable the Virginia & Southwestern Ry. and the Southern Ry. to handle coal from the fields of the South to this port. The dock, which will be built by the Wellman-Seaver-Morgan Co., of Cleveland, Ohio, will be constructed on property on the Cooper River containing about 120 acres, and having more than 4000 ft. of river front. The plant is designed to deliver coal to vessels at the rate of not less than 2000 tons per hour. About $450,000 will be expended in this work.

NEW INCORPORATIONS

Richmond, Va.—An amendment has been filed to the charter of the Mason Coal & Coke Co., a West Virginia corporation, reducing its capital stock to $135,000.

Seattle, Wash.—The Bolcom-Sligh Coal Co., of Seattle, has been organized with a capital of $10,000, by Charles R. Sligh, H. S. Bolcom, W. M. Bolcom and W. Y. Henry.

Tacoma, Wash.—The Summit Coal Co., of Tacoma, has been organized with a capital of $10,000 by H. M. Shovlain, James Marucha, Louis Sonney and Helen Schmitz.

Joplin, Mo.—The Higgins Land & Mining Co. has been organized with a capital stock of $80,000. The incorporators are F. S. Higgins, D. E. Miller and C. J. Martin.

Muskogee, Okla.—The Fidelity Fuel Co. has been incorporated here, with a capital stock of $10,000, by E. H. Bradley, Scott Kelly of Muskogee, and Fred Raurk of Kansas City.

Peoria, Ill.—The Gorman Coöperative Coal Co. has been organized to mine, sell and deal in coal. The incorporators are James Gorman, Gustav Forsten, Sam Angelo, Maurice Gorman and Alva Pitcher.

Brookville, Penn.—The Dilltown Smokeless Coal Co. has been organized with a capital of $5,000. The incorporators are E. E. Henderson, of Brookville; T. R. Williams and E. E. Hewitt, of Punxsutawney.

Charleston, W. Va.—The Jackson Coal Co., of Charleston, has increased its capital stock from $5000 to $570,000, and will soon take over 6000 acres of coal land in Jackson County, Ill.

Boston, Mass.—The Canadian Atlantic Coal Co., Ltd., of Boston and Richmond, N. S., has been incorporated under the

laws of Massachusetts with an authorized capital of $1,250,000, comprising 2500 shares of preferred stock and 10,000 shares of common. The preferred is 10 per cent. cumulative.

Carthage, Mo.—A certificate of incorporation has been issued to the Hugo Mining Co., of Carthage, with a capital stock of $3200. The incorporators are Louis Gratz, Mack Logan, Charles Wright and R. F. Glenn, all of Carthage. This firm is now developing mining properties near Joplin.

Bonanza, Ark.—The Woodson-Barr Coal Co. has been organized here, with M. M. Woodson, president; John Barr, vice-president, and Harry Reinhardt, secretary and treasurer, to further develop coal mines. Daily capacity now 300 tons. The name was changed from the Woodson-Strickland Coal Co.

Heberton, W. Va.—The Willis Branch Coal Co. of Herberton, Fayette County, has been organized with an authorized capital of $50,000. The chief works will be in the Fayette district, and the incorporators are Thomas K. Laing, M. P. Laing, L. E. Hiner, George W. Waring and Carl M. French, all of Beckley.

Charleston, W. Va.—A charter has been issued by the secretary of state to J. V. Thompson and others, of Uniontown, Penn., for a $2,000,000 coal company to be known as the Wetzel Coal & Coke Co. to take over and hold 19,250 acres of coal in the Clay and Church districts in Wetzel County. The chief works will be located on the Baltimore & Ohio R.R. near Littleton, and the main office and headquarters will be in Fairmount.

INDUSTRIAL NEWS

Easton, Penn.—The Thomas Iron Co., of Easton, recently blew in its No. 7 blast furnace at Alburtus, using as fuel part coke and part anthracite.

Washington, D. C.—By a viva voce vote, the Senate, on the afternoon of Sept. 26, passed the Alaska Coal Land Leasing bill, which then went to the President for final approval.

St. Louis, Mo.—The Southern Coal, Coke & Mining Co. has secured the Union Pacific R.R. contract for the coming season, which calls for 300,000 tons of Illinois coal.

Mobile, Ala.—Inaugurating the export of Birmingham coal to South America by way of the port of Mobile, the Uruguain steamer "Domingos J. De Silva" cleared recently for Buenos Aires, Argentina, with a cargo of 2964 tons of Alabama fuel.

Victoria, B. C.—The Manaimo Gas Co. of Victoria has succeeded in manufacturing standard illuminating gas of uniform quality from low-grade coal-mine refuse. The process has been in daily operation at Nanaimo for the past six months. The company has also successfully piped this gas as fas as Victoria, about 60 miles.

Columbus, Ohio—Arrangements were recently completed for a conference of traffic managers of the various commercial organizations of Ohio with the traffic managers of railroads in Central Traffic Association territory to be held at Columbus, Oct. 2, to discuss matters relative to the increase of five per cent. in rates permitted by the Interstate Commerce Commission.

Birmingham, Ala.—A cargo of briquette pitch, valued at $60,000, is being loaded by the Barrett Manufacturing Co. for Genoa, Italy. The cargo, which is being handled through a London broker, is being loaded on the L. & N. R.R., and will amount to about 5600 tons. This shipment is not due to the war, as this company has previously made shipments to the same consignees.

Chattanooga, Tenn.—Title to the plant site in Alton Park donated by the Chamber of Commerce to the Chattanooga Gas & Coal Products Co., has been transferred to the Central Trust Co., of New York trustee, for part security on the coke company's first mortgage, six per cent., six-year sinking fund gold notes to the amount of $500,000. President Lewis T. Wolle and others, agree to similarly transfer all other property which may from time to time be acquired, the usual phraseology being used.

Sharon, Penn.—The United States Steel Corporation has held up appropriations for improvements to many of its mills here and elsewhere, owing to unsettled financial conditions. Some time ago this corporation appropriated $500,000 for additions to the coking plant of the Carnegie Steel Co., at Farrell, for the manufacture of the byproduct, benzol. Plans were completed and preparations being made for beginning the work, when orders came to hold up the proposition. It is said that this corporation will make only those repairs which are absolutely necessary.

Wheeling, W. Va.—The coal traffic on the Baltimore & Ohio R.R. since the 1st of September has been the heaviest in the history of the line. From that date on, an average of between 600 and 800 cars of coal have been handled daily. The major part of this traffic is being brought to Benwood Junction by way of the Short Line and Ohio River Road. The largely increased coal traffic being handled by the road has been created by the long strike in the eastern Ohio field; 90% of the West Virginia coal is going to the ports of Lorain and Cleveland for shipment up the lakes.

Columbus, Ohio—The Baltimore & Ohio R.R. Co. has promulgated a new set of reweighing rules, applicable to coal cargoes which will become effective Oct. 24. According to B. F. Nigh, secretary of the Michigan-Ohio-Indiana Coal Association the new rules are much fairer than those in vogue previously. The application of Mr. Nigh for new rules which was to have been heard by the Ohio Public Utilities Commission, Sept. 25, was postponed because of the action of the Baltimore & Ohio and it is not likely that they will be brought up again.

Birmingham, Ala.—Dr. A. Crovetti, of Genoa, Italy, was in Birmingham recently accompanied by Walter L. Loeb, of New York, as interpreter looking over the field with a view to placing an order in Alabama for 50,000 tons of coal per month for steel works in Genoa, which Dr. Covetti represents. Cables are now being exchanged between Genoa and the New York offices of Birmingham corporations, and if financial arrangements are satisfactory the order will be placed in this district. Railroads are figuring on cars, and if the sale is consummated the coal will be shipped through Mobile, Pensacola and New Orleans.

Philadelphia, Penn.—Fuel shipments on the Pennsylvania R.R. east of Pittsburgh and Erie in August, with the exception of anthracite, fell off from the figures of the same month of the previous year. They were also smaller for the eight months' period, the only increase being in anthracite. The number of tons of this latter fuel carried in the month was 805,585, the increase being 93,134. Of bituminous, 4,299,810 tons were hauled, being a decrease of 262,529 tons; 792,656 tons of coke were handled, being a decrease of 368,828 tons. The total tonnage was 5,898,051, being a decrease of 539,223 tons. During the eight months' period, a total of 45,842,432 tons of fuel were handled. This was a decrease over the same period of the preceding year of 4,136,942 tons.

Philadelphia, Penn.—When, on Aug. 1, communications were interrupted betweeen the German factory and the American distributing and manufacturing agency of the Hess-Bright Manufacturing Co., steps were immediately taken by the American branch to provide manufacturing facilities in order to supply ball bearings of the sizes wherein shortages in the stock then on hand might occur. Although much of this work is being done outside of the Hess-Bright factory, it is in strict accordance with specifications and must pass the same rigid inspection as the goods heretofore imported from Germany. At the present time, although bearings are now being shipped from Berlin, the firm is proceeding on the independent basis of manufacturing here.

Owensboro, Ky.—Sale of all the property of the Fern Hills Coal Co. is asked by a suit filed in the Circuit Court here by trustee for the bondholders of the company. Paul Lehman, Edwin Hodde, A. J. Kirst, W. V. Doogs and Charles Powell, holders of five of the sixty $1000 bonds issued five years ago by the coal company are plaintiffs and numerous defendants are named, including the receiver of a defunct bank, among the assets of which were 35 of the same bonds. Interest on the bonds is alleged to have been defaulted for 30 days, making unpaid bonds immediately due, according to their provisions. All of the coal company's property, consisting of coal rights, tipple and necesssary operating equipment, was mortgaged for the bondholders' benefit and sale of the property to satisfy their claims is asked.

Toronto, Canada.—The new railway rates and regulations in force in Western Canada since Sept. 1, have improved shipping conditions so that the output of the mines of the Canadian Coal & Coke Co. in Alberta will be largely increased. At the Pacific Pass Colliery on the headwaters of the Pembina River, connected with the Grank Trunk Pacific by the Coal Spur branch, development has reached a point where an output of 2000 tons per day would be possible. The present production of 700 tons per day, employing a force of 150 men, it is proposed to increase as the company is now competing for the Winnipeg market and will also enter the field westward to Prince Rupert. The St. Albert mine operated by the same company has a seam 7½ ft. thick at a depth of 320 ft., which has been developed under difficulties owing to quicksand, which are now obviated by a concrete lined shaft. About 25 men are employed but this force will be increased during the winter as the demand warrants.

Coal Trade Reviews

General Review

Domestic grades of anthracite in strong demand, but steam sizes are heavy. Bituminous still slowing down, though prices are well maintained. Industrial demand suffering from the generally adverse conditions.

The anthracite market is steadily improving as the season advances, the recent cool weather having had a particularly beneficial effect. Domestic consumers who deferred buying during the discount period in the summer have been forced into the market by the lower temperatures, and this has created a general activity. The Lake business is also somewhat larger at the moment, but it has now reached the maximum for the season. The situation is not so favorable in the steam sizes, which are feeling the same general heaviness that characterizes the bituminous trade. Substantial discounts on the regular circular are noted on the small sizes, but the domestic grades are holding firm at the full circular. Operations in the mining districts are at practically full capacity.

The export bituminous trade continues in fair volume, but there is a growing uneasiness over the curtailed steam consumption. The one encouraging feature in the situation is the fact that the market is showing indications of an excellent undertone, and will no doubt respond quickly to any improvement in general conditions. The better grades of coal are still rather closely held. Prices are well maintained so far, and there is an absence of the customary large tonnages of demurrage coal, which usually characterize a weak market. It is none the less a fact that shipments are confined almost entirely to contracts, requisitions on which are reduced to a minimum, and there must be some favorable developments shortly to avoid a slump.

The Pittsburgh market is still losing ground in all directions; the steel mills are only operating at half capacity, with indications of a still further reduction shortly, and the manufacturing demand is again tapering off. The market has been thoroughly combed for orders, but consumption is at the minimum, and will continue so until there is a general resumption in industrial lines. Canadian manufacturing is heavily curtailed, so that fuel requirements are restricted and American operators are inclined to be suspicious of this business in any event. The market is very irregular, circular prices being purely nominal and obtained only on the very best grades.

The Ohio situation is unsatisfactory, the domestic grades having now suffered a relapse in sympathy with the steam coal. Lake shipping has reached the maximum, though it will probably continue until the close of navigation. Operators in the Southern markets are showing a more persistent interest in the export business than is generally the case through the East and the opinion is freely expressed that there will be a considerable tonnage shipped to South America during the next six months. Business locally is stagnant, the railroads suffering more or less severely from the depressed conditions prevailing in both the cotton and steel industries.

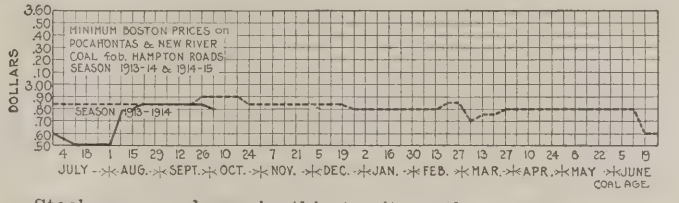
The Middlewestern trade is still contending with a completely demoralized steam market and a heavily oversold domestic trade. Production of the latter sizes is far below market requirements, and some substantial advances in quotations have been recorded. Had it not been for the general unsettlement following the European war, the Middlewestern operators believe they would have had an unusually prosperous season.

ATLANTIC SEABOARD

BOSTON

Large volumes of Pocahontas and New River coals at the loading piers, and facing a dull market. Prices being shaded. Georges Creek fast catching up on old orders. Pennsylvania grades firm. Water freights at a minimum. Anthracite demand is streaky.

Bituminous—The steadily increasing accumulation of coal at Hampton Roads does not speak well for the state of the market. The $2.85 price is still maintained in most cases but concessions are known to have been made and it is generally felt that lower prices will prevail before the end of October. The export trade shows a further decline in tonnage, and taking everything together, the difficulty of arranging foreign exchange and in some instances the 60- and 90-day settlements, the amount and the character of the offshore business that was offering so freely in early August has proved much of a disappointment. It was relied upon at least to steady the Tidewater situation, but with this prop to the market materially weakened, and the generally slack condition in manufacturing in New England, it is hard to see how a slump can be prevented.



Stocks are so large in this territory that even shipments for application to contracts are scaled down to the smallest tonnages. The few cargoes that come forward only partly sold, met with slow response. It is certain that the nominal price of $3.78 on cars Boston will have to be shaded materially if any buying is to be developed.

Further signs are observed of a better supply of Georges Creek available at all points. The shippers were far behind on their orders during August and September, but the prospect is more than favorable now for normal shipments the remainder of the season.

The Pennsylvania grades show no special change. All-rail the demand is better than at tide, but in no direction can the market be called anything but slack. The low-priced coals are at a standstill.

Water Freights are at a minimum, 65c. being the rate on large vessels, Hampton Roads to Boston. There is almost no inquiry, and certain of the steam colliers have been chartered to run to the West coast.

Anthracite demand is not quite up to expectation. The extremely unseasonable weather in late September doubtless had some effect and from now on there should be more business for the retailer. The shippers are loading a fair amount of coal but the orders are mostly for odd lots to patch out local stocks and the movement is by no means as steadily as is usually the case at this season.

Wholesale prices on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.25@1.65	$1.67@1.77	
Philadelphia*	2.15@2.80	2.50@2.90	2.92@3.02	
New York*	2.40@3.10	2.80@3.20	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.80@2.85
Boston†	.....	.....	.....	3.60@3.78
Providence†	.....	.....	.....	3.63@3.73

* F.o.b. †On cars.

NEW YORK

Bituminous stagnant but with a strong undertone. Contract shipments restricted and there is no prompt market. Anthracite opening up in a satisfactory manner. Cool weather stimulates buying.

Bituminous—It is generally felt that the soft-coal market has touched bottom. The trade is certainly dull, almost to the point of complete stagnation, and yet there is a strong undertone that indicates excellent recuperative powers when the industrial situation improves. The salient features of the current situation are the impressive manner in which prices are being maintained and the general absence of demurrage coal, together with the shortage of the high-grade varieties. The absence of demurrage coal is due, in part at least, to an evident change in the policy of the Western Maryland Ry., this road having been chiefly responsible for the excess accumulation of demurrage coal at Tidewater during the previous slump in the market during the summer. Shipments from that section are now restricted considerably below the general average for the bituminous mines.

The general movement on contract is only fair, some companies, such as public service corporations, taking their usual full quotas but others curtailing heavily. Stocks in the hands of the consumers are at a minimum, and when the long expected upturn sets in, there will undoubtedly be a heavy initial demand until normal stocks are again accumulated. An important exception to this rule is one of the large coal roads which has been stocking heavy tonnages in order to keep the operators on its lines going; its surplus is now so large, that even it has been compelled to suspend for the time being at least.

The New York market continues quotable on the following basis: West Virginia steam $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70 @2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The hard-coal season is opening up in an entirely satisfactory manner. The recent cold weather has stimulated considerable activity among buyers, many of whom deferred stocking during the summer because of the unsatisfactory financial conditions. The mines are working on practically full time and the line trade is particularly strong, especially in New England.

In the domestic grades, egg coal continues practically the only long size being offered in a few isolated instances down to the April circular; however, the lower temperatures are having a beneficial effect upon it, and it is now beginning to move better. Stove coal continues in the heaviest demand and shortest supply, shipments being substantially less than market requirements in all directions, both all-rail and at tidewater. The demand for chestnut is increasing and few sales are reported at less than the full circular.

The situation in the smaller sizes is not so favorable. Pea coal is the strongest there being a heavy movement all-rail with occasional premiums noted but at Tidewater the situation is easier and the full circular is not always obtainable. All the steam grades are generally heavy with the possible exception of barley; it is particularly difficult to find prompt disposition for No. 2 buckwheat, and there is some accumulation of this size.

The New York anthracite market is now quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.65@5.10	$5.05	$4.60@5.05
Egg	5.35	5.10@5.35	5.30	4.80@5.30
Stove	5.35	5.35@5.45	5 30	5.30@5.40
Chestnut	5.60	5.50@5.60	5.55	5.45@5.55
Pea	3.55	3.45@3.55	3.50	3.40@3.50
Buckwheat	2.80	2.70@2.80	2.50@2.75	2.25@2.75
Rice	2.30	2.10@2.30	2.00@2.25	1.50@2.25
Barley	1.80	1.70@1.80	1.75	1.50@1.75

PHILADELPHIA

Anthracite stimulated by cool weather. Better demand for prepared sizes, but steam grades little heavy. No perceptible improvement in bituminous.

Anthracite—The cool weather of last week has had a perceptible influence in the buying of anthracite. Dealers are not overwhelmed with orders, but claim that the volume of trade received indicates that the fall and winter demand is about commencing, and look for good business from now on. The only really depressing feature is the poor outlook for the steam sizes. The market is about absorbing the production of pea, but buckwheat and smaller are still long, and are going back into stock. This is accounted for by the fact that the mines are working full time, and the market is not yet ready to absorb the entire output of these sizes. Added to this, industrial establishments using the junior sizes of coal, are in many cases working on curtailed time. The large apartment houses, however, will soon begin to start their heating systems, and it is expected that the operators will soon have no trouble in disposing of their entire output; and as the colder weather sets in, to draw on their stocks to fill the current demand.

Outside of chestnut, one hears of few concessions on the circular. It seems difficult to understand, but reports of 75 to 80c. from the circular have been heard of on this size; this is undoubtedly an exceptional case, and no doubt reflects an effort on the part of the operator to rid himself of demurrage coal.

Prices at tidewater are as follows:

	Circular	Individual
Broken	$4.75	$4.75
Egg	5.00	4.90 @ 5.00
Stove	5.00	5.10
Chestnut	5.25	4.80 @ 4.90

Bituminous—The only feature of the bituminous situation seems to be the continued demand at tidewater. Shipments to the East are heavy, compared with conditions a few weeks ago. The line trade, however, shows little or no signs of improvement.

BALTIMORE

Distinct improvement in anthracite. Bituminous market continues flat, slack still being the heavy feature. General business shows signs of awakening, but improvement is slow.

That hard coal is improving from day to day is undoubted. Steam sizes are only slightly improved but the call on the trade for domestic grades is getting much better. The late September delivery has been well up to the seasonal average for some of the dealers at least, and the householder who held off in the early spring and summer buying is now getting into the market rapidly. A larger number than usual deferred stocking this season and the prospects for October and November are quite encouraging in the domestic lines. The majority of coal men here will probably have their business on the full winter schedule by the first of November.

While the export trade in bituminous continues fairly large the general situation on soft coal is far from satisfactory. The demand for industrial fuel is far below what it should be. Except on contracts of long standing the Northwest, New England and the South are taking far less coal than was the case at this time last year. Prices are also unsatisfactory. Pennsylvania low grade coals are still offering at the mines below the dollar mark in some cases, while best Pennsylvania line fuels are quoted around $1.30 and $1.35.

The poor call from the Lakes has caused three-quarter gas in West Virginia to sell quite cheaply, and offerings around 90c. are frequent. Run-of-mine sold during the week as low as 75 and 80c., and slack was so far off color that 30 and 35c. proffers were made in some cases.

The strictly local situation is being fairly well maintained; there has been little or no surplus at tide to be sacrificed. What over-shipping took place was absorbed in the bunker trade, which has been excellent by reason of the large movement of export ships. A number of the industries here are slowly coming back into their own. The iron and cement concerns both report improvement. The rail mills of the Maryland Steel Co. resumed the past week after several weeks' suspension.

COAL CHARTERS

The "Journal of Commerce" reports the vessel situation as follows: "The steamer market was quiet in all trades, and no charters of more than ordinary interest were reported. There was a limited demand prevailing for boats in a few of the transatlantic trades, principally for grain, coal and petroleum cargoes. There are a limited number of inquiries for West India boats for single trips ,and an occasional freight offer to South America, but there is an entire absence of orders in all long voyage trades. The supply of unchartered boats available for October delivery is sufficient for the current necessities of shippers, and rates are firmly supported in all trades at about the basis of last previous charters. In the sail tonnage market a slightly increased business was done in chartering, and there is a little more demand for vessels for West India account. In all other trades the demand continues light, with rates nominal and unchanged."

Coal charters have been reported as follows:

Vessel	Nationality	From	To	Tons	Rate.
Romsdal	Norwegian	Baltimore	Havana	2028	
Teesdale	British	Norfolk	Jamaica	1560	
Riverdale	Brisish	Baltimore	Rio Janeiro	2752	$3.84
Standish Hall	British	Baltimore	Alexandria	2544	3.60
Elio	Italian	Baltimore	West Coast Italy	2208	
Sava	Italian	Norfolk	Naples	1018	
Carrie A. Lane		Philadelphia	Ponce, P. R.	703	
Brina P. Pendleton		Philadelphia	Point-a-Pitre	821	
J. Edward Drake		Philadelphia	Mayport	789	
Van Allens Boughton		Philadelphia	Boston	1909	

Note—Steamers are indicated by **bold face** type, all others being schooners.

HAMPTON ROADS

Export shipments still continue heavy with a fair amount of coal going coastwise. September establishes a new high record for tonnage. Outlook hopeful.

Dumpings still continue heavy at all piers. Export shipments for the week have gone to Naples, Campana, Piraeus, Montevideo, Palermo, Bridgetown, Cristobal, Kingston, Brindisi, Gibraltar (for orders) and Chandler (Quebec). This latter cargo consisted of about 2500 tons of nut and slack and was taken by the steamship "Thyra Menier." There was also a small cargo of run-of-mine coal loaded for San Juan, Porto Rico. One of the most interesting shipments going coastwise went into the S. S. "Lewis K. Thurlow" which took about 4200 tons. This vessel will go via the Panama Canal.

Prices on the various grades remain about the same as they have been for the past several weeks and while there are reports of sales being made above circular prices it is impossible to get these confirmed. On account of the heavy demand for prompt shipment, coal is now being taken from the storage pile of the Gulf Smokeless Coal Co. at Sewalls Point, reloaded into cars and dumped into vessels.

The outlook at this time points to September being a record month for dumpings at tidewater; the total figures should run considerably over a million and a quarter tons.

The accumulation of coal in the railway yards is perhaps somewhat less than it has been for the last two or three weeks but at the same time there is ample on hand to take care of vessels in port and any due during the next few days. Shipments are making good time from mines and with the coal accumulating there is every evidence that the shippers at Hampton Roads ports are well prepared to take care of any orders which may be offered.

LAKE MARKETS

PITTSBURGH

Market gives still poorer account of itself, no quarter showing increased demand, while Lake and manufacturing demand promise decreases. Prices very irregular.

The local coal market has continued to lose ground. Lake shipments are tapering off further, demand from retail dealers is the lightest for this date in years, railroad demand has decreased slightly, and the demand from manufacturers generally, which was showing some slight increase a week or two ago, is now tending to decrease. The steel mills are operating at not over 50% of capacity at the moment, and are receiving orders in such small volume that a rate of 40% or less is likely within a few weeks.

There is hardly any demand for free coal, and the market is not clearly established. On the limited volume of business done prices are irregular, being down to 50c. or less for slack and close to $1 for mine-run, while there is no doubt that occasional sales have been made at less than $1. Mining operations in the Pittsburgh district are at about 50% of capacity, or the smallest since April. Circular prices are purely nominal and unchanged as follows: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

TORONTO, CANADA

Warm weather and accumulated stocks have restricted the demand. Manufacturing still heavily curtailed but outlook more hopeful.

The market has latterly been very quiet, as many consumers laid in large stocks shortly after the outbreak of the war. The warm weather has also lessened the demand for domestic purposes. There is so far little improvement in the industrial situation and many factories remain closed or are working much below capacity, though conditions in this respect are gradually improving and the increased demand in some lines formerly supplied by Germany points to a speedy renewal of activity.

There are ample supplies of coal on hand and operators are making active endeavors to push sales. Prices are stationary as follows; with some shading in car lots of bituminous. Retail, anthracite, egg, stove and nut, $7.75, grate, $7.50; pea, $6.50. Bituminous steam, $5.25; screenings, $4.35; domestic lump $6, cannel, $7.50. Wholesale f.o.b. cars three-quarter lump $3.83, screenings, $2.89.

BUFFALO

No stir in bituminous and none expected in the immediate future. Slack more quiet than formerly. Anthracite selling well except egg.

Bituminous—The demand is still light. In fact there is scarcely any demand except in a modified form, as the trade is canvassed so closely that the consumer has little chance of giving out unsolicited orders. This means an exceedingly dull market till there is a revival of manufacturing.

The export demand since the war broke out has been disappointing. In fact shippers in the various Pennsylvania bituminous fields are shutting up their export offices pending a return of their former export demand.

The Canadian trade is at a low ebb. Collections there are poor and a new customer is taken on with the greatest of caution, for the seller feels that some special reason has shut the buyer off from his former supply and this was not from want of coal to fill orders. Some had Canadian business of that sort offered them lately which has added to the natural suspicion.

The prices on bituminous are practically unchanged, though slack has been hit hard on account of the warm September. Regular prices, obtained only for the best grades, remain on the basis of $2.80 for Pittsburgh lump, $2.75 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley prices continue about 25c. lower than Pittsburgh for sizes, with slack about on a par with Pittsburgh.

Anthracite—The feature of this trade is the continued slack demand for egg. The practice of substituting stove for egg still keeps up and will do so till regulated by a readjustment of prices. The end of September has been quite different from former months. There has been no further decline to look for, so the buyer prefers to wait till another month comes in, so that his account will not come due so soon.

The Lake trade has shown more activity, shipments for the week amounting to 114,200 tons, which is a larger amount than for several weeks. Clearances were almost entirely to Chicago, Duluth and Sheboygan. There was nothing for Milwaukee or the Canadian ports of Lake Superior, as they are well supplied with both anthracite and bituminous. It does not appear likely now that the late fall will show much increase in the movement by Lake, as the amount on Upper-lake docks is large.

TOLEDO

Cold spell stimulated domestic business. Steam coal shows weakness and slack is hard to dispose of. Lake movement fair.

The cool spell helped the market but was not of sufficient duration. There seems to be a little more buying of steam coal recently but prices are not showing any greater strength. Slack is extremely hard to move and prices are the lowest known here in many years. Mine-run is said to be showing slightly more strength. The Pittsburgh No. 8 operators and miners have not yet reached an agreement and this is holding back some of the contract business.

The T. & O. C. docks have been quite active during the past week and considerable coal is going up the Lakes. Prices are holding close to the list although there are some concessions being made.

COLUMBUS

Continued weakness in the steam trade, together with a slackening in domestic demand, are the principal features of the Ohio market. Lake trade continues active. Sellers still maintain an optimistic view.

Not much improvement is reported in the coal trade in Ohio during the past week. In fact, the only change has been for the worse, as the domestic demand is now feeling the effects of the higher temperatures and orders are not coming in as rapidly. The tone of the trade is still good, and with more favorable weather, the future prospects are not believed to be particularly bad.

Dealers have had a slack demand since the weather has grown warmer, but prices on domestic grades are still stiff; in fact, there is some talk of an advance in retail prices the first of the month, but this will hardly be done under present weather conditions. Preference is still shown for the better grades.

The Lake trade is fairly good, although the tonnage handled at Toledo is not quite as large as formerly. Chartering of boats is still active and the docks of the Upper Lake ports are in good shape generally.

Steam business is slow and there are no immediate prospects of improvement. Manufacturing establishments are only buying what they need for the present. Very few steam contracts are expiring at this time. Railroad fuel contracts are mostly closed up and prices are between $1.02½ and $1.10.

Production in Ohio fields has been fairly large. In the Pomeroy Bend field, the output is estimated at normal, and in the Hocking Valley and Jackson it is about 85% of the average. The Crooksville field reports about 75%, and the same is true of Massillon. Eastern Ohio is still idle, and there are no negotiations for the adjustment of the wage agreement.

Prices in the Ohio district are:

	Hocking Valley	Pomeroy	Kanawha
Re-screened lump	$1.70	$1.75	
Inch and a quarter	1.60	1.60	$1.50
Three-quarter inch	1.45	1.45	1.45
Nut	1.15	1.50	1.15
Mine-run	1.15	1.15	1.15
Nut, pea and slack	0.30	0.35	0.30
Coarse slack	0.20	0.25	0.20

CLEVELAND

Fine coal is demoralized and coarse coals are little better. Lake trade is slow without signs of improving. Shippers are now of the opinion the season will close early.

Hocking slack that has been on the market for a week has been sold at ten cents less than the freight. Last week 100 cars of nut and slack were sold for shipment at 7½c., which in this market means $1.07½ delivered. Though quotations for shipment are nominally the same as a week ago the spot market is very weak as some coal is under car service. A good illustration of the condition of the market for Youghiogheny was an offer made by a shipper to send high grade coal to a local broker to be sold on consignment without any restrictions.

The light Lake business has curtailed operations in almost all districts shipping into Cleveland and slack is not really plentiful. With a few days of chilly weather there would be a chance of the market recovering, but a number of manufacturers are running so light and have such good supplies on hand that they are out of the market for three days to a week.

Pocahontas is in better demand owing to the large retail trade and lump and egg sizes are a little higher than a week ago. The small demand for Pocahontas slack is partially responsible for the curtailment in the production of prepared sizes, which have been less plentiful. The operators are no longer using export prospects as an excuse for refusing orders for prepared sizes.

The Lake trade has seen its best for this season. How much the shipping contracts have been reduced is manifested in the action of the owners who have been operating ships to carry contract coal. Ore shipments will end in most instances Nov. 1 and not later than Nov. 10 in almost all the others. The ship owners have decided to lay up a large number of vessels the next two weeks and will use the remainder of their fleets to fill out the coal contracts. By laying up part of the fleets they will be able to drag the ore out over a period that will let them have cargoes both ways.

Prices for current shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.75				
Lump, 6 in.			$2.45		
Egg	3.75				
Egg, 6 in.			2.10		
Lump, 1¼ in.		2.40	2.25		
Lump, ¾ in.		2.30	2.10	2.00	2.05
Mine run	2.75	2.15	1.95	1.90	1.95
Slack	2.40	1.55	1.50	1.50	1.50

CINCINNATI

Demand still weak in the steam market. Price concessions are less numerous. Improvement anticipated shortly in the steam grades.

The controlling factor in the coal market in this vicinity is still the lack of any demand for steam coal. Screenings are still available in excess quantities. The call for domestic coal continues considerably behind what it should be at this time, but is excellent as compared with the steam business. Accordingly, extremely low prices for spot coal are still the rule, although perhaps fewer sales of distress coal are taking place.

It is certain, however, that with the winter season immediately ahead, and probably most of the domestic trade yet to be supplied, screenings will continue to be a drag on the market unless the expected revival in manufacturing takes place very soon. Numerous plants are still closed down, but reports of large orders indicate that activity may soon be resumed. The refusal of consumers to accept deliveries on contracts, has been responsible for much of the cheap coal thrown on the market, complicating the difficulties of the situation materially.

DETROIT

Market almost at a complete standstill. Demand reduced to a minimum.

Bituminous—Were it not for a certain year-round trade to be supplied, business in this market would be almost at a complete standstill. The local industries are suffering severely from the restricted conditions prevailing in general manufacturing and there is no new demand for coal in any direction. In domestic coals, the Pocahontas grades are holding steady at $2.50 for egg and lump; Hocking lump of the 3-in. shaker variety is in moderately good demand at $1.70, while the ordinary domestic lump brings $1.60. Shipments to the Lakes are somewhat reduced, due to some difficulty in obtaining cars and the generally indifferent demand. Steam consumers are making practically no call whatever.

Anthracite—Anthracite is active, orders exceeding the immediate capacity of the dealers. Unconfirmed rumors are current to the effect that some dealers have advanced their retail prices 50c. per ton, beginning Oct. 1.

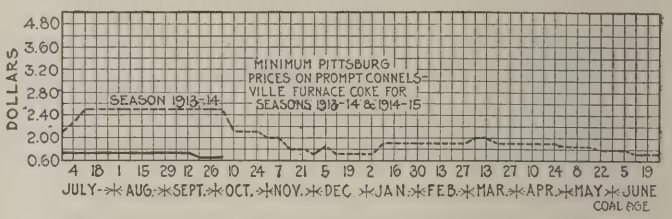
COKE

CONNELLSVILLE

Market absolutely stagnant, with prospects of decreased consumption. Current shipments 20% below maximum rate of the year.

The coke trade continues stagnant. No demand has developed for October, and it seems that the operating furnaces are fully covered. No furnaces are likely to go into blast while demand for iron and steel is so light that continued curtailment in output is in prospect. The Connellsville coke operators have been regulating production quite closely to demand, and very little coke has been dumped in the market. Prices are practically nominal, as follows: Prompt furnace, $1.65@1.70; contract furnace, $1.75@1.85; prompt foundry, $2.25@2.35; contract foundry, $2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Sept. 19 at 243,695 tons, a decrease of 7260 tons, and shipments at 256,537 tons, an increase of 672 tons. Shipments in the past four weeks have averaged about 20% under the record rate of the year, attained about six months ago.



BUFFALO

The demand for coke is still waiting for a stir in the iron trade and a better tone to business as a whole. While regular quotations are about as formerly, some low prices for foundry are reported. The average bituminous shipper wants no coke customers, for the duller the trade the more complaints are made. Quotations continue on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

BIRMINGHAM

There is absolutely no market whatever for furnace coke, and only small lots of foundry coke are being shipped. While there is practically no demand, still the manufacturers seem to be holding to their prices.

CHICAGO

The coke market remains steady. Production has been curtailed to meet the limited demand for furnace and foundry coke.

Quotations are: Connellsville, $4.90; Wise County, $4.75; byproduct, egg, stove and nut, $4.85; gas house, $4.25.

SOUTHERN

BIRMINGHAM

Lump coal shows increase in tonnage. Local steam trade quiet, but indications point to early improvement. Pig iron dull.

Dealers are increasing their orders for lump coal, due to approaching cool weather, and this has stimulated the market to some extent. The local demand for steam coal is far from satisfactory, but the appearance in Birmingham this last week of brokers from New Orleans and Mobile indicated that there were some deals on for a large tonnage for bunker purposes. It was rumored that a large amount of steam coal would be shipped to Panama and South America during October. Pensacola brokers were also in Birmingham getting a line on the possible supply for quick shipment. A representative of the Alabama operators will visit South America this month; it is estimated that during the next six months that territory will need something like 2,500,000 tons of coal.

Production in Alabama is only fairly good, as some of the large railroads are taking the minimum on their contracts, and the local demand is not up to the average. Officials of the various railroads state that no trouble is looked for in the car supply question this fall. The pig-iron business has suffered a period of stagnation during the past two weeks, very little being sold.

LOUISVILLE

Domestic business holding steady though collections are slow. A combination of adverse conditions has created an abnormally depressed situation in the steam trade.

Future business and collections are the chief concerns of the coal operators in the Kentucky market at this time, though the volume of business, especially in domestic coals, has held up well. It is reported, however, that the retail dealers are exhibiting a tendency to slow up, and collections are poor.

The cotton situation in the South is referred to at length by the dealers and operators. The stagnation of that market

is affecting every line in the South. For instance Georgia, the largest user of commercial fertilizer of any state in the Union, is buying practically none while the railroads, already deprived of their cotton tonnage, will have no fertilizer to haul and will therefore require much less coal than in normal years. In spite of these things the coal interests are optimistic about the future. They feel that it is only a question of holding on for a while and redoubled prosperity will be bound to come. Prices continue with practically no change.

MIDDLE WESTERN

INDIANAPOLIS

Domestic grades advanced 10 to 25c. a ton, with indications of a further increase if the screenings and other steam grades do not improve. Lump moving well to railroads and householders. Mines working four days a week. Some car trouble.

Prices have been advanced 10 to 25c. a ton at the mines for domestic grades. The rise is due mostly to the low price of screenings, lump coal prices being put higher to offset this. The railroads, which now use mostly lump, are better buyers and householders generally have been getting ready for the colder weather of October. Lump coal is selling generally at $1.75. There is no set price for screenings. The mines that make a specialty of domestic coal have been running full time and the others about four days a week. With the anti-smoke laws making necessary the use of automatic stokers, industrial plants are using a larger proportion of screenings than formerly. Other steam grades are suffering in price along with slack.

Operators are now saying that if it had not been for the war upsetting industrial conditions in this country, trade in September would have been better than for many years. Retail dealers report larger buying than usual, as consumers seemed to expect an advance by the first of October. It is intimated that there may be another advance soon. Operators are feeling the first of the fall car shortage, one company totaling up a ten-day loss at its various mines the last week.

CHICAGO

Anthracite trade unusually brisk. Smokeless in steady demand, with price on mine-run strong. Hocking market firm, but only fairly active. Indiana operators advance price on domestic lump.

There is still quite a heavy demand for domestic coal in the Chicago market. The anthracite trade has been exceptionally brisk; the only size difficult to move is egg coal.

Smokeless operators have a good demand. The mine-run price for the best grades has remained firm at $1.40; the shippers of off-grades have fixed $1.25 as their minimum, and are getting $1.40 on most sales. Lump and egg coal is still scarce, the price holding firm at $2.25 the mines. The Hocking market is firm, but only fairly active on a basis of $1.60 at the mines for lump coal. The country sales at this price have been interfered with by price cutting among some of the dock companies, which have been endeavoring to move a considerable accumulation of coal.

There has been an easing up in the demand for splint coal. In the Carterville field, lump, egg and nut coal is quotable from $1.60 to $1.75. There have been some recessions in price on domestic sizes of Franklin County coal. Indiana operators have announced an advance on domestic lump coal to $1.75.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.47	$2.65@2.80	$2.42@2.52	
Steam lump	2.02		1.97	
Egg		2.65@2.80		4.05@4.30
Mine run	1.87	2.15@2.25	1.87	$3.30@3.45
Screenings	1.07@1.12	1.40@1.50	1.07@1.12	

Harrisburg quotations are: Domestic lump and egg, $2.65@2.80; steam lump, $2.15@2.20; mine-run, $2.15@2.25; screenings, $1.40@1.50; No. 1 nut, $2.80; No. 2 nut, $2.30@2.40.

Carterville prices are: Lump and egg, $2.65@2.80; No. 1 washed, $2.80; No. 2 washed, $2.30@2.40.

ST. LOUIS

Domestic grades heavily oversold and production continues below requirements, due to light steam demand. Steam market still demoralized. Standard domestic coals not showing their customary form this season.

There is little change in the local market, with the exception, perhaps, that the steam grades are a trifle easier. Operators all report that they are far oversold on the larger sizes of coal, and in order to avoid having orders pushed on them, they are asking as high as $1.85 to $2 for lump and egg; $1.75 is about the top of the market, but there are indications of a further increase soon unless the steam market picks up. This is not likely to occur in the high-grade fields on account of the deplorable condition existing in the inner district.

The high-grade washed market picked up considerable during the past week, especially on the larger sizes, Nos. 1 and 2 moving quite freely. Screenings fell off to 20c. and were hard to move at that figure. The top of the Standard 2-in. lump market seems to be about $1.15, although some operators have been able to get $1.20. Offsetting this, they are giving their screenings away for the freight charges; 3x6 egg coal is selling for $1, and nut coal all the way from 35 to 75c. The domestic demand for Standard coal seems lighter this year, due principally to the fact that Carterville and Franklin County coals seem to be getting a better foothold.

In the high-grade market, lump and egg will be in good demand at from $1.65 up, with tendency to go to $1.85 the early part of October.

Pennsylvania anthracite is moving in in good tonnage, and the demand seems to be good. Smokeless is a drug on the market, and there are no buyers at any price.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.30	$1.10@1.20	$1.20
3-in. lump	.....	....	1.40	.....	.....
6-in. lump	$1.75@1.85	....	1.50	1.25@1.35	1.40
Lump and egg	1.85@2.15	$2.25	.....	.....	1.15
No. 1 nut	1.45@1.50	....	.....	0.75@0.80	.....
Screenings	0.70@0.75	....	0.80@0.85	0.05	0.10
Mine-run	1.05@1.10	....	.....	0.75@0.80	.....
No. 1 washed nut	1.50@1.65	2.25	1.50	....	.....
No. 2 washed nut	1.35@1.40	....	1.35	....	.....
No. 3 washed nut	1.10@1.15	....	.....	....	.....
No. 4 washed nut	1.00@1.05	....	.....	....	.....
No. 5 washed nut	1.20@1.25	....	.....	....	.....

Retail prices, delivered, are: Lump and egg, Carterville, $3.50; Mt. Olive, $3; Standard, $2.75; smokeless, $6.25@6.50. Anthracite, chestnut, $8.50; egg and stove, $8.25; grate, $6.25@6.50.

KANSAS CITY

No change in prices and little improvement in the movement. Trade very unsettled. Circulars scheduled for an advance soon.

Kansas City is not laying in heavy supplies of coal for the winter, and yet retailers declare that coal will be consumed in as large quantities as ever, the bulk of the buying coming later. There has not been a real touch of winter yet. And the fact that the Kansas natural gas receivers are holding out prospects of much gas this year, is a factor in the situation. On the other hand, the prospect that steam plants may not get fuel oil possibly will offset any advantage gas consumers will have. Some of the large buildings which buy heat depend upon natural gas for running their own plants early in the season before gas gets low. The wholesalers in heat started up their plants at fall schedule last week.

Through Kansas, but not in Kansas City, there are notices being issued by retailers that coal prices will advance Oct. 1. In Kansas City there are no threats of increases, but dealers believe that coal will probably rise by Nov. 1.

PRODUCTION AND TRANSPORTATION STATISTICS

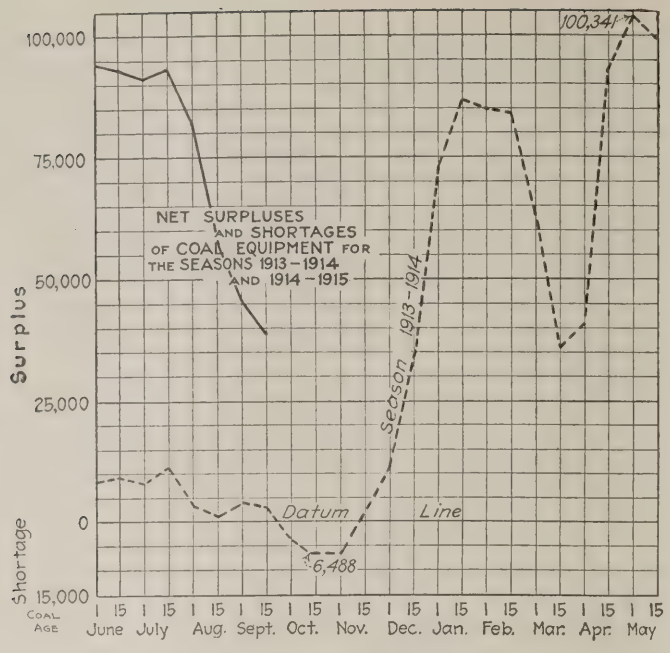
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Sept. 15, as follows:

	Surplus	Shortage	Net*
New England Lines	1,326	0	**1,326**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	5,232	0	**5,232**
Ohio; Indiana; Michigan; Western Pennsylvania	16,957	0	**16,957**
West Virginia, Virginia, North & South Carolina	3,194	9	**3,185**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	4,096	0	**4,096**
Iowa, Illinois, Wis., Minn.; North & South Dakota	2,823	0	**2,823**
Montana, Wyoming, Nebraska	963	0	**963**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,968	89	**1,878**
Texas, Louisiana, New Mexico	258	6	**252**
Oregon, Idaho, California, Arizona	2,741	87	**2,644**
Canadian Lines	0	0	**0**
Total	39,558	191	**39,367**

	May 15	June 1	June 15	July 1	July 15	Aug. 1	Aug. 15	Sept. 1
Surplus	99,664	94,770	93,520	91,280	93,509	82,284	56,560	46,141
Shortage	313	7	49	430	292	110	496	66
Net*	**100,341**	**99,351**	**94,763**	**90,850**	**93,217**	**82,174**	**56,064**	**46,075**

***Bold face** type indicates a surplus.



BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during June and the first six months of the last two years, in short tons:

	June		6 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	93,211	78,019	758,699	711,784
Chesapeake & Ohio[1]	1,794	1,669	8,775	7,893
Erie[3]	741,319	826,756	4,205,048	4,468,839
Pennsylvania[2] [3]	776,237	855,247	5,418,231	5,654,277
Virginia[2] [1]	223	84	709	136
Total 5 roads	1,612,784	1,761,775	10,391,462	10,842,929
Bituminous				
Baltimore & Ohio[1]	3,212,728	2,517,909	17,555,910	16,234,637
Buffalo, Roch. & P.[1] [2]	794,687	552,867	4,561,113	3,862,002
Buffalo & Susq.[1] [2]	149,139	70,537	903,535	561,309
Chesapeake & Ohio[1]	1,605,063	1,822,962	7,980,768	9,672,008
Erie[3]	11,034	7,443	274,252	40,126
Hunt. & Br'd T. Mt.[1] [2]	99,128	62,416	673,795	528,635
New York Central[3]	677,267	604,937	4,468,852	3,923,543
Norfolk & Western[1] [2]	2,061,911	2,315,956	11,431,452	12,516,321
Pennsylvania[1] [3]	4,189,969	3,897,544	24,232,419	23,555,182
Pitts. & Lake Erie[1] [2]	1,078,121	975,158	6,301,713	5,157,907
Pitts. Shaw. & North[1] [2]	201,798	181,711	1,324,848	1,198,520
Virginia[1] [2]	304,030	321,181	2,201,033	2,027,720
Western Maryland	247,354	209,502	1,501,966	1,357,061
Total 13 roads	14,632,229	13,540,123	83,461,656	80,934,971
Coke				
Baltimore & Ohio[1]	386,920	298,237	2,437,886	1,839,861
Buffalo, Roch. & P[1] [2]	41,771	24,207	296,925	142,604
Buffalo & Susq.[1] [2]	25,151	35,294	155,422	164,803
Chesapeake & Ohio[1]	30,015	29,392	180,538	207,755
New York Central[3]	6,242		35,627	
Norfolk & Western[1] [2]	123,941	87,921	840,642	580,668
Pennsylvania[1] [3]	1,161,521	793,463	7,386,908	5,227,885
Pitts. & Lake Erie[1] [2]	555,207	394,508	3,625,350	2,693,577
Pitts. Shaw. & North[1] [2]			9,383	
Western Maryland	4,582	4,001	40,093	38,505
Total 10 roads	2,335,350	1,667,023	15,008,774	10,895,658

Total Coal and Coke 13 Roads	1913	1914
January	19,266,202	18,124,936
February	17,546,496	15,419,439
March	17,631,345	20,201,479
April	16,850,690	15,463,143
May	18,986,796	16,495,640
June	18,580,363	16,968,921
Total, 5 months	108,861,892	102,673,558

[1] Includes coal from connecting lines.
[2] Includes company's coal.
[3] Does not include company's coal hauled free.

Note:—The Southern Railway hauled 324,025 short tons of bituminous coal during May, and 1,626,196 short tons during five months.

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during June, July and August of this year and last year:

	June		July		August	
	1914	1913	1914	1913	1914	1913
Coal	2,380,795	3,061,929	2,594,407	2,938,723	2,769,453	3,295,123
Coke	298,237	396,920	255,650	391,485	242,283	391,999
Total	2,769,032	3,458,849	2,850,057	3,330,208	3,011,736	3,687,122

FOREIGN MARKETS

GREAT BRITAIN

Sept. 18—Outside of the navy requirements, business is very limited on account of difficulty on the part of foreign buyers of arranging cash. On this account, and in spite of the diminution in output, free coal is more plentiful than it has been for some weeks, and prices are inclined to be weaker. Quotations are approximately as follows:

Best Welsh steam	$5.04@5.28	Best Mountmouthshires	$4.26@4.32
Best seconds	4.56@4.86	Seconds	4.08@4.20
Seconds	4.26@4.38	Best Cardiff small	1 68@1.74
Best dry coals	4.38@4.62	Seconds	0.96@1.44

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage, and for cash before shipment or against invoice.

Freights—Tonnage is offering freely, but orders are scarce. Rates are approximately as follows:

Gibraltar	$1.68	Aden	$2 16
Malta	1.68	Colombo	2.22
Marseilles	1.64	Sabang	2.22
Algiers	1.44	Singapore	2.40
Genoa, Savona	1.56	Las Palmas	1.80
Naples	1.68	St. Vincent	1.92
Venice, Ancona	1.86	Rio Janeiro	3.36
Alexandria	1.86	Monte Video	3.12
Port Said	1.80	Buenos Ayres	3.36

Operations in the coal industry are still restricted in some measure by the shortage of empty wagons, the reduced supply of skilled labor, the limitation of the exports and other factors in the situation which have had to be taken into account since the outbreak of war. The returns regarding employment at the mines cannot be regarded as unsatisfactory, the Board of Trade stating that while a considerable number of collieries are working only four or five days a week, there is considerable pressure in the steam coal trade in South Wales, where more men could be employed if they were available. Many pits have worked less than four days a week recently.

In the Newcastle district, there has been little change of importance in the state of the coal market. Business continues dull in all departments, but the shipments show some slight expansion, and there are signs that the inquiry is growing.

In the Yorkshire district, trade is fairly brisk. The inquiry for large steams on export account is good, and, when facilities permit, a more active state of affairs is expected. Some collieries have benefited by government contracts for steam coal, more of which may follow.

In the Midlands, the house coal position is quieter now that collieries have dealt with the rush of house coal orders experienced at the beginning of the month. There is no speculative buying going on, merchants just ordering for their immediate requirements.

In Lancashire, the fuel market is quiet but steady, and prices are held fairly well, but the uncertainty about credit is hindering sales. Many of the mills are idle, and consumption is still restricted.

In South Wales, there has been but a limited inquiry for all descriptions of steams. Shipments on Admiralty account and for foreign governments are slackening, leaving more coal of all qualities on the market, and more easiness prevails, especially for the second and cheaper qualities.

Rarely has the wholesale market for railborne house coal been so dull and lifeless as it is at the present time. Notwithstanding the somewhat lower temperatures generally and the colder nights and mornings in particular, the retail trade remains exceedingly quiet. The railway congestion due to military requirements has been relieved in some measure during the past week or more, with the result that many collieries are getting a better supply of empty wagons and are working with less irregularity. There can be no doubt, at any rate, that there are now ample supplies upon the London market.

No change has occurred in retail prices as yet, although an advance is now much overdue. The War Office has taken over a very considerable number of the horses employed in the coal trade, and may have to take over more to make good the wastage of war, which will probably be very serious. There are a few motor lorries here and there, but they are only suitable for special work, and it is quite certain that in these times of stress there will be a limit to the available supply of horses.

The seaborne trade remains quiet. Since the previous Friday, 33 colliers had passed up the river.—"The Iron and Coal Trade Review."

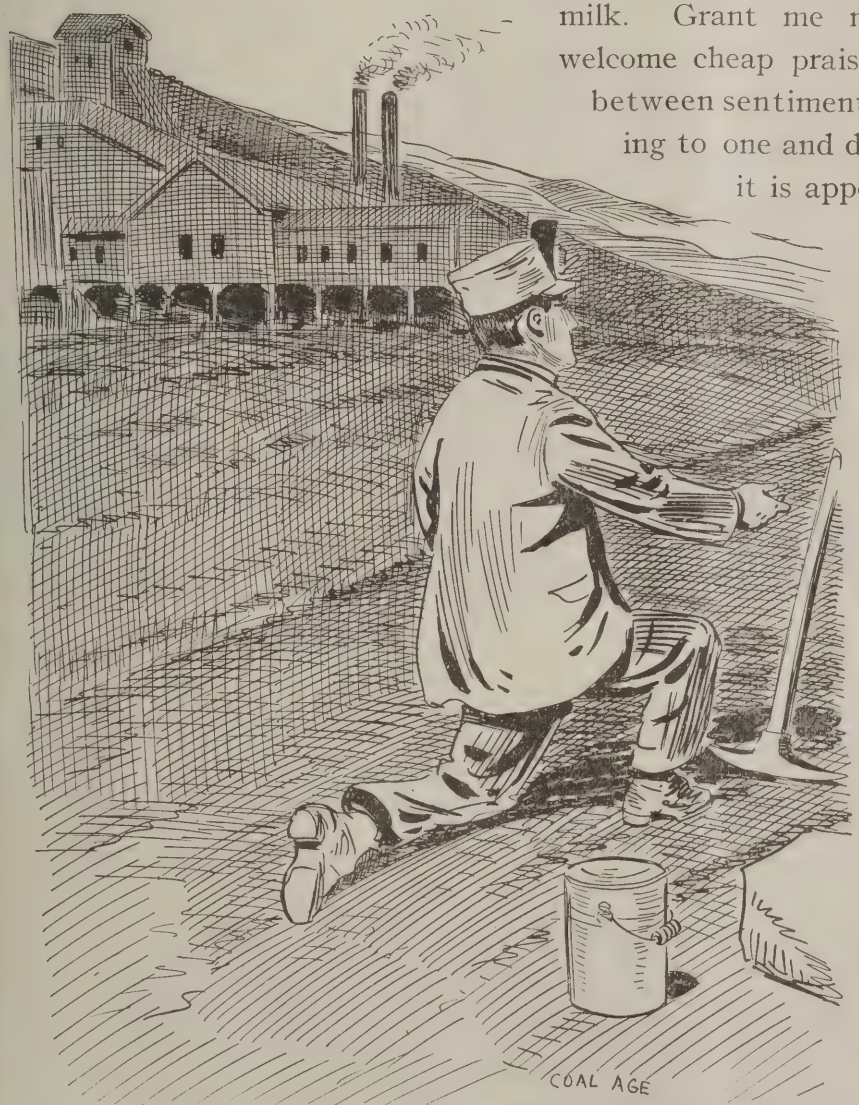
COAL AGE

Vol. 6 NEW YORK, OCTOBER 10, 1914 No. 15

The Good Miner's Prayer

OH POWERS that Be! make me sufficient to mine own occasions. Teach me to know and to observe the Rules of the Game. Give to me to mind mine own business at all times and to lose no good opportunity of holding my tongue. Help me not to cry for the moon, or over spilled milk. Grant me neither to proffer nor to welcome cheap praise; to distinguish sharply between sentiment and sentimentality, cleaving to one and despising the other. When it is appointed for me to suffer, let me—so far as is humanely possible — take example from the dear well-bred beasts, and go away quietly, to bear my sufferings by myself. Give to me to be always a good comrade, and to view the passing show with an eye constantly growing keener, a charity broadening and deepening day by day. Help me to win, if I may, but — and this, OH POWERS! especially—if I may not win, make me a good loser.

Amen.



Apologies to the Good Indian's Prayer, Anon.

Storage-Battery Locomotives at the Grant Mine

By R. Dawson Hall

SYNOPSIS—At the mine of the Grant Coal Mining Co., storage-battery locomotives are doing all the gathering work. The superintendent states that each locomotive can, and most do, handle 375 tons per day without difficulty. The average haul is 15 to 16 miles per day.

The storage-battery locomotive has been at once the hope and the query of the mine operator. He has felt on the one hand that it could be made more effective than the mule and so save the employment of men. It also could be constructed to need less traveling room than mules, and, therefore, save brushing. Moreover, it needs no conductors, and hence saves much expense in the erection of wiring, bonding of rails and maintenance of both. Where the roof is bad, the cost of maintenance of trolley wires is no small item and the danger of falling wires causing fires, and perhaps explosions also, is not to be overlooked. Furthermore, even with low-tension currents there is a certain risk in the use of trolley locomotives.

On the other hand, the operator has been wondering if storage locomotives were really reliable, whether they would be more seriously wrecked than trolley locomotives in a collision or derailment, whether in view of their cost they would really be economical, because a costly unit must haul more coal than one which is cheaper if its use is to be justified. In fact, the operator is disposed to believe that a storage-battery locomotive might well prove its value where the grades were adverse, because its drawbar pull being greater than that of a mule, it could pull a longer trip in cases where with mules the capacity of each unit is all too small. But the same operator has been wondering whether the storage-battery locomotive will pay on a level or on a favorable grade.

Storage-Battery Locomotives Are Proving Desirable

It is interesting to note that all these points of question and doubt do not appeal to H. M. Stewart, the general manager of the Grant Coal Mining Co., of Terre Haute, Ind. Very coldly, for there is little enthusiasm with him, he stated that he had now six storage-battery locomotives, which he had acquired at first one by one and then by twos. He added that he was about to buy two more like those he had already purchased, and he stated that the locomotives would gather 375 tons per day of 8 hr., doing as he estimated it, the work of four or five mules.



Plant of the Grant Coal Mining Co., at New Goschen, Ind.

Of course, some management is required to prevent interference between storage-battery locomotives, though not so much as between smaller units like mules. Furthermore, care must be taken to save long runs in gathering and to prevent the combining of two or more remote districts in the delimiting of territory to be served by a single locomotive. The problems are not different from those relating to mules, where storage-battery locomotives are involved; but to get record runs favorable conditions must,



Storage-Battery Locomotive Pulling Cars Out of Room Neck into a Room Entry



Locomotive Running on Lower Flange of Rail, Track Not Needing Bonds May Be of Impermanent Character

of course, as everywhere, be provided. Perhaps a few notes about the Grant mine may serve to explain conditions.

The Grant Colliery

The shaft is 272 ft. deep and is sunk in a country which is comparatively flat. The seam worked is No. 5. That and No. 4 are the two seams most generally operated in the Indiana "bituminous-coal" district. (The custom seems to be to class the "block" coal by itself, though, of course, it is as bituminous as the other.) The coal measures from 4 ft. 8 in. to 5 ft., the average being about 4 ft. 10 in.

The illustration will show that the mine is in most details strictly uptodate. The shaft is concreted; the headframe designed by Allen and Garcia is of steel, stiffened in places with concrete. The rough finish on the power house, it is true, shows the lines of the forms and gives the impression of wood, but that is deceiving, as the walls are concreted.

The bottom and workings were laid out by Rush and Everson, engineers of Terre Haute, Ind., and as a result of careful planning, three men on the bottom handle 1700 to 1800 tons per day. There is a Holmes lift for empty cars, and the caging is done by Bowerston automatic caging machines.

Methods of Working in Indiana

Indiana is a strong Union state, and the agreements with the Union have made it hard to operate the mines of Indiana with anything like due regard for conservation and even of safety. This is no place to discuss whether the burden of proper methods of mining should fall on operator or miner, and it is only necessary here to state that the rooms are from 21 to 24 ft. wide and the pillars 9 ft.

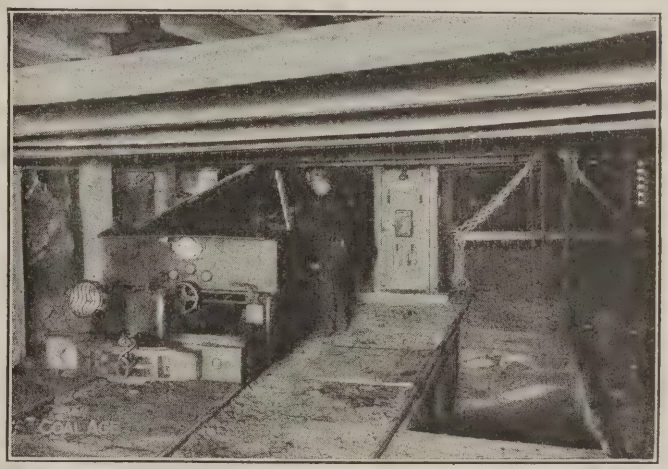


Shaft Bottom at Grant Mine

There have not been wanting those who wonder why the Indiana roof is so troublesome and so ready to squeeze, and that several men have been endangered by sudden movements of the roof, but the reason is so obvious that one forebears to point it out. With such weak room pillars and with chain pillars only 24 ft. wide in the headings, and rooms widened from quite close to the entry, what else could be anticipated? Yet we think that in choosing the Grant mine, we have chosen one of the most favorable illustrations of Indiana practice, for more than usual care is shown in all details of the plant.

A New Method of Working

Yet, if a digression may be pardoned, there is an exhibit of a sense of the importance of good pillars at the mines



The Car Barn with Chain Hoists for Removing Batteries

of the Bunsen Coal Co., Universal, Ind., where the room centers are 66 ft. apart, and the rooms being 21 ft. wide, the pillars are 45 ft. thick. The crosscuts, it is true, between rooms are for the most part 18 ft. wide and to comply with the somewhat too drastic law, are only 45 ft. apart. This width of break-through is adopted to avoid payment for driving a narrow place. Every 200 ft. the crosscuts are made narrower, only 12 ft. wide, and are driven by sights, and all the rooms are also so driven.

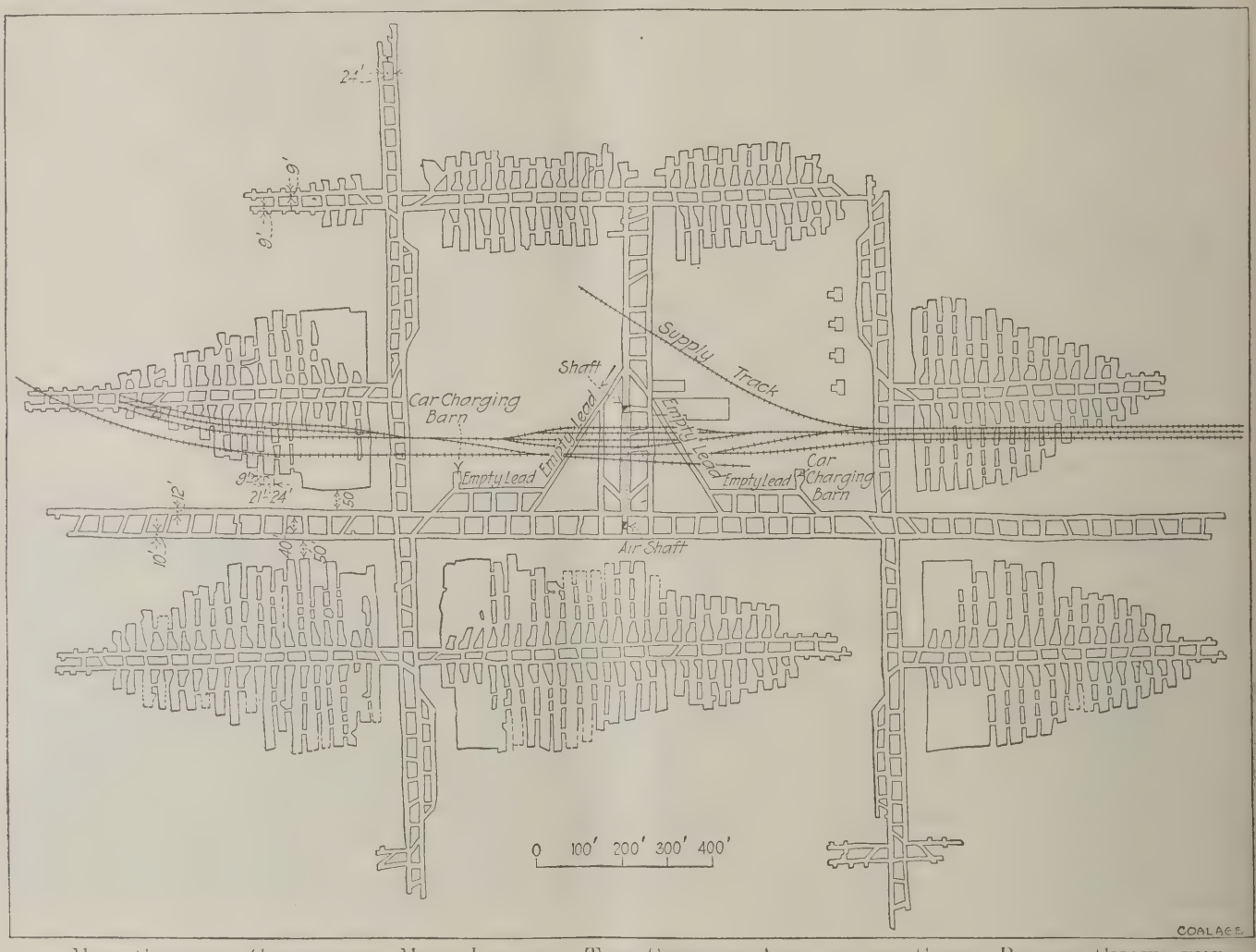
These crosscuts being opposite continuously from room to room, serve as counters, such as are driven in the anthracite region. The coal is hauled out by these to the cross entries, and the parts of the rooms thus cut off are abandoned till the time for drawing pillars arrives. The rooms are thus driven on till the boundary is reached.

So far no pillars have been recovered. That work, however, should not be difficult, as the first mining has been so conservative. However, the roof gives quite a little trouble when it gets damp, and this may cause some trouble if damp air is allowed to circulate through the parts of the rooms which are thus temporarily abandoned.

There is no reason to believe that the problem of the main roof in Indiana is any worse than that elsewhere. It would be solved at once if the idea that adequate support is needed, were boldly faced. It was interesting and pleasing to be told by a superintendent that chain pillars are almost worthless, and that flanking pillars the 43-in. height of the storage-battery locomotive gives it an advantage over the mule, though sometimes where a slight sag makes it necessary to boost the track, the height becomes somewhat scant, for though the coal is always 13 in. thicker than the locomotive is high, there is an allowance to be made for rail and tie.

Haulage at Grant Mine

The main haulage of the Grant mine is by two trolley locomotives, one a 7½-ton Goodman, and one a 10-ton Westinghouse. These pull from the double partings in the cross-entries and deliver their coal at the shaft bottom.



Map, Showing Convenient Mine Layout. The Stippled Area at the Shaft Bottom Shows the Concreted Section

could alone save an entry. Such a statement should be a platitude which everyone should believe, but you could count the people who adhere to it and practice it on the digits of your two hands.

The Drawslate Conditions Are Bad

The roof in Indiana seems to be of a character that makes the use of moistened air prohibitive. In one mine the reversal of the current is alleged to have done much to reduce falls, and it is the annoyance, cost and danger of falling trolley wires, which is, in part, making the trolleyless locomotive look so desirable in the State of Indiana.

The bottom at many of the mines is quite hard, and it is impossible to make height by shooting. Consequently,

The gathering locomotives draw from the faces of the rooms. They go into one room entry and find all the cars loaded. They draw these and go into the same entry with empties. They leave these at the mouths of the rooms and then go into another entry and draw loads there.

The power by which the trolley locomotives are propelled and the storage-battery locomotives charged is provided by one 100-kw. Goodman Manufacturing Co. electric generator, running at 250 r.p.m. and generating 364 amp. at 250 to 275 volts pressure. This is driven by a McEwen engine 16x16 in., with a rated capacity of 137 hp.

The boilers are five hand-fired Terre Haute Boiler Works units, producing 750 hp., using good run-of-mine coal. Here, perhaps, is the *one* point where the plant is

not uptodate. The headings are driven by puncher machines, and the compressed air for this work is provided by two Ingersoll-Rand compressors. The machine shop is unusually well equipped, there being a hammer, emery wheel, planer, hack saw and two drill presses, all power-driven.

The Storage-Battery Locomotives

A storage-battery locomotive was first installed in May, 1913. In September of the same year, another was added, in November two more were purchased, and in July of this year yet another two, and it is said two more are to be ordered. The locomotives have needed little or no repairs. Derailments and collisions—the first not infrequent—do the locomotives no greater harm than if they were propelled by trolley.

The locomotives pull from 12 to 14 trips per day, bringing on each occasion 12 to 18 cars. The net load on these cars runs from 3500 to 4000 lb. per car, and the wagon itself weighs about 1600 lb.

The locomotives weigh 5 tons, of which 1900 lb. is due to the weight of the battery, which consists of 63 cells. When these are charged, they have a capacity of 300 ampere-hours. The track gage is 42 in. The cells used are made by the Edison Storage Battery Co., of Orange, N. J., and the locomotives are manufactured by the Jeffrey Mfg. Co., of Columbus, Ohio.

With the storage battery jogging along unflaggingly over the rails at 5 or 6 miles per hour, and pulling any load likely to be placed behind it, it is really largely a matter of management whether the locomotive does as many times as much as a mule to justify its use. The storage-battery cells, whether Exide or Edison, appear to be giving satisfaction, giving both reliability and the power desired. They are built to withstand overloading, overdischarging and mechanical violence. There will be a further reference to these locomotives in an early issue.

Handling Tonnage Bulletins for Machine Mines

By H. H. Warner*

Various systems have been used to handle machine tonnage, both on the mine bulletin or tipple sheet and on the payroll, but one that eliminates unnecessary office detail is set forth herewith:

In starting this system, use check numbers from one to as high as necessary to accommodate the operation of the mine in question, and as these check numbers are issued, enter on the bulletin above the check number the number of the machine the loader is to work after, i.e., issue check numbers just the same as if it were a solid operating mine, with the exception that the machine number is entered above the check number.

The weighmaster in this case posts his tonnage as it arrives in the regular way and at the close of the day's business, he adds through his bulletin beginning with machine No. 1 and summing up their tonnage, machine No. 2, No. 3, etc., and as the final check against his separate machine addition, he makes complete addition of his bulletin beginning at check No. 1. He posts on his bulletin a recap of the machine tonnage from his machine addition, so that the office can post the machine tonnage to the machine runners without having to make another addition.

*Chicago, Ill.

In case a loader is changed from one territory to another, or from one machine to another, he places upon the first car loaded from the new territory a machine number, together with his check number. For instance, if check No. 36 was loading according to the present bulletin on machine No. 1, that number would be posted above check No. 36 on the bulletin. If he was transferred to machine No. 5, at any time, the first car he loaded from this territory would bear a No. 5 machine number and when this car reached the weighmaster, he would enter No. 5 after the last car received from No. 1 territory and the loader's tonnage from that time on would be posted to No. 5 machine. It is a very good idea to use either red or blue pencil in placing the machine numbers over the loading-check numbers, as it helps considerably in adding the separate machine tonnage.

When this bulletin reaches the office to be posted to the payroll, the payroll clerk begins at check No. 1 and posts straight through his payroll and the grand total of all the payroll loaders' tonnage should equal the grand total of the bulletin. When posting the machine tonnage, it will be necessary for him to split this tonnage as shown by the weighmaster between the runners on the various machine territories, for instance, No. 1 machine is double shift, four men working on same, the tonnage shown on the bulletin for No. 1 machine will be split by four and the separate amounts posted to the credit of each runner's account.

Where solid coal is loaded with machine coal, the letter "S" is placed on the bulletin above the loading-check number instead of machine number. This tonnage is carried the same as machine tonnage on the recap of daily bulletin.

This system is superior to the system where the first fifteen numbers on the bulletin are for No. 1 machine, the next fifteen for No. 2, etc., as it eliminates the necessity of changing the loaders' check number at the time he may be changed to a different territory.

To demonstrate, loader No. 5 is loading on No. 1 machine and during the day receives notice from the mine manager to change his working place and begin loading after No. 4 machine. With the last mentioned system, it would be necessary for him to come on top, get in touch with the office and have his loading check changed to some check number that was vacant on No. 4 machine before he could resume his work. Furthermore, when this change is made the fellow is carried on the payroll as having worked on No. 1 machine. Later, he may be given still another number on the payroll, and there are quite a few times when this becomes very confusing to the office in posting the loader's supplies, union dues and assessments.

Invariably when the pay is closed the payroll clerk will wind up on pay day with two or three different pay envelopes for the same man. The system outlined above eliminates any changes in the office work relative to the pay of any particular loader, and he retains the same check number and is carried on the payroll in the same place at all times.

The weighmaster takes care of the details outlined and carries a semi-monthly pay bulletin both for machine runners and loaders. This bulletin is posted each and every day for inspection, and by doing this, there is no question as to the correctness of the tonnage carried on the payroll for each individual. Any differences that come up before the pay is closed are handled through the weighmaster for correction.

The Purchase of Coal on Specifications--III

By F. R. Wadleigh*

SYNOPSIS—This third installment takes up in detail a study of the effects of sulphur on the actual value of the coal to the consumer. The importance of designating specific sizes is also shown. Two samples of typical specifications are given, one being for the standard proximate method, now so commonly used, and the second a more exhaustive and comprehensive type.

Perhaps one of the most glaring inconsistencies in many specifications now in use is the attempted regulation of the amount of sulphur in the coal, with the infliction of absurd and unfair penalties for a small increase above the standard. In the first place, the coal operator or seller cannot control the amount of sulphur in his coal.

Professor Lewes states that the original source of sulphur in coal is probably calcium sulphate, which exists in the ashes of vegetation and remains in the coal ash. Under the influence of temperature, pressure and heat in the presence of carbonaceous matter, the sulphate becomes reduced to sulphide, which combines with the iron salts and forms sulphide and disulphide of iron (iron pyrites).

Sulphur is present in coal in several forms, as a sulphate of lime, (gypsum) pyrites (rarely as marcasite) and as organic sulphur, the latter in compounds about which little or nothing is known, where the sulphur is combined with carbon and hydrogen; the organic sulphur varies in different coals from 2 to 75 per cent. of the total sulphur. (Lewes, "Carbonization of Coal.")

Of these various forms of sulphur, only the amount of iron pyrites can in any way be regulated by the coal operator and that to a limited extent only. The gypsum comes in thin layers or scales along the cleavage planes of the coal and cannot be removed in mining.

The organic and free sulphur cannot, of course, be removed but at any rate it is all driven off when coal is burned. The iron pyrites comes in balls and lenses, or layers and small scales, distributed throughout the coal; much of this can be removed at the mines by washing unless it is in small scales.

Effect of Sulphur in the Boiler Plant

Sulphur has a heating value of from 4050 to 5300 B.t.u., depending upon its form, whether organic or iron pyrites. Dioxide of sulphur with water forms sulphurous acid which may corrode any metal it comes in contact with, but this action only takes place after cooling of the gases of combustion. The action of sulphur in pitting or corroding boiler surfaces has been greatly exaggerated and may be practicaly neglected. The same applies to its action on grate bars, except in rare instances.

The percentage of sulphur in coal is no indication of its tendency to form clinkers. This is clearly proved by the tables given in the preceding installment†, showing the ash fusing temperatures with amount of sulphur, for various coals. There is no relation between the percentage of total sulphur in the coal and either the amount and kind of clinker or the ash fushing temperature.

Sulphur and Spontaneous Combustion—Fires in coal piles or bins from spontaneous combustion, are believed by many users to be due to sulphur in the coal. The theory that spontaneous combustion of coal may be caused by the oxidation of iron pyrites or sulphur has been held for a number of years, regardless of the fact that coals with less than one per cent. sulphur are known to be extremely liable to spontaneous combustion. As long ago as 1864, Dr. Percy pointed out that pyrites has little to do with spontaneous combustion, a fact later confirmed by Dr. Richter.

The U. S. Bureau of Mines, in Technical Paper No. 16, states that sulphur has only a minor effect on spontaneous combustion, in most instances. Numerous samples of coal taken from the hottest parts of a burning pile or bin showed that in no case was the unoxidized sulphur less than 75 per cent. of the average original total sulphur in the coal. The two great English authorities on this subject, Professor Lewes and Dr. Harger, both state positively that sulphur can have little to do with originating spontaneous combustion.

Therefore, no specifications for steam coal should include the sulphur content as a basis for payment. The U. S. Government specifications have no sulphur limit or percentage, except in the general description of coal, but there are a number of other specifications now in use that penalize the seller for a variation of ¼ of 1 per cent. Even if sulphur has anything to do with clinkering and thus increasing the cost of plant operation, such a small increase could not possibly be measured.

No specifications in use, in this country, so far as I know, take into account the size of the coal, in the way of specifying a percentage of small coal, dust, or slack and penalizing or giving a bonus on such basis. It is true that some contracts require the absence of "dust," but only in a general way is such requirement mentioned.

In other countries, this item is made of considerable importance in all specification contracts. This difference in practice is largely due to the fact that a great part of the steam coal used in this country is run-of-mine, while abroad it is nearly all sized by screening.

Type of Contract without Specifications

Should there not be a standard for run-of-mine coals used in this country as regards percentage of lump and slack? We know that the size of coal has an important effect in combustion results, a fact that is given much more weight abroad than here. As an example of this, see for instance, the specifications for the purchase of coal for electrical works as agreed on between the large London coal contractors and the Associated Municipal Engineers, which will be given in a succeeding article.

The old method of coal purchase, by name or reputation, still the most largely used, can and does give good results. A standard contract of this kind on which mil-

*Consulting engineer, 426 Real Estate Trust Bldg., Philadelphia, Penn.

†"Coal Age," Vol. 6, p. 424.

lions of tons have been and are being bought is as follows:

(City).....191

.....

.....

Bought of .....

(Subject to conditions endorsed hereon)

.....tons of 2000 lb. of.....Coal.

@$.....per ton of 2000 lb. f.o.b. cars at mines .....

This contract shall cover fuel requirements of.....

.....for term of.....from.....191

but shall not exceed the tonnage stated above without the written consent of .....(Selling Company).

Any portion of this tonnage not shipped by..... on which date this contract will expire, shall be canceled.

It is agreed that the monthly requirements under this contract shall be about as follows:

.....

.....

.....

.....

Terms of payment, cash on or before the 12th of each month for all coal shipped during the preceding month. Bills subject to sight-draft if not paid when due.

Every effort will be made for the fulfilment of this contract, but the sellers will not be responsible for same during any war affecting it, or if prevented by strikes, or combination of miners, laborers or boatmen, accidents at the mines, or interruption or shortage of transportation or navigation, by any cause or any occurrence. In such case the obligation to deliver coal under this contract is canceled to an extent corresponding to the duration of such cause, occurrence, interruption or shortage, and no liability shall be incurred by the sellers for damages resulting therefrom.

.....Railway Company's scale weights at point of shipment are accepted as conclusive.

Another kind of specification is that which gives: A standard analysis and limit of constituents; provisions for sampling each shipment of some certain size; scale for penalizing inferior coal.

No analysis is made unless coal gives inferior results in actual use, in which case the sample of that particular shipment is to be analyzed and payment based on results of such analysis according to scale of penalties. If the analysis shows coal to be within the standard limits given, then no penalty is to be affixed and the inferior combustion results are assumed to be due to poor handling or condition of equipment. The following is a typical example of such a specification:

SPECIFICATIONS AND CONTRACT FOR FURNISHING ——TONS OF BITUMINOUS COAL

By and between The.....a Corporation of the State of Pennsylvania, hereinafter called the consumer.

This contract shall cover the full requirements of the .....Co., for a term of.....from .....to.....

Description of Coal to be Delivered

Run-of-mine semi-bituminous coal, having an analysis approximately as follows, which analysis shall be taken as the standard for all coal delivered under this contract:

Moisture	2.5
Volatile not to exceed (dry coal)	18.00
Fixed Carbon	72.00
Ash not to exceed (dry coal)	8.00
Sulphur (dry coal)	1.5
B.t.u. (dry coal)	14,300

Ash fusing temperature, not lower than 2500° F.

Commercial name of coal.....

Name of mine or mines.....

Location of mine or mines.....

Name of coal bed or seam.....

The coal to be furnished under this contract is to be delivered by the contractor on cars at the plant of the..... at....., and is to be of the grade and kind described in the specifications.

It is understood and agreed that the Company will deliver under this contract as much coal of a size not to exceed 4 in., that is, coal that will pass through a 4-in. perforated screen, as it may desire, in quantity not to exceed the total tonnage called for by this contract; such 4-in. coal is to come from the same mines and to have the same approximate analysis as the run-of-mine coal described herein.

Deliveries

Coal shall be delivered at the rate of.....tons per week until the whole quantity has been delivered.

All deliveries to begin within ten (10) days after the signing of this contract.

It is understood by and between the parties hereto that the intent and purpose of this contract and of these specifications is to obtain for the consumer, during the life of this contract, a continuous supply of fuel, constant as to quality and delivered as the needs of the consumer require.

It is agreed that the failure on the part of the company to furnish coal of the quality described in this proposal on three consecutive deliveries, or in case more than 20 per cent. of the coal up to any date during the life of the contract has been of a quality below the standard and subject to rejection under this contract, this contract may, at the option of the company, be terminated.

It is agreed that, if for any reason, the Contractor fails to deliver coal in accordance with the terms of this contract, the company may buy coal in the open market and charge against the contractor any excess in the price of the coal so purchased over the contract price, or, at its option, the company may cancel the contract.

Causes for Rejection

It is understood and agreed that this contract shall not be binding if at the end of a service of ten days duration, the coal fails to give satisfactory results because of excessive clinkering, when burned in a hand fired furnace, at a rate not to exceed 25 pounds of coal per square foot of grate surface per hour.

Each car of coal delivered will be sampled by a representative of the.....Co., at their option.

(The method of sampling to be used is here specified).

If the coal from any car gives unsatisfactory results in actual use under boilers, the samples taken from such car, at the option of the consumer, shall be sent to..... for analysis.

Should any analysis show that the coal was inferior to that called for by the standard analysis given in this contract, than a reduction in price per ton shall be made on the coal contained in the car from which the sample was taken.

It is understood that the analysis of any sample is not to be used to regulate the price from month to month, but only where inferior coal has been delivered and in such cases the amount of reduction shall be determined by such analysis.

Basis for Reduction from Price on Account of Inferior Coal as Shown by Analysis

Ash. (Standard 8%)

Per Cent.	Deduction per ton (cents)
8.01 to 9.00	2
9.01 to 10.00	4
10.01 to 11.00	7
11.01 to 12.00	13

B.t.u. (Standard 14,000, dry coal)

Variation of 50 B.t.u. correction in price will be determined by the following formula:

$$\frac{\text{delivered B.t.u.}}{\text{standard B.t.u.}} - \times \text{standard price} = \text{price resulting from B.t.u. correction}$$

Degrees F.	Deduction (cents)
2499-2450	1
2499-2350	2
2399-2350	4
2349-2300	8
2299-2250	15
2249-2200	25
2199-2150	40

The company agrees to use the utmost diligence to keep the consumer fully supplied with the quality and quantity of coal specified during the life of this contract, it being understood that sufficiency of supply and quality of coal are of the utmost importance to the Consumer.

The company shall not be liable under this contract for failure to deliver or for any delay in delivering said coal if he is prevented from or delayed in doing so by strikes or combinations of miners or laborers occurring at the mines of the.....or upon any railroad over which the coal must of necessity be transported to reach its destination, or in case he is prevented or delayed by delays in transportation, or by other causes wholly beyond his control.

In case the output of the said mines is reduced by reason of any said causes but not wholly prevented, then the Consumer shall be entitled to receive under this contract the same proportion of the coal so mined as the total amount of coal required to be delivered under this contract bears to the total amount of the coal that the Contractor is required to deliver all the coal required to be delivered hereunder, he agrees to use his best endeavors to keep th Company supplied with coal of good quality at such prices as may be reasonable under the circumstances.

The Consumer shall have the privilege of testing other

coals to an amount not exceeding ten per cent. of the total tonnage to be delivered under this contract.

The undersigned hereby agree to deliver the coal as described in tons of 2240 lb. in quantity as previously specified and in strict accordance with these specifications.

Weights

All payments shall be based on railroad weights.

Payments

Payments for the coal delivered will be made at the price specified in this contract, less any deductions for inferior coal as elsewhere specified. Such payments for the coal delivered under this contract shall be made on the..... day of the month following that on which coal is delivered on the Consumer's tracks.

In 1908, the American Society for Testing Materials took up the question, with a view of putting out standard specifications for all classes of coal and for different uses, steam making, gas manufacture, metallurgical work, etc., and appointed a committee of about 50 members, divided into nine sub-committees, to frame suitable specifications. This committee was made up of leading representatives of the mine operators, of the consumers and of chemists and engineers.

For various reasons, this committee has not as yet agreed upon any standard specifications, partly because it was recognized that the whole subject was a large and growing one, that changes in methods of analysis, greater knowledge of coals and their sampling, alternations in plant equipment and operation, all made it advisable to postpone final action for a time. Differences of opinion as to what items should be embodied in the specifications added to the difficulty. The following quotation is from their preliminary report, presented to the Society at its annual meeting in June, 1910.

The committee recognizes the growing interest in the general subject of the purchase of materials under specifications; and it is believed that in all cases where a rational basis for such specifications can be agreed upon the results of such practice must be beneficial to both producer and consumer, as it enables the consumer to point out more specifically just what he wants while the producer can bid in a more intelligent manner; in addition it facilitates more suitable settlements.

Your committee desires to emphasize certain reforms which are regarded as fundamental accompaniments or outgrowths of the present movement for specifications, and which are essential to the welfare of the coal industry in the United States, namely:

(1) A classification of coals with respect to fuel efficiency, the adaptation of equipment to coals for obtaining the greatest efficiency from the different varieties, the continued use at each plant of that type of fuel best adapted to the equipment, the use of the low-grade fuels either at the mines or within short distances, and the use of the high-grade fuels under conditions demanding highest efficiency and requiring distant transportation.

(2) Special efforts on the part of architects and engineers to provide adequate space for power and heating plants and proper equipment, with a view of making the most efficient use of the fuels that are most available.

(3) Such readjustment in the prices at the mines of the different classes of coals as will render possible clean and safe mining, and the use at local or distant points of all grades of coal worthy of being placed on the fuel list.

Settling Sump for Mine Pumps

By Thomas G. Fear*

Cleaning the sump in a mine is anything but a pleasant job, as all who are familiar with mining operations know. To the mine owner, furthermore, it usually means an increase on the cost sheet, due, usually, to the fact that the cleaning must be done between shifts.

The accompanying sketches show how the sump for the main pumping station can be kept practically free from all foreign matter, such as particles of coal, slate and wood.

On one side of the main sump, a shallow sump is made, not exceeding 2 ft. in depth, and separated from the main reservoir by a concrete wall about 6 in. lower than the top, or high-water level.

The water from the mine is either ditched or pumped into the "settling sump," where the coal or rock is deposited, and the clear water flows over the wall into the main sump. A 1x12-in. board, used as a baffle, will prevent pieces of wood from being carried into the main sump.

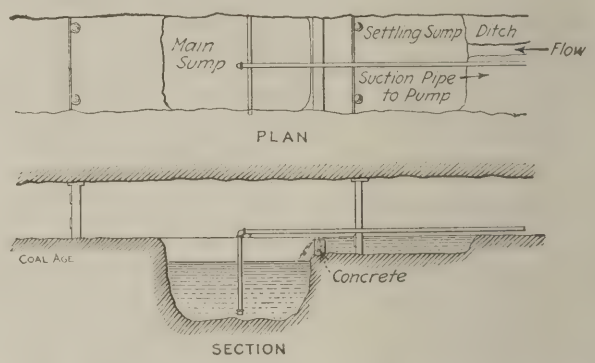


Fig. 1. Plan and Section of Settling and Pump Sumps

The settling sump can be cleaned periodically by the pumpman, during the regular working hours, and the life of the valves in the pump increased materially, as the cutting of these parts is due almost entirely to the amount of foreign matter in the water passing through the machine.

Fig. 2 shows a method of protecting the suction of a pump drawing its supply from a temporary sump.

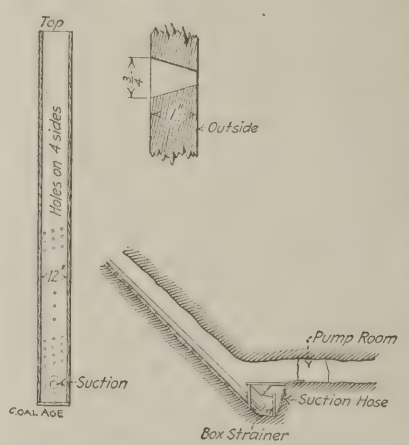


Fig. 2. Method of Protecting the Pump Suction in a Temporary Sump

When the slope was first sunk, a skip pit was made, and the mine cars dumped into skips; the pit was also used as a sump, and the pump suction was covered by coal, wasting from the skips. Later, a box made of 1x12-in. boards, with holes ¼ in. on the outside, and ¾ in. on the inside, was used; the pump suction being connected near the bottom of the box. When the pit filled up, the water level rose, and the water entered the box higher up, the taper in the holes preventing the coal from entirely choking them up.

The heat radiating surface of any electrical conductor varies as its diameter, while the current-carrying capacity varies as the square of the diameter. In consequence, the current density in large conductors will be less than in small for an equal temperature rise. It has been found impracticable on this account to use insulated conductors larger than two million circular mils except in special cases.

*Tennessee Coal, Iron & R.R. Co., Birmingham, Ala.

The Victoria Mine at Lunen, Germany

By F. Schulte

SYNOPSIS—A detailed description of one of the most modern of European mines. The production averages about one ton of coal per man per day, which is far below the individual production of miners in America. The sociological arrangements are unique and quite complete. Electrical hoists were not considered on account of greater first cost.

At present the daily output of the Victoria Mine, at Lunen, Germany, is about 2600 tons, with 2700 workmen on its payroll.

The general arrangement of the respective buildings and workshops, as finally accepted after several changes had been made while the shafts were being sunk, is shown in the plan, Fig. 2, Fig. 1 giving a photographic view of the plant.



Fig. 1. General View of the Surface Plant

The building, which serves both for administration purposes and for the comfort of the men, is found near the entrance to the mine, on the open square at the center of the village. Through this building the mine shafts, Nos. 1 and 2, are entered by crossing the foot bridge over the railway tracks. The main haulage shaft is No. 1, situated close to the screen house and the loading station, while further westward are the washery and the coal tower.

The buildings for the hoisting engines are south of each shaft, on opposite sides of the machinery building; directly beyond the hoisting-engine building of shaft No. 1 are the direct-fired boilers, with the gas-fired boilers further to the west, adjoining the coke ovens and the byproduct factory. To the eastward are the general workshops and the dump is near the river Lippe.

The Administration and Mine Buildings

Entering the main office or administration building, which faces the village, the first room to be met is the checkroom. The rooms for the foremen and manager follow, with windows on the square and doors opening upon the central payroom, which is further surrounded by the offices for the mine boss and the pay clerks. Leaving the payroom, the main corridor leads to the mine shafts, and, on the right of this passage are the pickrooms and the storeroom for giving out the supplies.

On the second floor, reached by the main entrance, the room nearest the stairs is given over to the superintendent, who, from his windows, has a general view over the plant. The offices facing the square are occupied by the pit manager, surveyor, machinery superintendent and draftsmen, and, on the other side of the hall are the bookkeeper and the head clerk. The baths for the officers and foremen are further along the hall to the left, the lamproom being on the right hand as the men go toward the shaft entrance. The lamps are handed back on the other side of the lamproom by the men returning from work and leaving the building on their way homeward.

The Miners' Building contains locker-room for 2403 men, 118 ft. long by 66 ft. wide; on opposite sides are the shower rooms, 14½ ft. wide. To warm the water for the showers, it is fed into an elevated tank, whence it is forced through a heater, and then pumped back into the tank, the circulation being kept up until the desired temperature has been secured. The water flows by gravity to the showers. The heating system for the building is by hot water and forms part of the bathing system, so that there is no steam anywhere, as will be described later.

It was sought, in planning these buildings, to so arrange these rooms and passages that the movement of travel should be subject to no interruption. The men going to their work pass along a special stairway to the lamp delivery room, thence to the covered foot bridge; while the men coming from the mine leave their lamps on the

Note—Translated in abstract by Henry B. Binsse from "Glückauf."

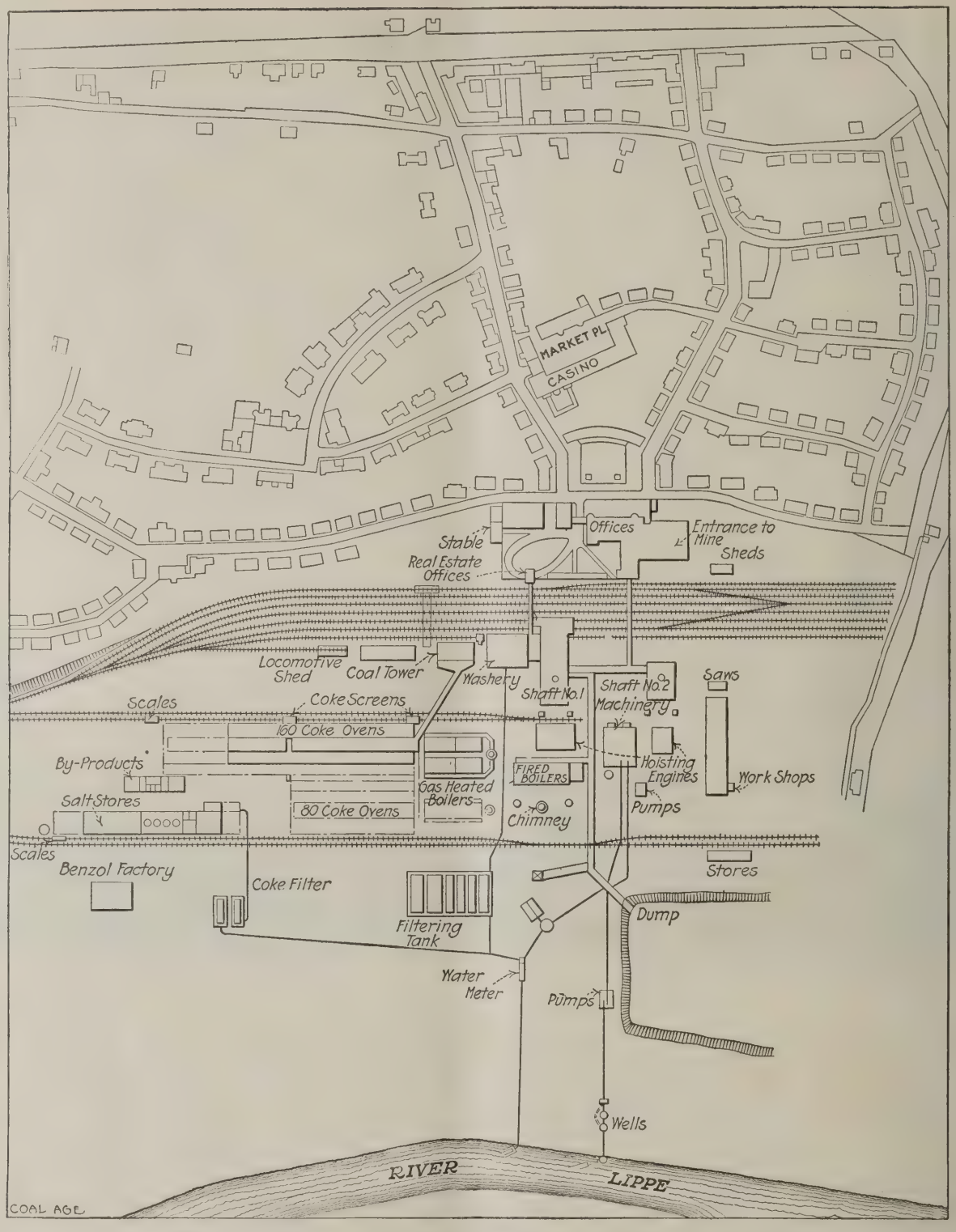


Fig. 2. Layout of Colliery Plant and Workmen's Village

other side and have their own exit. There are also, Fig. 4, rooms for the medical service and first-aid work.

Hoisting Plant

The shafts are 262 ft. apart and have a least diameter of 19½ ft. The air level is 1704 ft., the working level 2000 ft. No. 1, the main shaft, is provided with a double lift while shaft No. 2 is used for lowering timber and material chiefly and has but a single lift. The four floors of the cage in shaft No. 1 carry two cars each, so that eight cars are hauled at a time. The cars weigh 1030 lb. empty and carry 1675 lb. of coal. The hoisting engines are of the twin-cylinder type, the exhaust being used in the steam turbines, as it is well known that it is the best economy to use the exhaust of hoisting engines for heating and for turbines. Electrical hoists were not considered on account of the greater first cost.

The leading dimensions of the three hoisting engines are the same—cylinder, 42 in. diameter by 71-in. stroke, with 30 to 40 r.p.m. The engines are designed for 175-lb. pressure at 482 deg. F. superheat, with a net load of 14,300 lb. and a maximum load of 20,000 lb. from a depth of 2500 ft., at 55 ft. a second, at 103-lb. pressure and 15-lb. back pressure. The screen contains three loading units,

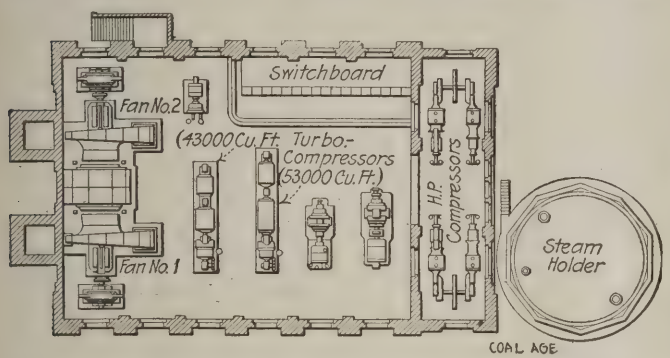
two for screening and loading lump coal, the third for loading the coal as it comes from the mine.

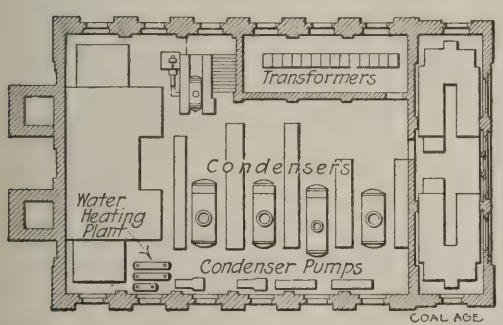
The washery has a normal output of 200 tons hourly and a maximum of 240 tons, and is electrically driven.

Coke and Byproducts Plant

There are two batteries of 80 ovens, and two of 40 ovens, with a plant for the production of tar, benzol and ammonium sulphate. The coke is pressed from the retorts by electrically driven machinery. The coking screen is arranged for 160 ovens.

The boilers are all single flue, alike in size, the working pressure being 175 lb. The battery of fired boilers consists of eleven boilers, with 105 sq.ft. heating surface each, internally fired. The gas-fired battery is made up of 19 boilers of a like capacity. The gases have a temperature of 1900 deg. F. The boilers are all under cover, the arrangement being shown in Fig. 5. The width of the span is 98 ft., the side spans are 13 ft. each.





Figs. 3 and 4. Showing General Arrangement in the Main Machinery Building

Superheaters

To lessen the condensation losses in the steam pipes, a superheating device is attached to each stoked boiler, which yields a temperature of about 500 deg. F.; the superheated steam has its own pipe system. The saturated steam from the gas-heated boilers is led to two superheaters, where it also is heated to 500 deg. F. The feed water is purified as well as preheated.

The main machinery hall is 77 ft. wide by 125 ft. long, and the general layout of its contents is shown in Figs. 3 and 4. It is provided with a 1000-kw. and a 328-kw. turbo-generator, the former for day and the latter for night service. The alternating current is used at 2000 volts and 50 cycles. The turbines make 3000 revolutions and are designed for 25 per cent. overload. The bearings are kept cool by the forced circulation of the refrigerated lubricating oil, and the air used for cooling the generators is filtered.

There are two electrically driven fans, giving a maximum output of 350,000 cu.ft. per minute.

There are two turbo-compressors, one taking 43,000 and the other 53,000 cu.ft. per hour, which are driven by two-stage turbines and may be operated either by live steam or exhaust steam from the hoisting system, the latter being the regular working condition. The air is cooled to 176 deg. F. at 88 lb. pressure on leaving the compressors. All the exhaust steam is collected in a steam holder near the main machinery building.

There are two high-pressure air compressors, one being for reserve. The steam cylinders are 17¾ in. and 29½ in. diameter by 19¾ stroke, and at 120 revolutions, each cylinder compresses 525 cu.ft. atmosphere to 2200 lb. pressure per minute, consuming about 275 hp.

Individual surface condensers are provided beneath each turbine, experience having shown that this gives the best vacuum, a most important feature in turbine economy. The air and water pumps of the two turbo-compressors are driven by a high-pressure steam turbine exhausting into the large turbine. The pumps for the turbo-generators are electrically driven. All the water for condensation is driven from the river Lippe; but, before use, it is allowed to settle in large tanks.



Fig. 5. A Street in the Village

Heating Plant

In the desire to keep the steam plants as compact and as concentrated as possible, a hot-water heating system was decided upon, thus doing away with all condensation losses, leaky stuffing-boxes and never ending repairs, as well as the noise from the steam hammer.

This system takes in the baths, workshops and offices. The water is heated by exhaust steam, three heaters in the basement of the machinery building having a heating surface of 475 sq.ft. and are of the brass water-tube type. The circulation pumps are electrically driven, the rotary pumps delivering 275 gal. a minute.

In planning the workmen's village, stress was laid upon making the walk to the mine a short one and upon creating pleasant attractive surroundings (see Fig. 2). There are 70 homes for officers and 637 houses for the men, generally of the several-family type. All are equipped with electric lights and each has its garden and shed. The streets are planted with trees and lighted by electric-

ity. On the main street is a market place, on the south side of which is the casino, with restaurant, music and card rooms. There is a school for very young children, where the little ones are cared for while their mothers are attending to their housework. There is also a school for sewing and cooking. Milk and mineral water find a large sale at the mine entrance.

Natural Gas Breaks Record

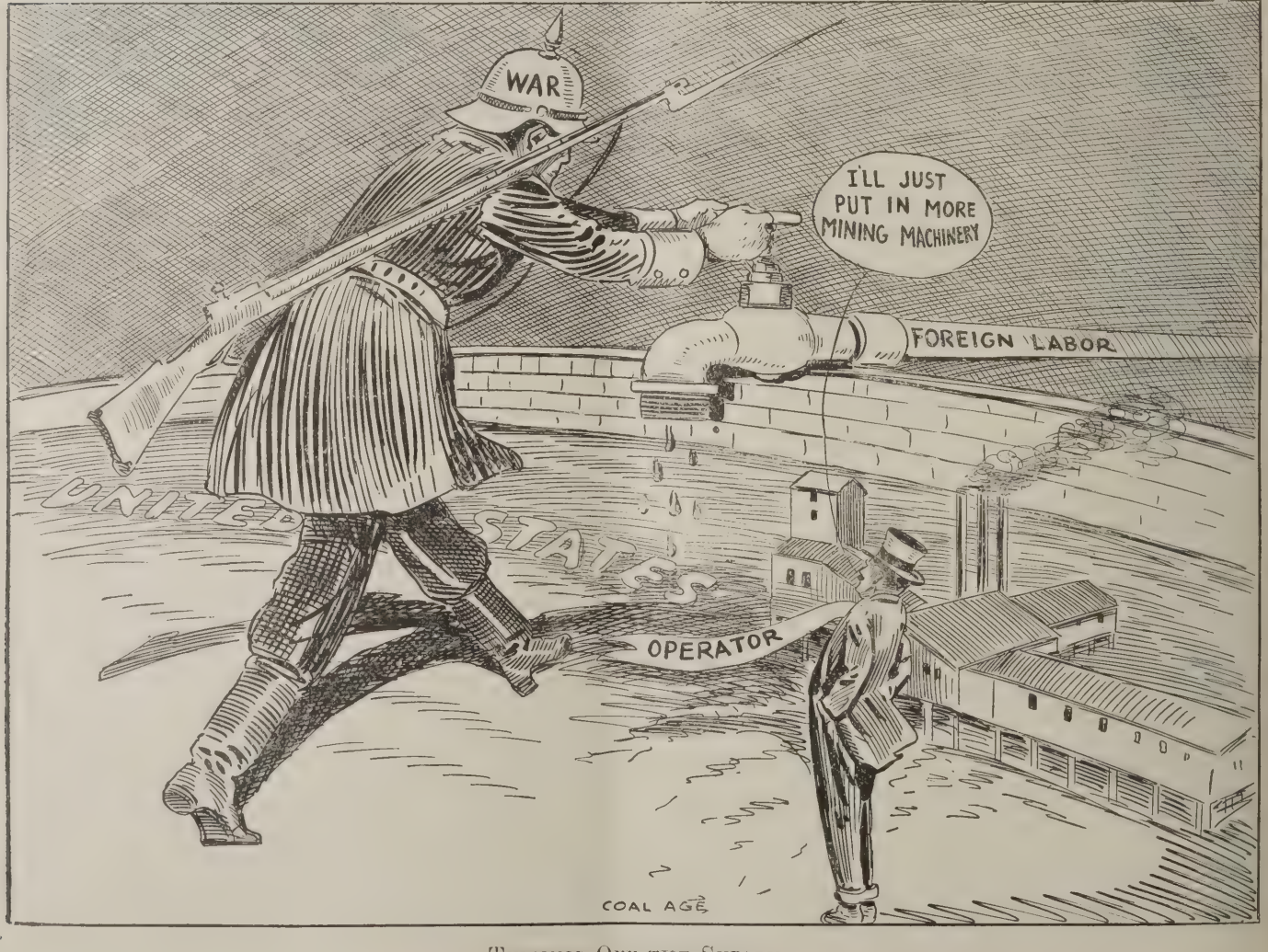
The production of natural gas in the United States in 1913 was the greatest in the history of the industry, surpassing that of any previous year in both quantity and value. The total gas production in 1913 is estimated by B. Hill, of the United States Geological Survey, at 581,898,239,000 cu.ft., valued at $87,846,677, an average price of 15.10c. per thousand cubic feet, as compared with a production of 562,203,452,000 cu.ft., valued at $84,563,957, an average price of 15.04c., in 1912, the increase being 19,794,787,000 cu.ft. in quantity and $3,282,720 in value.

Of this total product, about 32 per cent. was utilized for domestic purposes, or 184,885,662,000 cu.ft., valued at $50,522,415, an average price of 27.33c. per thousand cubic feet, and 68 per cent. was utilized for industrial purposes, or 397,012,577,000 cu.ft., valued at $37,324,262, an average price of 9.4c. The industrial consumption includes gas used for both manufacturing and producing power.

West Virginia led in 1913 in quantity of natural gas produced, 245,453,985,000 cu.ft., valued at $34,164,850 being the states output. Pennsylvania was second in quantity produced, with 118,860,260,000 cu.ft., valued at $21,695,845. On the other hand, Pennsylvania was the leading state in 1913 in quantity of natural gas consumed, with 177,463,230,000 cu.ft., valued at $28,709,565, and Ohio second with $128,204,722,000 cu.ft., valued at $27,055,824.

The extraction of gasoline from natural gas, or casing-head gas, from oil wells in the United States has become an industry of some importance in the last three years. Returns received from producers of gasoline of this character indicate that the production in 1913 amounted to 24,060,817 gal., valued at $2,458,443, an average price of 10.22c. per gallon, as compared with a production of 12,081,179 gal., valued at $1,157,476, in 1912, and 7,425,839 gal., valued at $531,704, in 1911.

In 1913, West Virginia produced 7,662,493 gal. of natural-gas gasoline, valued at $807,406; Oklahoma, 6,462,968 gal., valued at $577,944; Pennsylvania, 3,680,696 gal., valued at $405,186; California, 3,460,747 gal., valued at $376,227; Ohio, 2,072,687 gal., valued at $212,404. The balance of the 1913 output was produced by Illinois, Colorado, New York, Kentucky and Kansas.



Turning Off the Supply

The Haldane Flame Test for Blackdamp

Special Correspondence

SYNOPSIS—Effect of blackdamp noticeable in dimness of lights and rapid breathing. Blackdamp is not carbon dioxide, but a variable mixture of noxious gases. Depletion of oxygen proportional to amount of blackdamp present in air. Flame unsteady and easily extinguished as percentage of blackdamp increases. This fact is made the basis of the Haldane flame test for blackdamp. Description of apparatus used and manner of its calibration.

While the percentage of firedamp in mine air can be readily estimated by means of the cap on a lamp flame, no equally simple test has been hitherto available for estimating the amount of blackdamp in mine air. When their lamps burn dim or go out and their breathing becomes deeper and more rapid, these effects are attributed by miners to the presence of blackdamp in the air.

In chemical textbooks blackdamp is still treated as synonymous with carbon dioxide (CO_2), which mistake has led to much confusion. Pure carbon dioxide may be generated in a mine, and this gas is of frequent occurrence in some French coal mines, but no large amount of the gas has hitherto been found in any coal mine in this country.

Blackdamp, as ordinarily met with in mining, is simply nitrogen mixed with about 5 to 20 per cent. of carbon dioxide and some little oxygen may be present. It is the residual gas resulting from the various oxidation processes continually going on in mines and the surrounding strata. The oxygen is mostly consumed, leaving all the nitrogen and perhaps a little unconsumed oxygen; while the amount of carbon dioxide formed depends on the nature of the substance oxidized and other conditions. Thus, if iron pyrites (FeS_2) is oxidized no carbon dioxide is formed in the process, although the sulphuric acid formed may subsequently liberate more or less carbon dioxide from calcium carbonate (limestone). If, on the other hand, wood is oxidized, most of the oxygen consumed is converted directly into carbon dioxide.

It might perhaps be more logical to discard the use of the term "blackdamp" and refer only to the deficiency of oxygen and excess of carbon dioxide in mine air. To the miner, however, blackdamp has a very real meaning. Although the proportion of carbon dioxide in blackdamp varies within the limits mentioned, the character of the mixture is quite definitely described by its effect on both lights and men. There is therefore ample justification for retaining the name in mining practice.

When air is mixed with blackdamp, the oxygen percentage of the air is lowered in proportion to the amount of blackdamp added. The percentage of diminution of the oxygen is thus a measure of the percentage of blackdamp present; but firedamp or some other gas, if present in an appreciable amount, would, of course, help to lower the percentage of oxygen. In naked-light mines, however, firedamp is seldom present in appreciable quantities, so that the deficiency of oxygen is, practically speaking, a measure of the percentage of blackdamp in all such mines.

It is clear, then, that a suitable flame test could be graduated either to indicate the percentage of oxygen, or what seems simpler, to indicate the percentage of blackdamp present in the air of open-light mines. As the oxygen percentage in air diminishes, the flame of a candle or lamp is affected in two ways. In the first place, the light given steadily diminishes, being about 30 per cent. for a decrease of 1 per cent. in the oxygen; and the flame will no longer burn when the oxygen has fallen from normal (20.9 per cent.) to about 17.5 per cent. A further effect is that the flame becomes less and less stable as the percentage of oxygen diminishes, and is more easily blown out by any chance draught or movement. To those who work or move about in such air this effect is plainly evident, as their lights are constantly going out. It is upon these facts that the test I am about to describe is based.

When a thin lighted taper is held inside a glass tube an



The Haldine Flame-Test Apparatus

upward draught is produced by the heated air column in the tube; and this varies in strength as the taper is held higher up or lower down in the tube. The draught tends naturally to blow the taper out and the flame is extinguished at a point lower down or higher up the tube, depending on the percentage of oxygen present. The tube chosen for this purpose is 7 in. long and 0.75 in. inner diameter. The principal graduations are in percentages of blackdamp from zero up to 10.5 per cent.; and there are, besides, corresponding subsidiary graduations in percentages of oxygen, reading from normal (20.9 per cent.) down to 18.8 per cent., at which point the taper ceases to burn in the tube; and when held upright it will no longer burn outside the tube with less than about 18.2 per cent. of oxygen or 13 per cent. of blackdamp. When the taper is held in a horizontal position, however,

it continues to burn until the percentage of oxygen has fallen to about 17.2 per cent., which corresponds to 18 per cent. of blackdamp. There is thus a wide range through which the proportion of blackdamp can be estimated by the taper and tube.

The tube and tapers used in these experiments, which demonstrate the Haldane flame test, are shown in the accompanying figure; and the following tables are interesting. Table 1 shows the results of experiments made in a closed chamber, with the object of finally testing the graduation of the tube. No vitiation of the air was caused by breathing, but only by the combustion of the tapers used in the test. While each test was being made air was breathed from the outside through a tube, until after a sample had been taken for analysis. The air was thoroughly mixed by a fan before each test and the percentage of moisture was kept at about 2 per cent. The taper, held vertically, was extinguished when the oxygen fell to 18.2 per cent.

TABLE 1. RESULTS OF EXPERIMENTS MADE IN CLOSED CHAMBER

Percentage of Oxygen Found by Tube	Percentage of Oxygen Found by Analysis	Percentage of Carbon Dioxide	Percentage of Black Damp Indicated by Tube	Percentage of Black Damp Found by Analysis
20.90	20.90	0.56	0	0.1
20.45	20.33	0.49	2¼	2.9
20.15	20.13	0.65	3¾	3.8
20.00	20.67	0.71	4½	4.1
19.65	19.63	1.07	6¼	6.2
19.25	19.32	1.33	8	7.7

As shown by Table 2, however, the same accuracy cannot be expected in tests made underground, unless troublesome corrections are introduced for the varying percentages of moisture in the mine air and the varying proportion of carbon dioxide in the blackdamp mixture; and unless great care is taken to observe the exact point at which the flame is extinguished.

TABLE 2. TESTS MADE UNDERGROUND

20.9	20.78	0.16	0	0.7
19.7	19.73	1.02	6	5.9
18.9	19.20	1.51	9½	7.9
19.5	19.65	1.06	7	6.1
20.7	20.77	....	1	0.8
20.5	20.73	0.12	2	1.0

It will be seen that in every case but one the indication of the tube was correct to within about 0.2 per cent. of oxygen or 1 per cent. of blackdamp. These experiments indicate, however, that this method is sufficiently delicate to make it very useful in estimating the percentage of oxygen or blackdamp in the mine air. For ordinary practical purposes, it is greatly preferable to a chemical analysis, as it gives the information at once and the test can be reported in as many places as desirable.

The tube method must not, however, be supposed to do more than it actually accomplishes. For instance, it does not detect carbon monoxide in air containing afterdamp or fumes from explosives or an underground fire, which might be excessively dangerous although the tube test would not show it; but, nevertheless, the tube is a more practical means of testing for blackdamp than a lamp.

Commutating Poles for Mine Locomotive Motors

By J. C. Barry*

SYNOPSIS—This is a clear and concise statement of the factors governing motor design and performance; also the reasons for and effect of commutating poles upon the magnetic field of the machine and upon the commutation.

The May 9 issue of Coal Age contained an article entitled, "Interpole Motors for Mining Locomotives," which generally depreciates the desirability of employing this type of motor for mining work. The paper contains certain contradictory statements, in which the point of view seems to have been changed at will to suit the argument at hand.

For instance, at the beginning it intimates that the initiative in the application of commutating poles to mine-locomotive motors was taken by certain manufacturers, principally for the purpose of reducing cost, but later it states that there is no particular difference in the cost of production between the commutating-pole and the non-commutating-pole motor.

It further maintains that the commutating-pole motor should not be recommended for mine locomotives on account of greater complication and because there is no gain in efficiency, although there are no facts advanced to substantiate the latter statement.

Although the statement regarding cost is questionable, it would seem, if true, an argument in favor of the commutating-pole motor; as it is both legitimate and commendable to reduce the production cost of any commodity without depreciation of quality and with ultimate benefit to the purchaser.

Were it not for the fact that the article referred to attempts to show that the commutating-pole motor as applied to mine locomotives has no advantage over the non-commutating-pole machine, the whole subject might be dismissed without further comment. It is the purpose of this paper, however, to show that the introduction of commutating motors for mine haulage is as legitimate and important as their application to railway traction work, where they have entirely superseded the noncommutating-pole type. To prove this statement, it will be necessary to go into the designs of the two types of motors quite thoroughly, considering the losses involved, their effect on performance and to what extent they can be controlled in the design of the motor.

Motor Losses

In any direct-current electrical motor, the losses can be divided under three heads. The C^2R, or *copper loss,* is due to the resistance of the conductors on the armature and field windings. This loss varies with the square of the current, as will be seen from the formula C^2R = watts lost.

The copper loss is composed principally of two parts, one due to the load or line current and the other due to the idle current that circulates in the short-circuited

*Mine locomotive engineering department, General Electric Co.

turns of the armature winding at the instant of commutation, due to the distortion of the field by the armature reaction.

The core loss can be separated into two parts. One is known as the eddy-current loss and is due to the current set up in the armature laminations by their being revolved in a magnetic field. This loss increases with the square of the number of magnetic lines per square inch, or the density of the field, and with the square of the speed.

The other part, known as the hysteresis loss, is due to the reversals of the magnetic lines of force in the armature iron, as it is being revolved in the magnetic field, which varies with the 1.6 power of the density and directly with the speed. These two losses combined are known as the core loss.

Friction Loss

The third loss is the mechanical, or friction, loss, and is due to the bearing friction, the brush friction on the commutator and the windage.

This friction loss amounts to about 1 per cent. at full load of the energy being supplied to the motor; and, as it is practically equal on all types of machines, it can be eliminated from the discussion.

The combined core and copper losses in a well designed motor will amount to about 12 to 14 per cent. of the input at full load, and about 8 to 10 per cent. of the input at one-half load. At full load, this loss is largely composed of the C^2R or copper loss, but at one-half load it is principally the core loss.

From this, it will be seen that the copper loss is the greatest loss at full load, and the one largely responsible for the one-hour rating of the motor. On the other hand, it will be noted that for loads of one-half or less, the core loss is the principal loss and, therefore, largely responsible for the continuous rating of the motor.

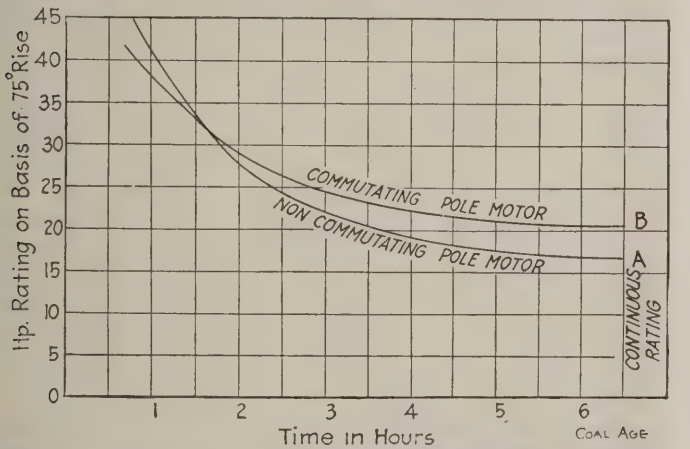


Fig. 1. Horsepower Curves for the Two Types of Motors

The copper loss of the motor is well within the power of the engineer to control. He, therefore, can govern fairly well the hourly rating that the motor is to have. The core loss of a *noncommutating-pole* motor is not so well within the control of the engineer, because he must sacrifice low core loss in order to get good commutation, and in so doing, sacrifice the continuous rating of the machine.

Noncommutating-Pole versus Commutating-Pole Design

In the design of any direct-current motor, the question of commutation must be kept firmly in mind; for no matter how good the other characteristics of the machine may be, if it does not possess the ability to commutate, it must be considered a failure.

In the design of any motor, there are two forces that must not be lost sight of: one of these is the magnetic field produced by the current in the field windings; the other, the magnetic field produced by the current in the armature winding.

These two fields are directly opposed to each other. The former is known as the motor field and the latter as the armature reaction. If the motor field is not sufficiently strong, it will be overpowered and distorted by the armature reaction to such an extent as to cause injurious sparking at the brushes.

This sparking is caused by the armature reaction

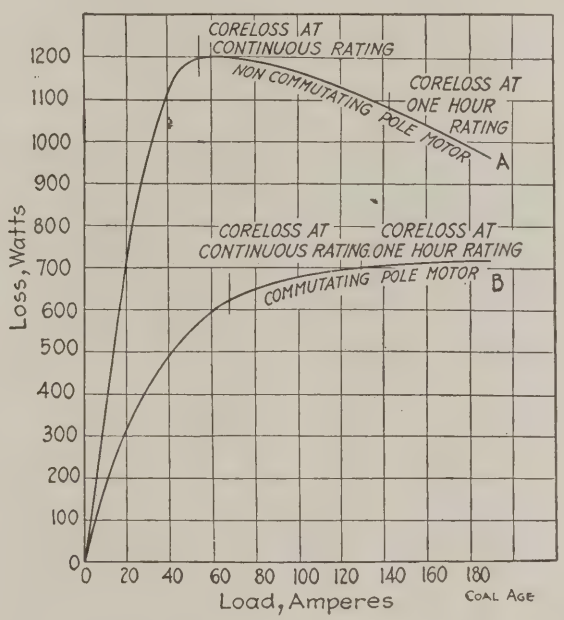


Fig. 2. Core-Loss Curves of the Two Types of Motors

crowding the field flux backward, against rotation, to such an extent as to force the armature coils under the brushes to cut a magnetic field and thereby produce a difference of potential between the commutator bars under the brushes, causing a heavy current to flow in these coils, heating the armature and causing sparking and burning at the brushes.

In order to overcome this difficulty, the designer of a *noncommutating-pole motor* must increase his motor field or magnetic density to a high point, so that the effect of the armature reaction will not greatly distort it. In this way he can effect fairly good commutation and greatly reduce the circulating current and consequently the heating in the short-circuited coils of the armature undergoing commutation. But by doing this, he greatly increases the core loss; for it will be remembered that the core loss increases practically as the square of the magnetic density, or with the square of the strength of the field.

The Design Is a Compromise

It will be seen, therefore, that the design of a *noncommutating-pole motor* of this type is one of compromise. If the designer attempts to run low magnetic density, in order to reduce his core loss, he is sure to get into trouble from commutation, caused by the distortion

of the field by the armature reaction. On the other hand, if he increases the density to prevent this, the core loss will be excessive.

This condition is fully realized; for he knows that the core loss does not greatly affect the hourly rating of the machine, which, unfortunately, is the standard by which all mine-locomotive motors are compared, and also that the core loss will not readily be detected by the operator. He, therefore, disregards core loss and pushes the magnetic density to the limit in his endeavor to secure good commutation, regardless of the heating characteristics of the motor on continuous service.

In the design of the commutating-pole motor, the problem is different. The designer is no longer compelled to rely on high magnetic densities to prevent the distortion of the field by the armature reaction, but makes use of the commutating pole.

This auxiliary pole is magnetized so that it directly

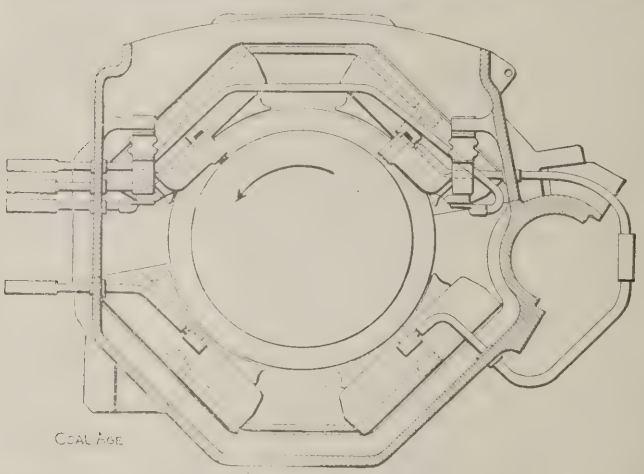


FIG. 3. CONNECTIONS FOR A NONCOMMUTATING-POLE MOTOR

opposes and practically neutralizes the armature reaction in the commutating zone. The motor field is, therefore, mostly relieved of the distorting effect of the armature turns or armature reaction.

By this means the engineer is able to run low densities in his armature core, armature teeth and pole faces, greatly reducing the core loss and consequently the heating, which results in an increased continuous rating of the motor.

The commutating pole, therefore, minimizes the distortion of the field by the armature reaction, fixes the brush position for all loads with either direction of rotation, prevents all sparking and burning at the brushes, and reduces local current in the armature winding to a minimum.

In order to prove these theories and substantiate the above statements, the horsepower time curves and core loss curves of two motors of practically the same one-hour rating are submitted. These curves are the result of actual tests conducted by the writer on these two types of motors. The mechanical features of the two machines are as follows:

	Noncommutating Pole Motor	Commutating Pole Motor
Weight	2130 lb.	1850 lb.
Speed	375 r.p.m.	395 r.p.m.
Mount on	28-in. wheels	28-in. wheels
Mount on	30-in. gage	28-in. gage
Builder's rating ..	40 hp.	37½ hp.

Figs. 1 and 2 show the horsepower time and core-loss curves of the two motors on the standard basis of a 75-deg. C. rise.

Curve *A* represents the noncommutating-pole motor and curve *B* the commutating-pole machine. By referring to curve *A*, it will be seen that the noncommutating-pole motor has an hourly rating of 41 hp., and a continuous rating of 16½ hp., or 40.2 per cent. of its one-hour rating for a continuous rating.

Referring to curve *B*, it will be seen that the commutating-pole motor has a one-hour rating of 38 hp. and a continuous rating of 20.8 hp., or 54.8 per cent. of its one-hour rating for a continuous rating.

If the noncommutating-pole motor had been designed with interpoles, along the lines of the commutating-pole machine herein described, it would have 54.8 per cent. of its one-hour rating, or 22.6 hp. for its continuous rating instead of its present rating of 16½ hp., an increase of 6.1 hp., or 36.4 per cent. in continuous rating.

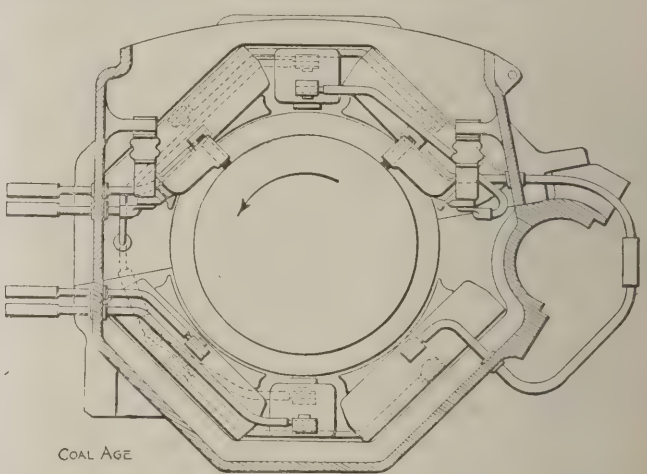


FIG. 4. CONNECTIONS FOR A MOTOR WITH TWO COMMUTATING POLES

It would be pertinent to inquire if this gain of 36.4 per cent. in the continuous capacity of a motor is not of sufficient importance to compensate for the slightly more elaborate field connections of the commutating-pole type.

CONNECTIONS

I would also like to point out that the connections of a commutating-pole motor of the type used in mine locomotives are not so complicated as the writer of the article referred to would have us believe. In the first place, a sketch is shown of a commutating-pole motor with four main and four commutating poles. The leading manufacturers who have adopted this type of construction for mine locomotives as standard, use one-half as many commutating poles as main poles. Therefore, in the conventional four-pole motor, there would be employed two commutating poles instead of four.

The accompanying sketches will give the exact relation between the two types of motors in regard to connections, as actually constructed.

CONCLUSION

It will be seen, therefore, that commutating-pole motors have been introduced into mine haulage for the same legitimate reason that they have been adopted in railway traction work, namely, higher efficiency, improved commutation, reduced core loss and increased continuous capacity.

The Plant of the Lilley Coal & Coke Company

By Lee Llewellyn*

SYNOPSIS—This plant is arranged to load coal upon either railroad cars or river barges. No hand tramming is necessary from the time a trip of loads is uncoupled from the locomotive at the foot of the slope until the cars are again made into trips of empties for return to the workings.

On the Monongahela River, about one mile from West Brownsville, Penn., and provided with a connection to the Pennsylvania R.R., is located the plant of the Lilley Coal & Coke Co.

The officers of this firm are Thomas Lilley, president, John Moffit, secretary and treasurer, and Thomas Elliott, assistant treasurer and superintendent. The engineers are Harrop, Hopkins & Taylor, of Pittsburgh, who were in charge of the construction of the plant.

The company owns 800 acres of coal and 400 acres of surface upon which the plant and town are built. The coal measure operated is the famous Pittsburgh seam, which is here 9 ft. thick, and reached by means of slopes. This particular block of coal is one of the finest on the Monongahela River.

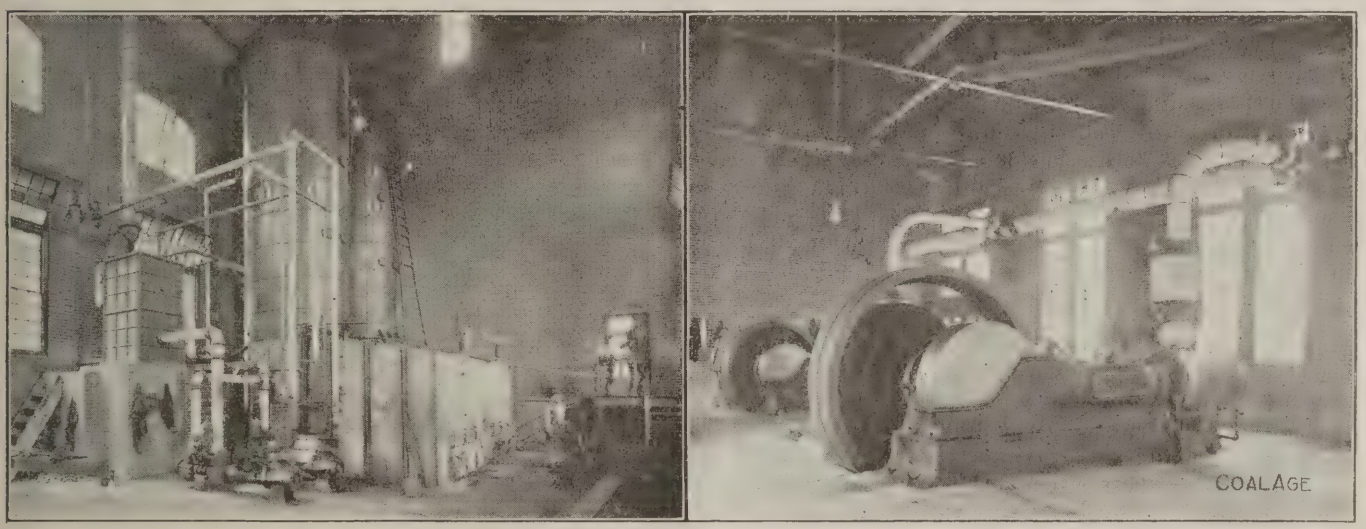
Two slopes have been driven to the coal bed, one being employed for hoisting and the other as a supply and manway. Both are concrete lined and well lighted with incandescent lamps.

The power plant is housed in a building 40x132 ft. in dimensions with a partition separating the boiler room from the engine room. This is of brick construction with concrete floors. Two 300-hp. Wickes vertical boilers equipped with Murphy stokers, two American boiler-feed pumps and a Cochrane feed-water heater of 2000 hp. capacity make up the steam-generating equipment and auxiliaries. Steam is regularly carried at 150 lb. gage pressure.

The engine room contains one 300-kw. and one 150-kw. 250-275-volt compound-wound Westinghouse generators, driven by Harrisburg engines. Provision has been made for the future installation of two more 300-hp. boilers, and an additional 300-kw. generator, also for a boiler coal-handling plant.

The present fan, a 6-ft. Venturi, driven by a 25-hp. General Electric motor, is a temporary installation. An air shaft is now being sunk, at which a permanent ventilating fan will be installed, the make of which has not yet been decided upon.

Mine haulage is accomplished by means of Baldwin-Westinghouse locomotives, equipped with cable and crab reels. The cutting machines are of the chain type and were manufactured by the Goodman Electric Co., and the Jeffrey Mfg. Co.



Views in the Boiler House and Engine Room

The power plant, tipple and car hauls were built under contract by the Pittsburgh Coal Washer Co., Fulton Bldg., Pittsburgh, Penn. This firm constructed and equipped the power plant, and designed and equipped the tipple. The Pittsburgh Bridge & Iron Works, however, fabricated and erected the structural steel from plans furnished by the Pittsburgh Coal Washer Co. The Dravo Contracting Co., of Pittsburgh, built the river piers and tipple foundations under contract.

Tipple Operation

The operation of the tipple and head works is as follows:

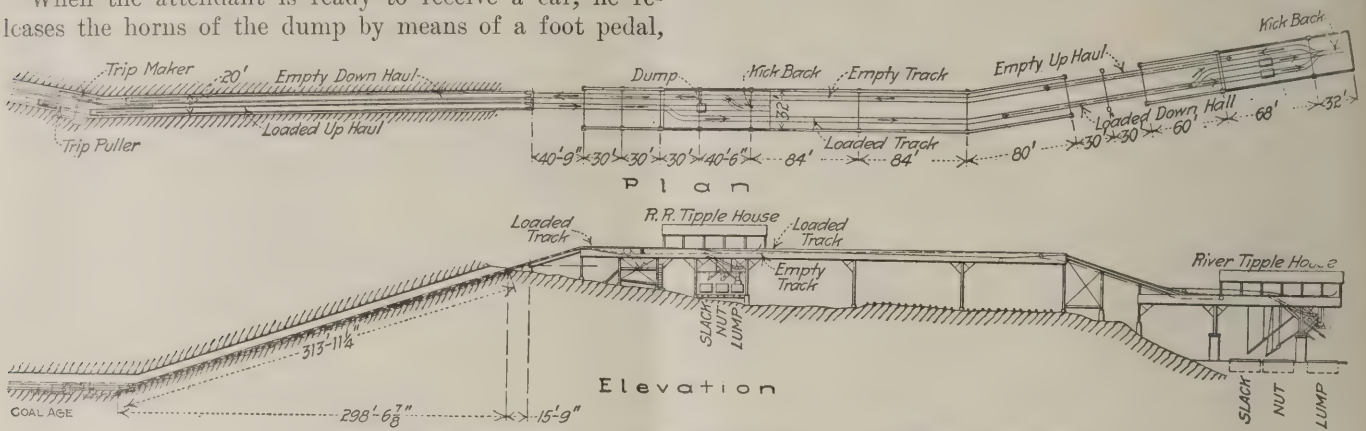
Loaded cars in trips of 80 or less are delivered by the mine locomotive to the trip puller, located at the foot of the slope. This device, picks up the trip, and delivers the cars one at a time to the up-haul chain of the car haul. This car haul consists of two parts, an up-haul chain for loaded cars and a down-haul for empty ones. It operates in a slope approximately 350 ft. long on a grade of 32½ per cent.

The up-haul delivers the loads spaced 24 ft. apart at the rate of 3½ cars per minute at a point 40 ft. beyond

*Pittsburgh Coal Washer Co., Fulton Bldg., Pittsburgh, Penn.

the knuckle from whence they gravitate to a special car-feed regulator and are brought to rest about 20 ft. in rear of the horns of a Phillips cross-over dump.

When the attendant is ready to receive a car, he releases the horns of the dump by means of a foot pedal,



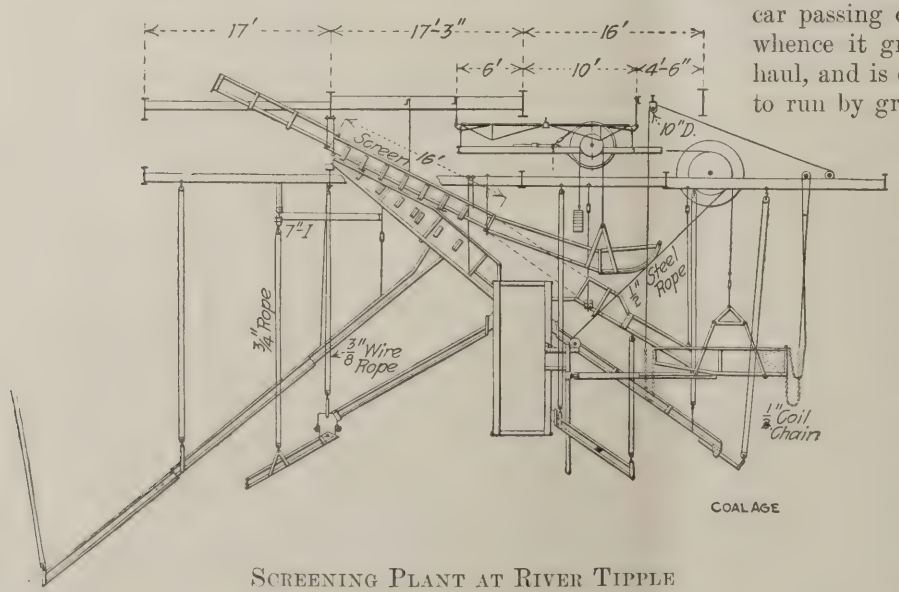
Plan and Elevation of the Railroad and River Tipples

and the car gravitates to the dump where the coal is discharged onto a set of gravity screens. The empty car passes over the dump, through a kick-back, from whence it gravitates to the head of the down-haul chain, by which it is lowered back down the slope.

From the foot of the down-haul chain the empty cars gravitate a distance of about 45 ft. to a trip maker, which picks them up and passes them on down the heading on a one-half per cent. favoring grade until a trip of 80 cars or less has been formed.

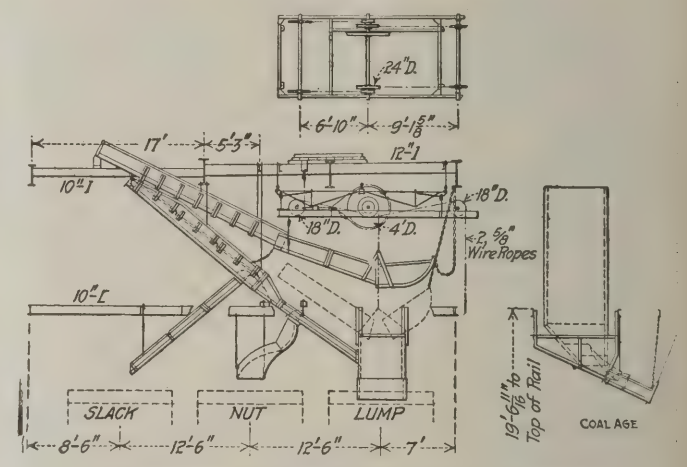
If it is desired to pass any or all of the coal through the river tipple, a switch at the end of the up-haul is thrown, and the cars allowed to pass to a second loaded track, which leads to the river tipple.

In this case the car gravitates from the above mentioned switch to the end of a chain car haul. This car haul consists of a down-haul for loads and an up-haul for empties, and is used for lowering the loads from the level of the railroad tipple to that of the river tipple, and bringing the empties back up again. The head end of the down haul is built on an up-grade of sufficient length to bring the cars to rest after they have gravitated from the main haul, and a special car check is provided to prevent them from running backward.



Screening Plant at River Tipple

The down-haul chain picks up the loaded car, delivers it to a point approximately 85 ft. in rear of the horns of two Phillips cross-over dumps, from which point it gravi-



Screening Plant at Railroad Tipple

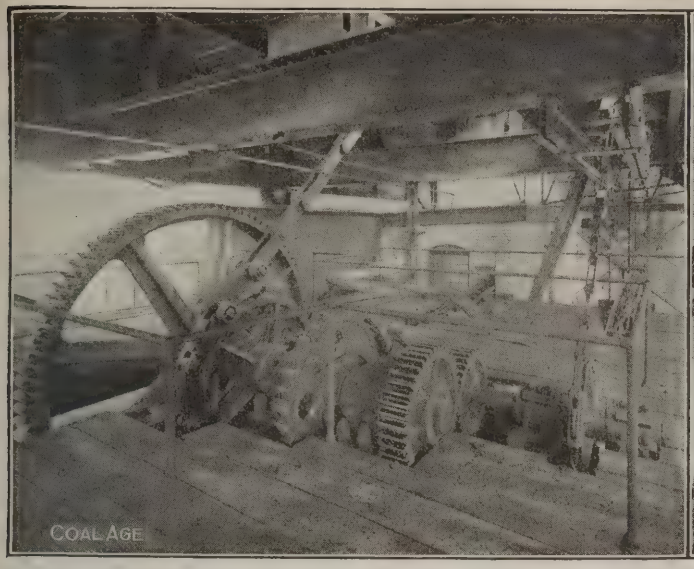
tates to either of the two special car-feed regulators, located about 20 ft. in rear of the dump horns.

Gravity Screens Are Employed

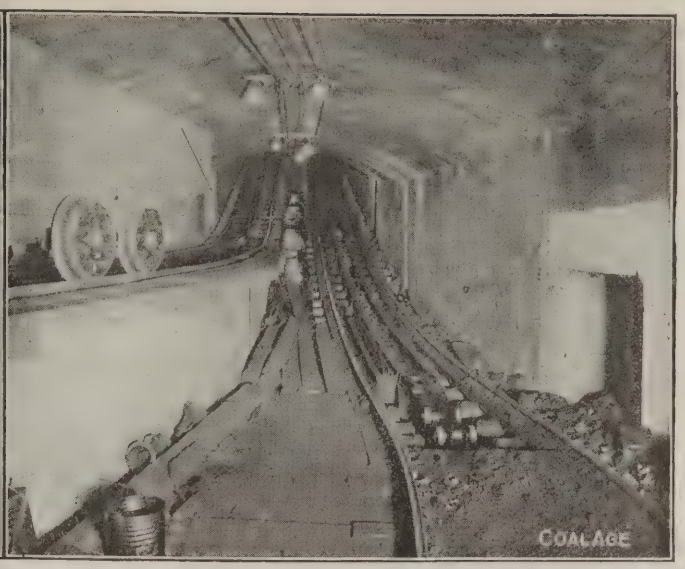
The operation of the car regulator is the same as the one described for the railroad tipple. The coal is discharged into one of two sets of gravity screens, the empty car passing on over the dump to a kick-back, from whence it gravitates to the foot of the empty up-haul, and is elevated to a sufficient height to allow it to run by gravity to the main down-haul chain and return to the mine.

The trip puller above mentioned, located at the foot of the slope, is about 20 ft. long from center to center of the sprockets, and capable of handling a trip of 80 loads on a level grade at the rate of 3½ cars per minute, the total gross weight of each car being about 7500 lb.

The chain is composed of 12-in. pitch links, made up of 2½x⅝-in. bars, connected by 1¼-in. diameter pins, which are turned down at the ends and riveted over steel washers ⅛ in. in thickness. Steel knock-down dogs are inserted in the chain



THE DRIVING MACHINERY FOR MAIN CAR HAUL, LOCATED UNDER TIPPLE FLOOR



VIEW AT FOOT OF SLOPE, SHOWING UP-HAUL AND DOWN-HAUL CHAINS

every 10 ft. to engage attachments on the bottoms of the cars.

The trip puller is driven by a 25-hp. motor, which also drives the trip maker. The drive is accomplished through a rubber belt and two spur-gear reductions. The head shaft is 5½ in. in diameter and the tail shaft 3 in., the latter being equipped with extra-heavy take-up bearings. The speed of travel is approximately 35 ft. per minute, and a friction clutch is provided for controlling the operation of the device.

The trip maker is about 15 ft. from center to center of the sprockets and is capable of handling empty cars at the rate of 3½ per minute and forming them into trips of 80 or less, on a ½ per cent. favorable grade, the weight of each empty car being approximately 2500 lb.

The 12-in. pitch steel chain is made up of 2½x⅝-in. bars, connected by pins 1¼ in. in diameter, being a duplicate of the trip-puller chain. Steel knock-down dogs are inserted every 5 ft., these engaging an attachment on the bottom of the car. The trip maker is driven from the trip puller's countershaft through a spur-gear reduction and a steel-thimble roller-chain transmission. The head and tail shafts are 4½ in. and 2½ in. in diameter, respectively, and the latter is equipped with an extra-heavy take-up bearing. The lineal speed is about 40 ft. per minute.

THE UP-HAUL IS OF EXTREME LENGTH

The up-haul is approximately 500 ft. from center to center of sprockets, measured along the grade with the inclined portion on an 18-deg. slope for a distance of approximately 400 ft. It was designed to handle loaded mine cars weighing 7500 lb. each, at the rate of 3½ per minute.

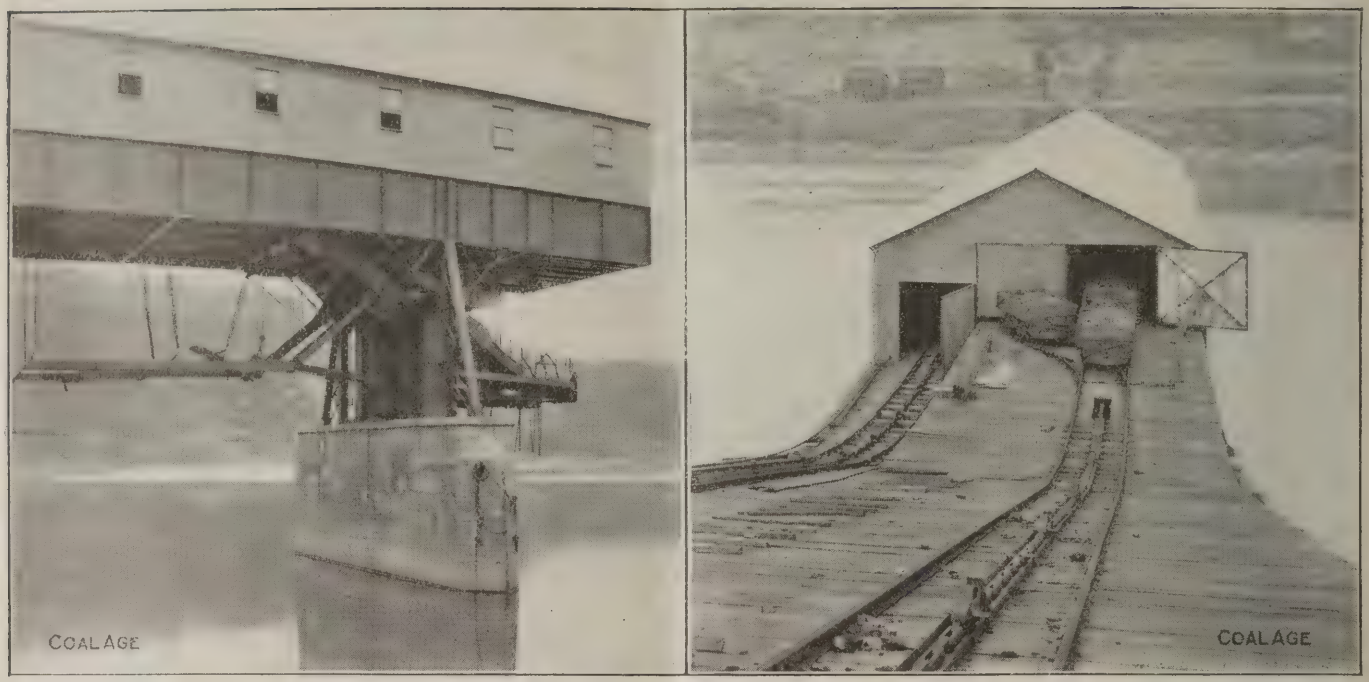
The chain is made up of steel links with a pitch of 18 in., composed of 5x1½- and 5x3-in. bars, set two and one and connected by steel pins 2½ in. in diameter. Forged-steel hook links are inserted in the chain every 24 ft. for engaging the attachments on the cars. Each hook link is carried by four cast-iron, steel-bushed traction wheels with chilled faces, these being 6 in. in diameter. The chain between each set of hook links is carried on two of the same wheels. The pins of the chain are extended to form axles for these wheels, both ends being turned



ANOTHER VIEW OF THE CAR HAULS



A VIEW OF ONE OF THE DUMPS



General View of and Approach to the River Tipple

down to 1½ in. in diameter to accommodate hexagon nuts. Steel washers ¼ in. thick are inserted between each nut and wheel, while the nut is held in place by a ⅜-in. cotter pin extending through the axle. Intermediate pins are turned down at the ends and riveted over ¼-in. steel washers.

The up-haul is provided with 8 knuckle rollers 18 in. in diameter to relieve the carriers of the strain at the knuckle points. These rollers are mounted on cold-rolled steel shafts, 2½ in. in diameter, supported in cast-iron flanged babbitted deadeyes, bolted to special structural-steel girders.

The chain is carried forward to a knuckle shaft approximately 55 ft. in rear of the railroad tipple dump and brought down beneath the floor to the head sprocket and shaft, to which the driving machinery is attached. This keeps the machinery entirely below the floor and out of the way.

This haul is driven by a 200-hp. steam engine through a rubber belt and two spur-gear reductions. The speed of the chain is 84 ft. per minute, and the capacity 3½ cars. The calculated horsepower is 133 when the up-haul is loaded and the down-haul empty. When both the up-haul and down-haul are loaded, the calculated horsepower is 105. The estimated maximum stress on the chain is 45,000 lb., but the bearing load on the pins and links is only 6000 lb. per sq.in. of projected area. The links also at the weakest section are stressed to only 6000 lb. per sq.in. in tension. This provides for an ample factor of safety, insuring a long life to the chain.

The head shaft is 9½ in. in diameter of hammered steel, while the tail shaft is 4 in. in diameter and of cold-rolled steel. The knuckle-sprocket shafts are 6 in. in diameter of cold-rolled steel. The first and second countershafts are 4 in. and 3 in. in diameter, respectively, both of cold-rolled steel, while the tail shaft is equipped with extra-heavy take-up bearings, having an adjustment of 24 in.

The head, tail and knuckle sprockets are 58½ in. in pitch diameter of a special car-wheel iron. The pinion on the first set of gears is cut forged steel, 10.4 in. in pitch diameter, carrying 13 teeth, 7½-in. face. The gear with which this pinion meshes is cut cast iron, 72 in. in diameter, 90 teeth, 7-in. face. The pinion of the second



Screen Rig at River Tipple and Operating Rig for the Same

gear reduction is machine-molded cast steel, double shrouded. It is 14.62 in. in pitch diameter, has 13 teeth of 11-in. face. The gear with which it meshes is machine molded, is 95.83 in. pitch diameter, carries 86 teeth of 10½-in. face. These gears are 3½-in. pitch.

The head shaft on the haul is provided with a 6-ft. ratchet wheel to prevent the chain from backing. This wheel is cast steel and has a double forged-steel noiseless pawl.

Rigid Supports Are Provided

The driving machinery is mounted on rigid structural-steel supports. The upper chain guides consist of two 4x3x⅜-in. angle irons, mounted to wood ties. The lower chain guides consist of two, 2x⅜-in. steel bars, secured to wooden stringers. The return strand of the chain runs in a concrete-lined trench.

This up-haul chain is perhaps the largest ever installed. The entire haul is practically noiseless and has worked perfectly from the time it was first started, it being entirely unnecessary to make even a single adjustment. This is a remarkable record, considering the size of the installation.

The down-haul is approximately 460 ft. long from center to center of the sprockets, measured along the slope. The inclined portion is on an 18-deg. angle for a distance of approximately 390 ft. It was designed to handle empty cars weighing 2500 lb. at the rate of four per minute.

The chain is of 12-in. pitch, made up of 3x⅝-in. steel bars, set two and two, and connected by steel pins 1½ in. in diameter. These are turned down at the ends and riveted over steel washers $\frac{3}{16}$ in. thick. Cast-steel knockdown dogs and special disappearing dogs made of cast steel are inserted in this chain every 10 ft.

When the empty car returns to the head end of the haul, it comes to rest on the incline in front of the knuckle, and is held in position by special car checks. A knockdown dog picks up the car and carries it up the incline to the knuckle, where it runs forward about 8 ft. to one of the disappearing dogs, which, in the meantime, has come up to position for its reception. The car is then lowered by this dog to the foot of the slope.

The chain is carried forward to a knuckle sprocket, then brought down underneath the floor to the head sprocket, which is driven from the head shaft of the up-haul through a spur-gear transmission. The speed of the haul is 80 ft. per minute.

Stresses and Pressures Are Small

The calculated maximum stress in this chain is 11,200 lb., and the bearing load on the chain pins is only 6000 lb. per sq.in. of projected area. The chain links at the weakest section are stressed only to 6000 lb. per sq.in. in tension.

The head, knuckle and tail shafts are 6 in., 4½ in. and 3 in. in diameter, respectively, all being made of cold-rolled steel. The tail shaft is equipped with extra-heavy take-up bearings, having an adjustment of 18 in.

The upper chain consists of steel channel irons bolted to wood ties. The lower guides are made up of two 2x⅜-in. steel bars, secured to wood stringers. The return strand of the chain runs in a concrete-lined trench.

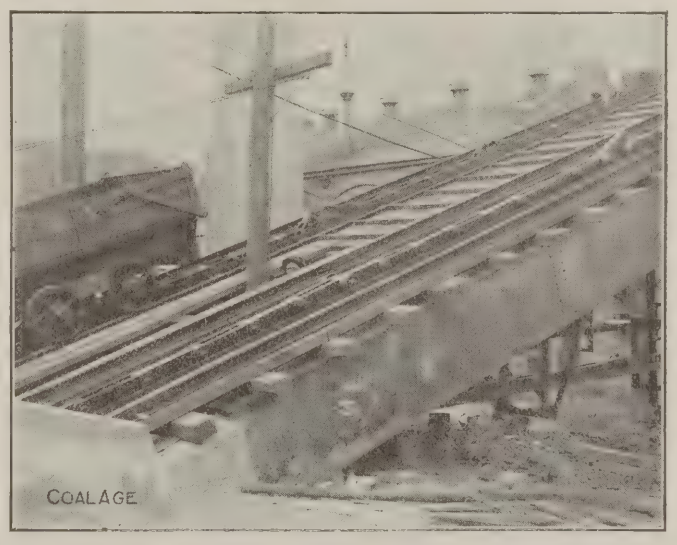
The down-haul for loaded cars at the river tipple is approximately 142 ft. from center to center of the sprockets, measured along the haul, with the inclined portion on an 18-deg. slope for a distance of approximately 80 ft. It was designed to lower the loaded cars from the level of the railroad tipple to that of the river tipple at the rate of four per minute.

The chain is of 12-in. pitch, and is made up of bars 2½x⅝ in., set two and two, and connected by 1¼-in. steel pins, which are turned down at the ends and riveted over steel washers ⅛ in. thick. The links and pins are duplicates of those employed in the trip-puller and trip-maker chains. Cast-steel knockdown dogs, and special disappearing dogs, of the same material, are inserted in the chain every 10 ft.

The loaded cars coming from the railroad tipple gravitate to a point in front of the knuckle, being there held in position by special car checks until a knockdown dog delivers each individual car to the disappearing dog, which in turn discharges it at the foot of the slope, from whence it runs by gravity to either one of the cross-over dumps.

Power Must Sometimes Be Absorbed

The motive power for this haul is a 25-hp. motor, which also drives the empty up-haul through a belt and two spur-gear reductions. This drive is connected up to the head shaft of the empty haul. When the two hauls are working under ordinary conditions, it requires 3 hp. to drive them. When all portions of both hauls are loaded, except the slope of the down-haul for the loaded cars, 19 hp. is required momentarily. When only the down-haul slope is loaded, about 8 hp. has to be dissipated. This is accomplished by connecting the driving motor with a suitable control in such a manner as to take power from the line only when it is required for the operation of the hauls and to absorb power, automatically becoming a generator and discharging surplus power to the line when the hauls are so loaded as to drive the motor. A shunt brake is provided to hold the load when the current is off.



The Up-Haul and Down-Haul Chains at the Slope Portal

The speed of this haul is 60 ft. per minute and the capacity four cars. The head and tail shafts are 5 in. and 3 in. in diameter, respectively, both being of cold-rolled steel. The tail shaft is equipped with extra-heavy take-up bearings, having an adjustment of 15 in.

The up-haul for the empty cars at the river tipple is approximately 142 ft. from center to center of the sprock-

cts, measured along the chain with the inclined portion at an angle of 18°, for a distance of 100 ft. This was designed to lift the empty cars from the river-tipple level to that of the railroad tipple at the rate of four per minute.

The 12-in. pitch chain is made up of 2½x⅝-in. bars, set two and two, and connected by steel pins 1¼ in. in diameter. These are turned down at the ends and riveted over steel washers ⅛ in. thick. These links and pins are duplicates of those used in the trip puller and trip maker, also the down-haul for the loaded cars. Cast-steel knockdown dogs are inserted in the chain at intervals of 10 ft., while a special car check is provided to hold the empty car at rest when it returns from the river-tipple kick-back.

This haul is driven from the countershaft of the down-haul for the loaded cars through a belt and one spur-gear reduction. The speed is 60 ft. per minute and the capacity four cars. The head and tail shafts are 5 in. and 3 in. in diameter, respectively, both being cold-rolled steel. The tail shaft is equipped with an extra-heavy take-up bearing having 15 in. of adjustment.

Three Screens Are Provided

In this installation there are three screen rigs, one for the railroad tipple and two on the river tipple. These are of the standard gravity type for this district. The river-tipple equipment is so designed as to make it possible to load nut coal in boats if desired. Each river rig is also designed to operate independently of the other.

The structure in which this apparatus is housed is of heavy steel design. No metal less than ⅜ in. in thickness was used, thus providing for long life. The columns are 14-in. Bethlehem H-sections supporting 8-ft. plate girders, which carry the floor system.

The houses over the screen rigs are roofed and sided with corrugated asbestos-protected metal, manufactured by the Corrugated Asbestos Protected Metal Co., of Beaver Falls, Penn.

It will be readily perceived from the foregoing description and the accompanying illustrations, that great care has been exercised both in the design and installation of this plant. It would appear that all portions of the equipment had been designed with ample size, thus rendering the bearing pressures moderate, which should result in long and efficient operation.

Don'ts for Assistant Foremen and Fire Bosses

1. Don't fail to observe all the rules pertaining to examination for the safety of the workmen in your district.
2. Don't fail to see before entering the mine that the ventilating apparatus is running at the speed designated by the mine foreman.
3. Don't fail to see, before proceeding with your examination, that the air current is traveling in its proper course.
4. Don't forget to examine all places adjacent to live workings when making your examination of every working place in the morning.
5. Don't use a light other than an approved safety lamp when making an examination for gas.
6. Don't fail to mark the date of your examination at or near the face of every place examined by you.
7. Don't fail to examine the entrance or entrances to all worked-out and abandoned places adjacent to the roadway and working places where explosive gas is likely to accumulate.
8. Don't allow any person to pass your station until you have notified him of the condition of his working place. If any danger exists, see that it is removed before any person or persons are allowed to enter.
9. Don't fail to record the results of your examination in the book kept at the colliery for that purpose, stating the location and nature of any danger you may have discovered and immediately report the same to the mine foreman or his assistant.
10. Don't fail to make a second examination, where practicable, of every working place previously examined where men are employed, giving special attention to the roof and sides.
11. Don't fail to place a danger sign across the entrance to every working place and every other place where explosive gas is discovered, or where immediate danger is found to exist from any other cause.
12. Don't fail to place a danger sign at the entrance of every worked-out or abandoned portion of the mine.
13. Don't allow any person (except the mine foreman or some person designated by him) to pass beyond a danger signal until the mine, or that portion thereof, has been examined and reported to be safe.
14. Don't allow any person to remain in any portion of the mine through which a dangerous accumulation of explosive gas is being passed in the ventilating current.
15. Don't allow a light, other than a locked safety lamp, to be used in any working approaching a place where there is likely to be an accumulation of explosive gases.
16. Don't fail to examine the place, and adjoining places, before a blast is fired in a district where locked safety lamps are used.
17. Don't fail to caution the miner that after lighting a charge he should retire to a heading on the intake side of the breast, and not to a blind heading at any time.
18. Don't allow any person to work with a defective safety lamp.
19. Don't fail to report any dangerous condition which you may observe at any time.
20. Don't allow miners to work so far beyond the last set of timbers that their place becomes unsafe.
21. Don't allow an accumulation of gas to be removed by brushing where it is practicable to remove it by brattice.
22. Don't forget that it is the duty of the safety inspector to look only after the safety of the employees, and is not to relieve you of any of your duties.
23. Don't wait for the general inspector to point out dangerous conditions.
24. Don't forget that thorough and efficient examinations and inspections before accidents bring better results than the same work after an accident.
25. Don't forget that we expect you to help us educate the employees to take care of themselves, and this can be done best by personal instruction and attention.
26. Don't allow any person or persons to enter their working places where standing gas has been discovered except for the purpose of removing said gas, and only when accompanied by yourself or a competent assistant, and do not allow any persons to work in the return current until such gas is removed and the place made safe.

Note—From Susquehanna Coal Co.'s book of instructions to employees.

Extracts from a Superintendent's Diary

Our citizens are very fond of having their pictures taken and they never fail to patronize liberally any traveling photographer who happens our way—in this they are not very different from the great mass of ordinary everyday men.

When the artist happens upon his subjects away from home, standing about in groups, discussing mining matters, he has little trouble arranging satisfactory poses, but when he finds them singly at home his troubles begin; for example, if the would-be customer happens to be a groom, the business must be delayed until the bride can be found and then she must be given a chance to bedeck herself becomingly. At last when all seems fixed they recall that brides must always wear flowers and so a hasty search is instituted for a suitable bouquet.

Again they are about ready and the artist suggests the pose. Here again, unforseen delays are encountered. They cannot decide whether the groom should stand and

the bride be seated or the bride stand and the groom be seated. The photographer makes suggestions but his suggestions are not accepted as final. The bridge recalls that somewhere in a magazine she has seen a photograph of a famous man and his bride, and off she goes in seach of the magazine. The photographer hesitates, he would like to pull up his camera and go in search of a more profitable subject, but he has already wasted so much time that he cannot make up his mind to do so. At last all obstacles are overcome and the bulb is pressed.

It would not be fair to assume that women are the cause of all of the artists' troubles. Some times men have to make a good many attempts before they can satisfy themselves about a proper pose. Shall they wear a hat or appear without one; shall they assume an ordinary everyday appearance or must they appear in lodge regalia or possibly as captain of the first-aid squad; and so forth and so forth.

A collection of all of the photographs in a camp very often suggests a complete and interesting history of the camp's existence.

Here is a group picture taken during the last strike with all of the belligerents lined up with their weapons proudly shouldered—Shot guns both single and doubled barreled, mostly breech loading, but not all by any means —pistols, knives, matchetes, and clubs—men, women and children. Subsequently in court they were all very sure that no one was intimidated, but they took pains not to allow any of these photographs to follow them into the court room.

Here is a print showing the first-aid squad just as they looked after their third attempt to penetrate the inside workings, the day after the big explosion. The bunks in the background are part of the temporary morgue. The small flash light, showing all of the frightened women lined up behind a rope was taken about midnight of the same date at the pit mouth.

The blueprint showing the young ladies in holiday attire was made by one of the mining engineers; it is a part of the wedding party welcoming the boss driver and his bride back to camp. The balance of the party were busy re-arranging things in the bride's house according to well-established ideas governing such occasions.

Today we had our prize fruit tree photographed at the request of a nearby Weekly that wants to give our camp a write-up. Think of miners planting fruit trees in rented yards and then living to see the trees bear fruit for their own families.

H. C. Frick Coke Company's Proposed San Francisco Exhibit

A $10,000 model of a coke plant will be one of the features of the United States Steel Corporation's exhibit at the Panama-Pacific Exposition at San Francisco next year, and it is now complete and ready for shipment. The model was made by the H. C. Frick Coke Co. and for several days was on exhibition in the Frick offices at Scottdale. From Saturday until Tuesday the model was inspected by 6022 persons.

The plan is a replica of the Phillips plant of the Frick company. It is 16 ft. wide and 26 ft. long. Every feature of the Phillips plant has been reproduced with a model of the bath house at Standard added.

Briefly, the model shows the shaft and tipple, boiler house, engine house, fan house, lamp house, oil house, blacksmith shop and bath house. At one end is the coke yard, with both block and bank ovens. Careful attention has been paid to detail. When the model is erected at the fair, it will be operated just as a coke plant is. The self-dumping cages will ascend and descend the shaft, the larries will travel from the tipple to the ovens, the wheels of all the machinery will turn constantly.



General View of the H. C. Frick Co.'s Panama-Pacific Exhibit

Not only have the exterior buildings been drawn to scale, but the machinery is also in the proper proportion. Most of the work was done at the car shops of the company at Everson. There are exact models of the hoisting engines and those which operate the fans, as well as other machinery about the plant. Ultimately a turbine pump will be installed, and it will be shown how water is pumped out of the mine.

All of the approved safety devices are to be shown, even to the cage about the high ladder scaling the boiler-house smokestack. Regulation danger signs have been placed where they belong. Within the bath house and other buildings, the interior fixtures have been made to scale, down to the individual showers, etc.

On the ground about the tipple the material yard has been laid out, with its steel ties, pit posts and other things that are used about the plant. In the material shed are sections of firebrick, made in the shapes and sizes required for repairing the ovens.

The coke ovens are true to life. After much experimenting it was found possible to secure electric light globes for the interior which exactly imitate the color of a burning oven. At the end of each row of ovens a cross-section has been left open, showing the shape and construction of the ovens. On the bank ovens the waste-heat flues have been added. Through these flues the boilers are fired by the gases from the ovens.

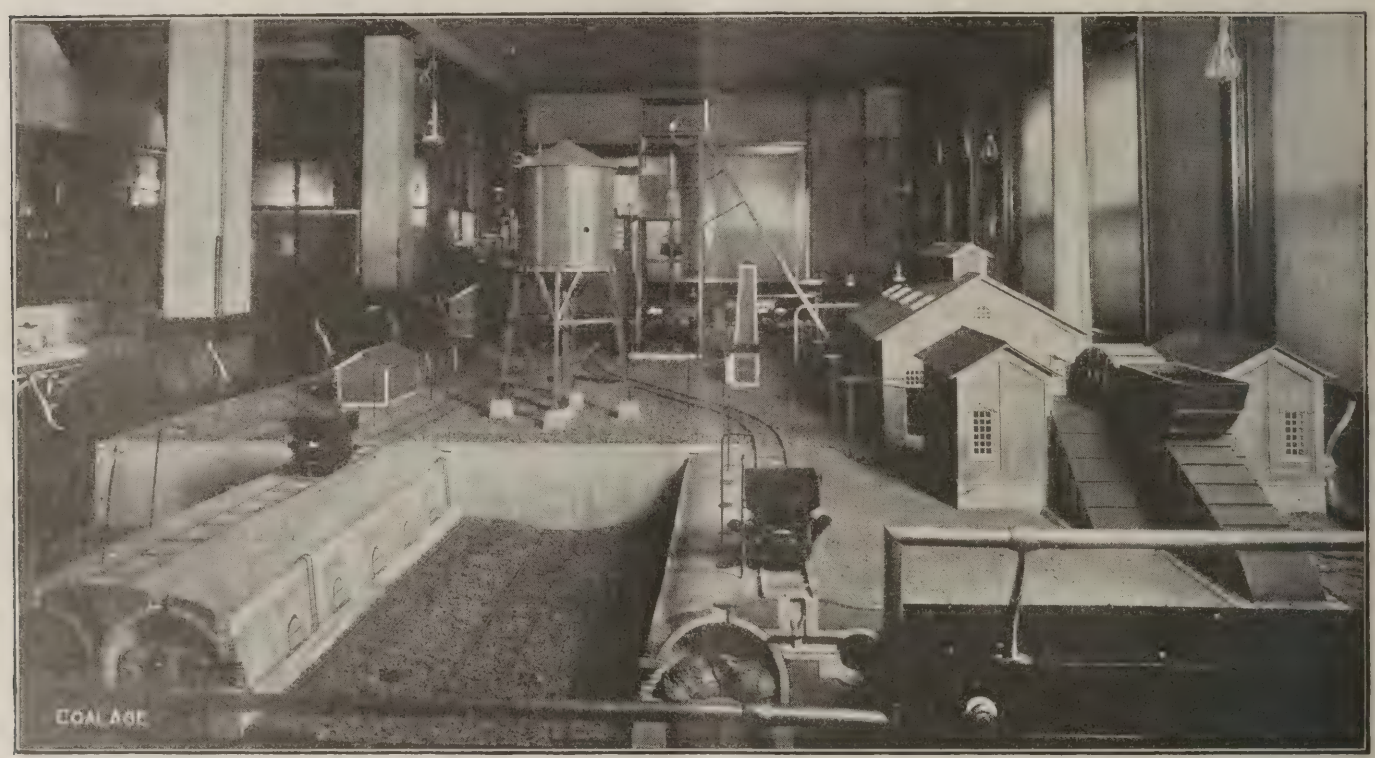
There is the water tank, an important feature of a coke plant, and the hose house for the volunteer fire department. A tower for drying the hose after use was not overlooked. In line with the propaganda of beautifying the colliery surroundings, a flower plot has been laid out along the lawn between the bath house and the lamp house.

The mechanical coke drawer has not been completed, but it will be operated when the model is exhibited at the explosion. An emergency hospital will also be shown. There isn't a detail which has been overlooked, or if it has, none of the superintendents who inspected the model detected it. Virtually every superintendent in the region has passed judgment on the model and pronounced it perfect.

The machinery will be run by electricity at the fair, and the current will be generated from two generators which have been donated by the Westinghouse Electric & Manufacturing Co.

The model was built under the personal direction of T. W. Dawson, assistant chief engineer of the H. C. Frick Coke Co. Mr. Dawson will accompany the model to the Pacific Coast and supervise its erection. The company expects to make the shipment by Oct. 1.

In addition to this model, the Frick company will also contribute a relief map of the coke region, the most complete that has ever been made. There will also be an exhibit of photographs and samples of coal. Various blocks of coal have been contributed from the various fields of the Steel Corporation, but the pride of all will be a column of genuine Connellsville coking coal, 8 ft. high and 16 in. square, bound in steel. There will also be a generous exhibit of Connellsville coke.—*Connellsville Courier.*



ANOTHER VIEW OF THE H. C. FRICK CO.'S EXHIBIT AT THE COMING SAN FRANCISCO EXPOSITION

Explosion at the Mulga Mine

A local explosion occurred at 9 a.m., Sept. 5, at the Mulga mine of the Woodward Iron Co., about 15 miles from Birmingham, Ala. Fifteen men were killed and 16 injured. Two only of the 15 died from the violence of the explosion, the other 13 being suffocated by afterdamp. On Apr. 20, 1910, the Mulga mine was the scene of an explosion resulting in the death of 40 men.

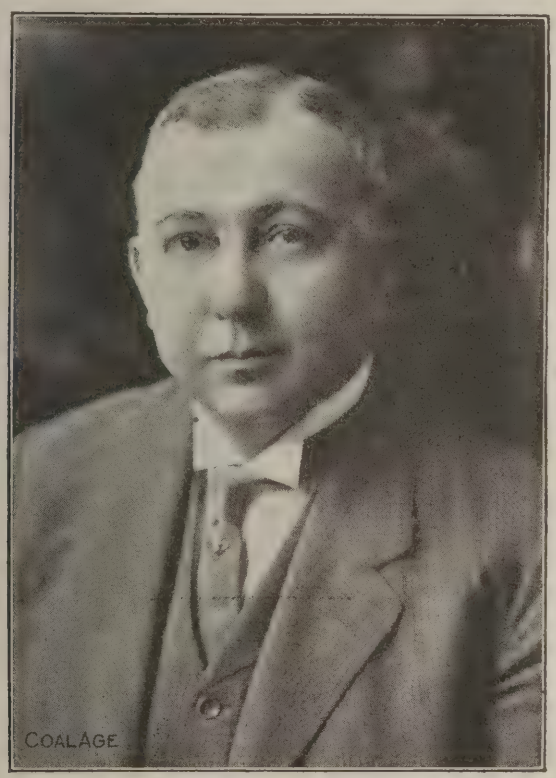
The West Virginia Coal Mining Institute will hold its winter meeting at Huntington, W. Va., on Dec. 9 and 10, 1914. Neil Robinson, president; E. N. Zern, secretary-treasurer.

Who's Who in Coal Mining

Wm. L. Schmick

One of the largest producers of coal in the State of Illinois is the Big Muddy Coal & Iron Co., with headquarters at St. Louis, Mo. The mines of the Big Muddy company in Illinois are located at Murphysboro, Harrison, Herrin and Clifford. These collieries have an output of approximately 8000 tons daily.

Much of the prestige and success of the Big Muddy corporation during the past year is due to the efforts of its vice-president and general manager, W. L. Schmick, whose extensive experience in the selling end of the coal business has been most helpful to his people in these days of semi-darkness in American commercial and industrial



William L. Schmick

life. Mr. Schmick is one of those coal men who realizes in full that to mine coal is not all—there must be a market for the output produced. As a result of this most necessary understanding on his part, he devotes his attention largely to market development, and is as familiar with the trade end as he is with the operating end of the business.

Born in Baltimore, Md., in 1860, Mr. Schmick gained his early education in the parochial school of his native city. When 22 years of age, he entered the coal business as salesman for the Post & Hart Coal Co., in St. Louis. Continuing in his employment until 1886, he then accepted a place as sales agent for the Girard Coal Co., in the St. Louis district, covering this territory for the Girard people until 1891.

When the Consolidated Coal Co. needed an agent to take charge of its northwestern markets, Mr. Schmick was selected to fill the place, and was appointed its representative, with headquarters at Chicago. This job held his attention for six years, at the end of which time the Consolidated company advanced him to the position of general sales agent for their entire output, at the same time changing his headquarters to St. Louis.

That Mr. Schmick served his corporation well for the next eight years is evidenced by the Consolidated company's action in appointing him vice-president and general manager of all its mines in July, 1907. He continued in this position until June 30, 1913. Just about this time the Big Muddy Coal & Iron Co. was looking for a man with sufficient experience to capably fill the place of vice-president and general manager of its coal operations. In its quest for a suitable candidate, Mr. Schmick loomed so large on the horizon of its vision that the search ended with his employment to fill the place he now holds. That was little more than a year ago, but today the comparatively new vice-president and general manager of the Big Muddy Corporation is a most intimate and integral part of the company's organization.

Mr. Schmick's entire attention has been given so exclusively to his coal-mining duties, he has had but little time to divert any effort to outside business interests. He is a director of the Union Fuel Co. in St. Louis, and in October, 1912, was elected president of the Illinois Coal Operators' Association. He is a member of the Mercantile Club, the Sunset Hill Country Club and the Algonquin Club, all of St. Louis. In Chicago, he belongs to the Traffic Club and the Automobile Club. He is an active member of the American Mining Congress and the Illinois Mining Institute.

The Checkweighman

While discussing with the general manager of a coal company the dispute over a checkweighman, which resulted in the shooting up of a mining town, he gave a chapter from his own experience. His miners had selected a checkweighman, who was in the habit of telling all men who came to the tipple seeking work what a poor place that mine was and advising them to look for a job elsewhere. The miners sent a committee to the manager about some misunderstanding, and after it had been adjusted to their entire satisfaction, the manager said he had something he wanted to discuss with them. He detailed to them what the checkweighman was doing and asked them to put some other man in his place.

At a meeting held by the miners shortly afterward, this request was considered, but the hotheads, as usual, argued that as the manager wanted to get rid of the checkweighman, he was just the man they wanted, and so the request was refused. The manager made no comment, but a week or two later, casually stepped up to the checkweighman, who was sitting with a group of men, and called him to one side, sat down and talked with him for ten or fifteen minutes, passed him out a good cigar and when he left him, slapped him on the shoulder in a "hail fellow" spirit. At intervals he repeated this performance. The result was that the same hotheads who had opposed his requests, now said the checkweighman was getting too chummy with the manager and succeeded in ousting him from his position.

The electric current-carrying capacity of an aluminum wire of any given size may be taken as 84 per cent. of the capacity of an equal sized copper conductor.

Editorials

The President and the Colorado Situation

The public has been severe on the Rockefeller family in relation to the Colorado situation, alleging that while owning a large block of stock in the largest company in Colorado, it has been willing to leave the business control in the hands of its representatives. We have been ready to admit that the absenteeism of the Rockefellers was a real misfortune but one which naturally arises from the large extent of their interests.

Now, however, another person has essayed to control the Colorado situation and he, as little as the Rockefellers, understands the conditions which he desires to control. He also is an absentee and dependent on what others tell him. His lack of knowledge is also excusable for he has many other and severe duties pressing on his attention. We refer, of course, to President Wilson.

It is true that he has the results of the congressional investigation to inform him and it is extremely creditable to him that he tacitly overlooks its findings and bases his conclusions on other premises. We congratulate him on knowing that the purpose of committees of Congress is to manufacture political capital.

But we cannot feel he has been fortunate in choosing the men to enlighten him on the situation. One of the two was William Fairley, a member of the National Executive Committee, at least till Nov. 30, 1913, of the organization which was endeavoring by creating disorder to prevent the operation of the mines in Colorado. In 1904, he was an organizer and agitator in that state. The judgment of such a man could not well be regarded as ex parte.

To balance him a man, Hywell Davies, was chosen, who was, at one time for a short while, president of the Kentucky Coal Mine Operators' Association. Apparently he, while passing as a coal operator, has not acted in that capacity for several years, and in fact it is hard to connect him now in an operating way with the coal industry. He appears to be a man well liked by all associated with him, but it does not seem that he was in any way a fit balance for a paid organizer of the United Mine Workers' Union.

These two investigators stayed 10 weeks in Colorado, but at no time, we are told, did they present any letters of instruction or other credentials to the operators. When Mr. Davies first arrived in Colorado, he called on D. W. Brown, J. C. Osgood and S. F. Welborn. About the time he left he called on Van Mater and C. L. Baum. This was the extent of the effort Hywell Davies made to learn the views of the operators, according to our informant, the inquiry of our correspondent having been made at the meeting on Sept. 20, when the signatories of the letter to the President quoted last week were present.

The operators of Colorado, therefore, do not believe that the President has been adequately informed relative to the conditions in that state and the crude proposition offered suggests such a lack of acquaintance. The terms of the proposal are vague and indefinite and overlook facts which everyone should know. Into these defects it is not necessary to enter because the operators themselves in their reply to the president have explained the inadequacy better than we can.

The only right Mr. Wilson had to interfere in Colorado was derived from the fact that a state of disorder existed. The only right by which he may now withdraw, especially now he has taken the arms from the operators, is based on the fact, real or presumed, that disorder will not result. It cannot lawfully be done for any other reason. It must not be done to coerce anyone, to enable anarchic violence to perform what may not, or has not, been done by legislation. If his duty required him to withstrain the lawless, the duty is not now removed unless he believes the lawless are already permanently restrained. He cannot say that he will not permit his truce to be rejected. If he does he sets himself above the law and seeks to legislate for the people.

A New President for the A. I. M. E.

The presidential nominating committee of the American Institute of Mining Engineers is endeavoring to sound the membership for an opinion as to a successor of retiring President Thayer. The deliberations of the committee must be concluded this month, and opinions and ideas on the subject are being solicited.

This seems to be a propitious time for the coal and coke members to enter more actively into the affairs of the Institute. Particularly is this so now that one of the most successful meetings in the history of the Institute is just being concluded under the auspices of the coal and coke committee at Pittsburgh. Under the new regime, a new era has been inaugurated in the Institute; it has been rejuvenated, gained a new vigor and a greater strength, and the fuel members should support this innovation.

With a presidential nomination now up, the question arises, is it not time that the coal men put forward a nominee? There are certainly many convincing reasons for doing so, and the encouragement which the Institute has recently been offering for broadening and enlarging upon the scope of the work of the coal members would seem to indicate that such a proposal would be favorably regarded by the other members.

Strange as it may seem, though the American Institute of Mining Engineers originated in the coal regions of Pennsylvania, there are only three of its presidents who have been in any way directly connected with the fuel industry. And it has now been two decades since a coal man has occupied the presidential chair. We, of the fuel industry, well appreciate the fact that the past presidents have been men of conspicuous ability, some of whose names will go down in history for their noted achievements in scientific lines. But we also feel that the coal industry has produced some equally powerful figures whom the Institute could not honor too highly.

The Export Coal Trade

Let us say first that any coal company or selling agency, with coal of the necessary quality, that is prepared to give extended credit can get foreign business, but it is doubtful if it will always get its money.

There is now plenty of good coal available and there are ships to be had, at a price, but the financial end of the business is far from satisfactory. At present our exporters or those who would be exporters, know but little about ocean freights and charters, port charges, unloading conditions, etc., and will only sell coal f.o.b. tidewater, requiring cash against documents before they will allow their coal to be actually shipped. They know that the financial situation, in the countries needing our coal, is generally bad and will take no risks.

Exporters must realize that the essence of the export coal business is transportation, and that before they can get any large share of the world's foreign coal trade, they must learn the devious ways of ocean transportation and provide the required facilities.

Our competition in the export coal trade, in the past, has been due to opportunities that have come about through outside causes. The British coal strike in 1902 gave us the West Indies markets, which we have never lost, not because we had better coal, but because, in addition to cheaper mining costs, we found iron ore and sugar for return cargoes.

The British strike of 1912 did us little good, because we failed to take advantage of the opportunity offered us to increase our exports, getting only such additional business as was offered, but which we failed to retain when British shipping returned to normal conditions.

Even now, with the chance given by the war, there has been no organized, systematic effort to increase our coal exports; it is all spasmodic, each company for itself after its own plans, usually based on insufficient knowledge of conditions, either of transportation or of finances and credits.

To capture and retain the foreign coal markets, we must follow the example of Great Britain's exporting companies and understand the basis on which they have worked.

They have coal of first-grade quality; we also have coals equally as good in heating value.

They mine and prepare their coal to suit the wishes and needs of the consumer; we prepare our coal as we think best or do not prepare it at all.

They have the necessary loading facilities that will handle coal with the least possible breakage; we load our coal into ships much more quickly, but with little attention to breakage.

They build and own their own colliers; we are entirely dependent on other nations for ocean transportation.

They have established or control their own agencies; we have now but local agents, who often handle British coals and over whom we have no control.

They build or obtain dock and storage facilities and coaling stations; we have nothing of the kind at foreign ports.

They have created and maintain banking and financial agencies in foreign countries; we are entirely dependent on foreign banks.

They meet the consumers' or buyers' views as to sales conditions and credits; we generally refuse to do so and insist on our own conditions, or no sales.

To sum up, the export coal trade is a business in itself and to succeed in it, it must be studied and learned like any other business; every factor in it (and there are many) must be allowed for and made a part of the whole, otherwise we shall never succeed in obtaining and holding our share of it.

The Pittsburgh Coal Co.'s 10% Wage Cut

The Pittsburgh Coal Co. has announced a general horizontal reduction in the salaries of all employees drawing $100 per month or more, excluding, of course, all members of the miners' union. The announcement was not entirely unexpected as it has been under consideration for some time, and it is more or less in line with the policies adopted by several of the largest corporations in the country. In such periods of acute and protracted depression as this country has been laboring under, rigid retrenchment propagandas have been necessary; and, particularly is this so in the case of concerns like the Pittsburgh Co., who are carrying a heavy indebtedness.

While the position of this individual company is not, therefore, open to a general criticism, there is an objectionable phase to the move that cannot be overlooked. This is the throwing of the entire burden of the reduction upon the official personnel of the company and excluding organized labor entirely. The reason is, of course, obvious, the wage agreement with the labor unions making a reduction in that direction impossible without precipitating immediate strikes among the miners. In this we see a tacit acknowledgment of the latent power of organized labor whose rights and demands must be given precedence over every other consideration.

As pointed out in a previous editorial* on this subject, while the company officials form the buffer between capital and labor, the unions have been consistently forcing more and more concessions from capital, which, in the aggregate, has greatly enhanced the cost of living. On the other hand, salaries paid the official forces have, in the main, been stationary, or even suffered a moderate reaction as in the case above cited. The minor official in the coal offices has, therefore, been facing the problem of maintaining appearances commensurate with his presumably superior position, while the buying power of his salary is being constantly restricted to narrower limits. Indeed, one might quite pertinently ask if this constant enhancement in the cost of labor and the apparent small premium placed upon the economic value of the brain worker is not of greater significance as portraying the trend of conditions in our country than is commonly thought.

Even if machines are eventually proved to have a slightly higher fatality rate per man employed than hand labor, their greater productive rate would bring down the death rate of the industry. We are bound to get the coal and we desire to get it with the least number of fatalities possible. We could reduce the death rate per man by putting a few figureheads in safe places below ground, but what good would that do if the death roll per ton mined were unchanged.

*See "Miners' Work and Wages," Coal Age, Vol. 6, p. 273.

The Labor Situation

SYNOPSIS—The labor situation is unchanged everywhere. The operators in Colorado persist in their determination not to yield to the threat of the President, and in eastern Ohio they are holding steadily to a mathematical equivalent of last year's wage.

The Colorado operators are quietly, but nevertheless firmly, of the determination that they will not yield to the President's threat, and so far the President has sense enough not to commit the iniquity he has purposed. So far the troops are not withdrawn, nor will they be, we feel confident, till the strike is settled by the withdrawal of the armed desperadoes from the tented villages throughout Colorado. Perhaps no settlement will be possible till all the perpetrators of past violence are in jail and serving their appropriate sentences. But it is likely that shortages of money will make an earlier termination of hostilities necessary.

Eastern Ohio

In eastern Ohio there is no change in conditions. The miners are extremely angry with Thomas L. Lewis, the former president of the United Mine Workers of America, because he has urged a settlement on the operators' terms. Reproachful letters have appeared signed by Italian miners and by local unions.

Headed by the Maynard and Barton brass bands, about 1000 miners from the unions of Maynard, Neffs, Provident, Fairpoint, Blaine and Barton marched to St. Clairsville on Sept. 28. They paraded the main street and assembled in front of the court-house steps, where several speakers addressed them. The demonstration was caused by the injunction suit filed by the Youghiogheny & Ohio Coal Co. against Obed Hardesty, Father McEachen and others to prevent them from mining coal at the mine recently opened on the Hardesty farm. The company declared that it owned the coal which the miners desired to work.

The striking miners are receiving $3 per week from the union. Sub-district president, C. J. Albasin, left Sept. 28 for Indianapolis. He desires to borrow $10,000 from the Illinois district.

Allowable Impurities

The Ohio Industrial Commission has been asked to determine the percentage of impurities allowable in the Crooksville district. Because the bed is thin and the impurities not so general as in the Hocking Valley field, it was decided that only 75 lb. of impurity should be regarded as permissible, whereas in the field mentioned 100 lb. has been allowed. All impurities over 75 lb. are made subject to docking.

Compensation for Injuries

The smaller operators who lease their mines for operation, will be affected by a decision of the State Industrial Commission, which makes the owner liable for compensation in all cases of injury. This ruling was made in the case of the widow of Thomas McAllister, in a suit against the National Fire Proofing Co., which owns mines at Haydenville, in the Hocking Valley district. It is said that the desire of the mine owners to maintain the mine in good condition has resulted in most contracts to lessees being so drawn that the lessee is not an independent contractor, but merely an agent of the owner. Under the ruling of the commission, the National Fire Proofing Co. is required to pay McAllister's widow $2600. Neither the company nor the lessees were contributors to the workmen's compensation fund of the state.

West Virginia

In the Cabin Creek district, West Virginia, there is much unfavorable comment regarding the union officials, and an "Efficiency League" has been organized. At Beechgrove, near Crown Hill, on Sunday, Sept. 27, a ticket for the district organization was named as follows: Walter Deal, Cedar Grove, for president; W. F. Ray, Black Betsey, vice-president; Norman Atkinson, Crown Hill, for secretary ,and J. L. Workman, national board member.

For purposes of record, we supply the details of two recent settlements in West Virginia. The Four States Coal Co. has made an agreement with the United Mine Workers' Union, District No. 17 The contract will expire Mar. 31, 1916. The new agreement gives unreduced pay to the day workers in the mine, despite the reduction in the hours of labor from 10 to nine hours. The machine-mining rate is unchanged, namely, 31c. per ton. A higher rate had been demanded, but as the company pointed out, the rate paid is higher than that prevailing on Coal Creek and Cabin Creek. The contracts with the Milburn Coal Co. and the Solvay Coal Co. still remain unnegotiated, but a speedy agreement is expected.

The Paint Creek Collieries Co. has at last completed its temporary contract by inserting the rates for machine-mined gas and splint coals. The price for the former is to be 26c. per ton instead of 25c., as in the past. In narrow work, the rate will be 5c. higher. The rate on splint coal will be 29c. instead of 32½c., as was asked and as is paid in the Kanawha district. The general lines of the contract were laid last spring, but the tonnage rate remained as a bone of contention, and an arbitration board was created, consisting of W. Wood and J. Martin for the operators, and A. D. Lavender and W. Patrick for the miners. Finally, to break the deadlock, C. E. Krebs was appointed as referee to sit with the other four arbitrators. The gas-coal price is that paid in the Kanawha district by those operators who are affiliated with the Kanawha Coal Operators' Association.

Recent Judicial Decisions

Effect of Illinois Compensation Act—The Illinois Workmen's Compensation Act does not prevent suit against a coal mining company for injury resulting to a miner from the company's violation of the safety requirements of the Mining Act, such as failure to sprinkle, spray or clean the roadway of an entry, whereby an explosion occurs. (United States Circuit Court of Appeals, Seventh Circuit; Eldorado Coal & Mining Co. vs. Mariotti; 215 Federal Reporter 51.)

Responsibility for Unforseen Accident to Pedestrian—A pedestrian passing along the main track of a railroad company near a coal company's tipple is not entitled to recover from the coal company for injury sustained by her on being struck by a lump of coal bounding from a chute while a car was being loaded at the tipple, in the absence of any showing that the accident could reasonably have been foreseen and prevented by the coal company, although a foreman of that company had assured plaintiff that she might safely proceed along the track. (United States Circuit Court of Appeals, Fourth Circuit; Kirk vs. West Virginia Colliery Co.; 215 Federal Reporter 77.)

Proof of Damage under Breach of Contract—To fill his needs, plaintiff contracted for 50. carloads of coal to be delivered by defendant during a certain period as ordered, and made a similar contract for a like quantity with a third person. Although he ordered out the 50 cars which defendant had agreed to sell, only five were delivered, and the seller under the other contract made no delivery. To obtain the necessary 100 cars, plaintiff was required to buy elsewhere at prices ranging from 50c. to $1.25 a ton above the price at which defendant had agreed to make deliveries. Held, that these facts were sufficient to constitute a basis for computing plaintiff's damages recoverable against defendant for breach of the contract; the two contracts not being so intermingled as to prevent a determination as to the approximate loss sustained by plaintiff through defendant's breach. (Kansas City Court of Appeals, Eaton vs. J. R. Crowe Coal & Mining Co., 165 Southwestern Reporter 1170.)

When a Mine Owner Is Not Required to Support Surface—In the recent case of Graff Furnace Co. vs. Scranton Coal Co., 91 Atlantic Reporter 508, involving the liability of defendant for injury caused by it in mining operations to the overlying surface of land owned by plaintiff, the Pennsylvania Supreme Court said:

"It has long been settled in this state that, where there is a separation of the minerals from the surface, the owner of the mineral estate owes a servitude of sufficient support to the superincumbent estate. That principle was announced in Jones vs. Wagner, 66 Pa. 429, nearly a half century ago, and it has since been uniformly recognized and enforced. Equally true, however, is it that the owner in fee of the entire estate may grant the mineral estate and by apt words in the deed of conveyance may part with or release his right to surface support, and, where he does so, his grantee or those claiming through him may mine all the coal, even though it should result in the surface falling in. The owner of the entire estate, may likewise grant the surface of the land and reserve the mineral estate with the right to mine and remove it without liability for any injury or damage done to the surface, and in such case the grantor or those claiming through him may mine and remove all the coal without being compelled to support the surface. These rights of the owners of the servient and superincumbent estates in land are settled by numerous and some very recent decisions of this court."

The court further holds in this case that a reservation of right of surface support in a deed conveying the surface of mineral lands, need not be signed by the grantee.

Discussion By Readers

The Reverse or Counter-Current Theory

Letter No. 10—The recent discussion by Messrs. Verner, Ashworth and Parfitt shows the deep interest that is taken in everything pertaining to coal-dust explosions. The letter of Mr. Ashworth, COAL AGE, Sept. 5, p. 398, makes it clear that Mr. Verner's claims in regard to the counter-current developed at the moment of a dust explosion in a mine, have not been presented in a manner to be understood by all.

While we may not be able to agree with Mr. Verner wholly, in his attempted explanation of this theory, he should be congratulated for having the courage to voice his convictions in the face of opposition, and for having persistently kept this important subject alive by discussion, for it is by this means that a right conclusion may be reached. Mr. Ashworth, also, can claim an equal share of recognition, because of the tenacity with which he has handled the subject and demanded proof in the shape of observed facts. Many men are satisfied to "play safe," never leaving the old beaten track and the world is none the wiser for their living.

It is not my intention to attempt a discussion of this theory, but to refer briefly to one or two points that have been mentioned. In regard, first, to Mr. Verner's claim of a "counter-current" traveling in an opposite direction to that of the explosive blast, I recall that no less an authority than Sir Frederick Abel tells us that air at a lesser pressure will travel against an explosive wave of greater pressure, which seems to be Mr. Verner's theory, briefly stated.

Again, reference has been made to the Eskmeals experiments undertaken for Mr. Dean, and which showed conclusively that there is an inrush of air during the course of the explosion. This inrush of air is evidently the result of a lowering of the pressure at some point in the mine, which would naturally be followed by a rush of air toward the point of lower pressure. We may justly conclude that the inrush of air, at the Eskmeals experiment, is evidence that a partial vacuum was formed at some point in the tube during the progress of the explosion.

In this connection, it has been pointed out that such a vacuous condition is probably the result of a sudden cooling of the gases, at a point where the conditions were unfavorable for the combustion of the coal dust; as, for example, a wet zone or a stone-dust zone. However, the Eskmeals experiment does not seem to prove that the outrush of the explosive wave and the inrush of air took place at the same time; but, rather, that these currents were produced by certain pressures that acted in their respective directions, the one due to the expansive force of the blast exerted principally along the roof and the other being the atmospheric pressure acting against a more or less vacuous condition at the floor.

If Mr. Parfitt admits that an explosion of any kind, whether it be a shot in the coal or an explosion of coal dust, causes an equal pressure in every direction, it is hard to understand how he would explain his "partial vacuum" at the face of the coal surrounding the shot. I have always considered that when a shot was discharged at the face of a room, the pressure due to the blast was equal everywhere in the room. If this is true, there could be no vacuum formed at *C*, as he states.

When an explosion of coal dust occurs in a mine, it is evident that the mine air is, for the moment, in a state of compression, which extends its influence a slight distance outside beyond the opening. If, now, after the mine pressure has reached a maximum, there is a slight decline, owing to the cooling of the gases in the mine, there would naturally result an inrush of air from the outside, until equilibrium was again established; and this outrush and inrush of air would be repeated one or more times, as the result of other explosions in the mine or any causes that would raise and lower the mine temperature and pressure.

ROBERT MCCUNE.

Dawson, N. M.

The Mine Foreman

Letter No. 9—In the discussion of the many qualifications a mine foreman must possess, too much emphasis cannot be laid on the idea that he should be a practical as well as a theoretical man. His success as a mine foreman is not determined by the knowledge he has acquired in the use of textbooks or by his ability to successfully pass an examination for a certificate of competency. The foreman who has a practical knowledge of the work in charge impresses his subordinates that he knows what he is talking about; and his orders unconsciously carry the conviction that his instructions must be carried out and obeyed.

It is important that the mine foreman should be a man of detail. He must make himself familiar with all conditions existing in the mine, by personal investigation. This requires energy and a persistent determination, on the part of the foreman, to observe any infringement of rules or negligence in the performance of work, and to quickly bring the same to the attention of the party at fault. In every mine, men are found who make a continual practice of violating rules, in order to facilitate their work. In many cases, they jeopardize not only their own lives but those of their fellow workmen by a willful act or neglect. It is important that the mine foreman should show himself alive to such practices and maintain the discipline of the mine.

It has been said that the Union will support a man in the violation of rules and orders. My experience in the handling of this class of labor for a number of years convinces me that such a statement is unfair to organized labor. I have known cases where a violation of rules has been presented to the Union as a grievance, by a member, and later brought to me by the pit committee. In every instance, I have been able to show that it was a direct violation of orders or mine regulations and rules laid down for the safety of the men and the security of the

property. As a result, I have never failed to secure the support of the committee.

A successful mine foreman must be capable of judging the amount of work a man should be able to do, in every department of mining and under different conditions, if he works conscientiously. Then, when making his daily rounds, he will be able to detect any shirking of the work. Many men, when not watched closely, are prone to take advantages. They are afraid of doing more work than they are paid for, forgetting that the man who never does more than that for which he is paid, will never be paid for more than he does. This is a true maxim, which every worker should regard.

One of the things that tests the ability of a mine foreman most severely, in many cases, is the attempted installation of new machinery or a new method of operating. In his endeavor, he is almost invariably opposed by the strong prejudices of the workmen, simply because they have never seen the machine or the method tried before. It is a well known fact that men must work with a will to insure the success of a new undertaking. Scores of good and efficient systems and installations have proved a failure through the lack of coöperation on the part of the workmen employed.

For this reason, a successful mine foreman must be competent to change the system of working whenever altered conditions require such a change. In order to introduce chain machines where punchers are being used, it is necessary that the mine foreman select an efficient, reliable man to run the machine and then personally watch the work; calculate the amount of coal undermined; and observe closely the effect of blasting the coal and the amount of powder required, and compare these results with those obtained by the use of the punchers.

When introducing a new system of haulage, or an extra locomotive on the present haul, or when making a new run with the locomotive, the foreman should ride the locomotive himself for a few trips; note the time it takes to make the trip and the time required for switching. The motorman, on that trip, will then know that the foreman has a practical knowledge of the work required and that he must give a plausible excuse for any delay.

Without question, a successful mine foreman must be a good judge of human nature, in order to handle the different classes of men he employs. He must be able to select the best men from those who apply for work and to distribute the men to the best advantage, giving to each man the work he is best fitted to do. This will not only avoid trouble in the future, but will reduce the number of accidents in the mine.

Above all, the mine foreman must be observant of the ventilation, drainage and timbering of the workings. He must provide good ditches at the sides of all roads and see that these are kept clear of refuse. As the successful operation of the mine depends primarily on the *car of coal*, nothing is more important than the maintenance of good roads. It is important that these be well timbered; and the timbering must be closely watched to observe any evidence of excessive weight. A roof cave on a haulage road is not only a menace to safety, but practically shuts down that section of the mine, as no coal can be hauled until the obstruction is removed.

Finally, the mine foreman must be a man of foresight, capable of looking ahead. He must keep his development work in advance, so that any unforeseen occurrences, such as running against a fault, or a squeeze shutting off a portion of the mine, will not reduce the daily capacity of the mine, for which he is responsible.

J. W. Powell, Supt.,
Cottonwood Coal Co.

Lehigh, Mont.

Letter No. 10—I have been a constant reader of Coal Age, for some time, and to say that I have enjoyed the interesting discussions by many of the ablest mining men in this country would be putting it mildly. These discussions have been a great help to me, as they have been to others of my acquaintance. I have been interested in the recent discussion of The Mine Foreman, and offer a few comments, in hopes of seeing it further discussed, as it is a most important subject.

I have often felt that there was a great lack of earnest coöperation between many mine foremen and the respective mine inspectors of the districts where they are located. No argument is needed to prove that the sooner this condition is remedied, the better it will be for all concerned. There should be a feeling of true friendship existing between every mine foreman and his inspector. The same responsibility rests on the shoulders of each of these men, who should work together in earnest efforts to increase the safety of the mine and thus reduce the accident list.

I believe that we have as good inspectors in Alabama as can be found in any state; and there isn't any doubt but that they are doing all in their power to reduce the number of accidents occurring in the mines. It is up to us, as mine foremen, to coöperate with the mine inspector in our own district in every way possible. The way to cooperate with the inspector is to listen to what he has to say when making his inspection of the mine. As a rule, when an inspector recommends a certain thing, it is not his own individual opinion, but the result of matters he has discussed with his associates in mine inspection.

I recall the mine foreman who, just a week or two before the inspector was supposed to make his regular visit to the mine, put on an extra crew of men to clean up the mine and get it in shape for inspection. I have been told of other instances where the inspector told the foreman to make such and such changes; and the foreman would forget all about it or postpone doing the work until nearly the time for the next visit of the inspector, although he was in daily contact with the conditions to be remedied, and there was no reasonable excuse for his delay in making the changes requested.

We should not be so narrow minded as to think that when an inspector offers a suggestion that, in his opinion, would prevent someone from getting injured or killed, it is not a one-man's idea. The suggestion is made in good faith and is born of experience. While the number of mine fatalities is greater in this country than anywhere else, in proportion to the coal mined, we may hope with active coöperation to reduce this high death rate in mining.

Some years ago, the first-aid movement found its way into coal mining. It has proved a blessing to the miners everywhere, and has spread so fast that, now, every coal-producing state has its first-aid teams. The result is that hundreds of lives have been saved through their efforts.

It is essential that every foreman produce a good cost sheet; but it is just as essential that every foreman should devote some time to looking after the safety of the working places and to keep the entire mine in a sanitary condition. He should do this the same, the day *after* the inspector makes his visit as the day *before* the visit. I am glad to say that there has been a vast improvement, in this respect, and the mines today are in a much better condition than they were 15 years ago. Mine legislation has much to do with the advance made in this direction.

In conclusion, let me say, let us all work together in harmony and remember than in unity there is strength; and that great things may be accomplished by coöperation.

J. F. Smith, Mine Foreman,
Alabama Consolidated C. & I. Co.

Lewisburg, Ala.

Electric Mine Locomotive

I notice, in your description of the second electric mine locomotive installed in the anthracite region at the Hillside Colliery (1889), Coal Age, Sept. 5, p. 385, the credit for the design of the machine is given to Mr. VanDerpole. Permit me to correct this statement to the extent of saying that I succeeded in inducing Sup't May, of the Hillside Coal Co., to install this motor, only after guaranteeing a saving in expense of haulage. I designed the machine in Scranton and the order was sent to the Thompson-Houston Electric Co., at Lynn, Mass., before Mr. VanDerpole's connection with that company. The design was rejected on the ground that a 40-hp. machine could not be built within the dimensions specified.

About seven months later, the design was gone over by Mr. VanDerpole and myself, with the result that the only change made was to cut down the weight by making the covers of the wheels in wood. As the machine would not pull its load, I was compelled later to replace these wooden covers with iron castings. I will state, however, that the winding of the motor and the design of the pole is entirely Mr. VanDerpole's work. The conditions in the gangway of the mine would not permit the use of the present trolley pole.

The installation of the plant, however, was entirely in my hands as consulting engineer for the company. The next machine was built entirely under my direction and installed by me, first, at Blossburg and then removed to Forest City, being found too large for the work at Blossburg. The expansion bolts were used, first, at Mayfield, and then on the VanDerpole-Thompson-Houston line, in Scranton. I first adopted the method of running wires through pipes (1888) when lighting the main haulage road at Burley Colliery, Sheffield, England. It may be interesting to note that this was the first coal mine lighted by electricity, which plan I think was first adopted in 1883.

Francis A. Pocock.

Philadelphia, Penn.

Study Course in Coal Mining

The Coal Age Pocket Book

The Operation of a Siphon—There are a few practical points, in the operation of a mine siphon, that demand consideration, as upon these its action depends. The most important of these are the following:

1. In order to **start a siphon,** the pipe must first be completely filled with water, from the intake to the discharge end; and to accomplish this a valve or stop-cock is required at each end of the pipe. When **valves** are used they should be of a type that will offer the least obstruction to the flow of the water, the gate valve being best for that purpose. If **stop-cocks** are used they should provide a passage equal to the full area of the pipe. A **foot-valve** is often used at the intake end, in preference to any other type, because it is automatic in its action.

To **fill the pipe,** all valves are first closed, and water is then poured into the funnel or opening at the summit or crown of the siphon, until both legs of the pipe are full, time being given for the escape of air that may be entrapped in the pipe. When the pipe is apparently full close the opening at the crown and open the valve at the intake end, which will cause a vacuous condition to form at the summit and assist to drain any air still remaining in the pipe, to that point. Again, close the intake valve and displace any air found at the summit by completely filling the pipe with water.

Finally, having closed and sealed the opening at the crown, open first the intake and then the discharge valve. The intake valve should be opened to its full capacity before starting to open the discharge valve. The latter should only be opened gradually, thus giving ample opportunity for overcoming the inertia of the water and reducing the liability of air entering the pipe.

The suggestion of using a **pump** to start a siphon is a poor suggestion. A siphon should be **primed,** in starting, in the same manner as a suction or lift pump is primed to enable it to act.

2. Air-Tight Joints are an absolute necessity to insure the successful operation of a siphon line. Air will enter a pipe, in siphoning, through a joint that is perfectly water-tight. In large pipe lines with flange joints, rubber gaskets dipped in tar should be used. The screw-joints of smaller pipes should be put together with lead. It is a very bad air-leak that can be detected by a lamp or candle held at the joint.

3. The **accumulation of air** in a siphon line cannot be wholly avoided by the effectual submergence of the pipe ends and maintaining air-tight joints. Water always contains more or less air that it has absorbed from the atmosphere and holds mechanically. Under the vacuous condition that exists at the summit of a good siphon, the air held by the water tends to escape and then accumulates in ever-increasing amount till it impedes or completely shuts off the flow of water through the pipe.

This can only be avoided by so proportioning the size of both the intake and discharge pipes that the pipes will flow full and the air be swept away by the water as fast as it accumulates.

The Coal Age Pocket Book

PUMPING

The work of pumping water from a mine shaft or slope is often a difficult problem, owing to the great depth of the shaft or the length of the slope. In many cases, it is necessary to perform the work in stages or lifts, in order to avoid the excessive strains due to a high lift.

The rapid corrosion of the pipes and the valves and linings of the pumps, owing to the action of the acid mine water, is also a matter causing much annoyance and trouble. To overcome this difficulty, it is necessary when the mine water is very corrosive, to use wooden pipes and pump linings or to employ other acid-resisting material.

Theory of Pumping—In the common system of pumping water, there is a suction end and a discharge end. The pump separates these two branches of the system, and is the means or agency producing the flow.

A pumping system is not a gravity system where water flows by gravitation from a higher to a lower level. On the contrary, the pump is the means by which the water is lifted **from a lower to a higher level.**

Briefly stated, the action is as follows:

1. The pump, by its action, produces a more or less perfect vacuum, in the pump barrel behind the piston or plunger, in its forward stroke

2. The pressure of the atmosphere, acting on the surface of the water in the sump or basin, forces it up the suction pipe and through the valves into the vacuous space in the pump barrel.

3. On the return stroke of the pump, the intake valve is closed by the pressure of the water, which is forced out of the pump barrel and through the discharge valve into the column pipe by which it is discharged at the surface.

The Suction Head—This is frequently called the "suction lift" of the pump. It is the vertical height of the center of the pump barrel above the surface of the water in the sump. The suction head must always be less than the atmospheric head, in order to make due allowance for the friction head and the velocity head, which must be overcome before the pump can draw water from the sump. As stated in respect to a siphon, the suction head of a pump in feet, may be taken, in general practice, as nine-tenths of the barometric pressure in inches. With a vertical lift and a good pump, the suction head can safely exceed this amount.

The Discharge Head—This is the vertical height of the free discharge of the column pipe above the pump. The discharge head is only limited by the available steam pressure at the pump multiplied by the square of the ratio of the diameter of the steam cylinder to that of the water piston or plunger.

For example, if the steam pressure available at the pump is, say 50 lb. per sq.in. and the diameter ratio of steam end to the water end is 2, the pump will operate against a water pressure of $50 \times 2^2 = 200$ lb. per sq.in.

Inquiries of General Interest

Steam-Boiler Efficiency

In the October issue of one of my mining journals, in an article entitled "Efficiency of Steam," I read as follows:

As water is converted into steam at 212° F., 14,500° F should convert 68.4 lb. of water into steam (14,500 ÷ 212 = 68.4); but an excellent evaporation under a boiler is 7 lb. of water per pound of coal, or 7 × 100 ÷ 68.4 = 10.2 per cent. of what should occur.

From this statement, the writer of the article proceeds to calculate that, with a feed-water temperature of 100 deg. F. and using steam at 70 lb. gage, the consumption of coal is 30 ÷ 7 = 4.29 lb. per boiler horsepower per hour.

I have compared this article with the answer to an inquiry in COAL AGE, Oct. 3, p. 563, where it is calculated that a consumption of 4.5 lb. of bituminous coal per horsepower per hour, will evaporate 34.5 ÷ 4.5 = say 7½ lb. of water, from and at 212 deg. F. The rate of evaporation per pound of coal consumed is practically the same in each of these cases, making some allowance for difference in the performance of the two boilers used and the range of evaporation from the temperature of the feed water to that of the steam, which is different in the two cases.

I fail to understand, however, the calculation made in the other journal to ascertain the *efficiency* of the evaporation, which is there found to be 10.2 per cent. This seems to me to be a very low efficiency, in boiler practice. Will you kindly state what is meant by boiler efficiency, and what percentage of efficiency should be obtained in ordinary boiler practice, using cylindrical, tubular or flue boilers, such as are in common use at a large majority of the bituminous coal mines in this country.

W. L. A.

Pittsburgh, Penn.

The first portion of the statement to which correspondent refers is wholly unintelligible as it reads and the calculation wrong. As a consequence, the calculated efficiency (10.2 per cent.) is absurdly low. At normal atmospheric pressure (sea level), water is certainly converted into steam at 212 deg. F.; and the calorific power of the coal consumed may be taken at 14,500 B.t.u. In these respects, the above statement is correct.

But, taking the case assumed by the writer of the article in question: namely, the evaporation of water from a feed-water temperature of 100 deg. F., to steam at 70 lb. gage, the heat required per pound of water evaporated, as taken from steam tables, is (Kent) 1183.4 — 67.97 = 1115.43 B.t.u. per lb. On this basis, the evaporation of water per pound of coal is 14,500 ÷ 1115.43 = 13 lb., nearly, instead of 68.4 lb. Then, assuming, as stated, an evaporation of 7 lb. of water per pound of coal burned, the efficiency of the boiler is 7 × 100 ÷ 13 = 53.8 per cent., instead of 10.2 per cent.

It may be remarked, in passing, that it is a very poor boiler and poor coal that will yield an efficiency less than 50 per cent. An average boiler efficiency may be taken as ranging, in practice, from 65 to 70 per cent.; while many uptodate boilers frequently yield an efficiency as high as 80 per cent.

By boiler efficiency is generally meant the ratio of the heat units in the steam generated, to the heat value of the coal consumed. According to the character of the coal consumed, and the type of boiler used, and the adaptation of the fuel burned to that particular type of boiler, the consumption of coal will vary from, say 10 lb. to 2.5 or 3 lb. per hp. per hr. In coal-mining practice, employing cylindrical, flue, or tubular boilers, it is fair to assume a consumption of 4.5 lb. of ordinarily good bituminous coal, per horsepower per hour, and an evaporation of 7.5 lb. of water, from and at 212 deg. F., per pound of coal burned.

Now, taking the latent heat of steam, at atmospheric pressure (sea level), as 970.4 B.t.u., and the heat value of the coal as say 14,000 B.t.u. per lb., gives the theoretical evaporation, from and at 212 deg. F., 14,000 ÷ 970.4 = 14.4 lb. of water, per pound of coal burned. Under these conditions, the boiler efficiency is 7.5 × 100 ÷ 14.4 = 52 per cent.

In the article, to which correspondent has referred, it is further calculated that the generation of steam at a gage pressure of 80 lb. will require 14.2 per cent. additional coal, per horsepower per hour, which is far in excess of the truth. The latest steam tables, now generally adopted, show a difference of only 2 B.t.u. in the steam, at 70 lb. and 80 lb., respectively, at sea level. Since the total heat in the steam above 100 deg. F., at 70 lb. gage (sea level), is 1115.43 B.t.u., a difference of 2 B.t.u. when generating steam at 80 lb. gage, would require less than 0.2 per cent. additional fuel, instead of 14.2 per cent.

It is unfortunate that an article of this character should come so wide of the mark, in dealing with matters of prime importance in coal mining. This is all the more regrettable, because the journal in question assumes that it "is frequently required to correct mistakes in other coal journals, which if not corrected would lead to the impression at home and abroad that *all* were unreliable in their technology."

Sealing Off a Gob Fire

When sealing off an abandoned section of a mine where the slow combustion of the waste coal and slack thrown into the gob has started a fire, where should the first stopping be built; at the intake end or at the return end of the section, assuming gas is generated and considerable firedamp has accumulated within the section?

RALPH BUTLER, Mine Boss,
Keystone Mine.

Shelburn, Ind.

In answer to this question, we cannot do better than to refer to the excellent discussion of the question in COAL AGE, Vol. 1, especially, pp. 617-18. The conclusion was that conditions alone could determine the order of building the stoppings.

Examination Questions

Hoisting Engineers' Examination Held at Terre Haute, Ind., Sept. 10, 1914

Ques.—Name the essential qualifications of a hoisting engineer, as to character, habits, education and experience.

Ans.—He should be honest, straightforward and conscientious in the performance of his duties. He should be temperate and industrious in his habits; painstaking and quick to observe every detail and to respond to any call or signal. He should be able to speak, read and write the English language; and should have a fair education in the rudiments of arithmetic and mechanics. He should be thoroughly familiar with the principles of steam and its generation. He should be fully acquainted with the construction of the steam engine and experienced in its operation.

An engineer should also be able to clean and fire boilers, in case of need; and to make any necessary repairs that may be required in his engine, and set or regulate the valves so as to produce the highest efficiency and best working conditions. This knowledge should be gained by experience in the successful operation of an engine, before an engineer is intrusted with the work of hoisting men.

Ques.—Define clearly the duties of a hoisting engineer.

Ans.—The engineer should be on hand a sufficient time before taking charge of his engine to examine every part and observe carefully its operation. In his spare moments, he should examine carefully and ascertain the condition of all brakes, bolts and other fastenings; replenish the oil cups, and oil and wipe all journals and other bearings. It is the duty of every hoisting engineer to study his engine and acquaint himself with any eccentricities of its operation. He must have a thorough knowledge of the signal code and system and must test the latter, from time to time, to make sure that it is in good working condition. He must never authorize or permit anyone to handle an engine in his charge, during his temporary absence from the engine room; but must hold himself personally responsible for the safe operation of his engine throughout the shift. He must give his entire attention to the care and operation of his engine while on duty.

Ques.—(a) What pipe fittings, valves and other attachments are used in setting up and connecting a boiler and engine? (b) What kind of fittings are necessary to make a boiler as safe as possible, so far as the fittings are concerned?

Ans.—(a) The kind of boiler fittings will depend much on the type of boiler in use; but, in a general way, all boilers are fitted with steam pipes, safety valves, steam gages and water gages or try-cocks for determining the water level in the boiler. Many boilers are fitted with steam domes, but more modern types are equipped with dry-pipes, baffling plates or steam separators for separating the water from the steam as it leaves the boiler or before it enters the cylinder of the engine. Besides these fittings, there are the necessary feed pipes, feed pumps, feed-water heaters, fusible plugs, check valves, blowoff valves, mud drums and manholes for cleaning the boiler.

(b) The usual fittings required for the safe operation of the boiler are the safety valve, fusible plugs, steam and water gages or try-cocks, and the blowoff valves and mud drums.

Ques.—(a) What is a blister on a boiler, and how is it produced? (b) Are cracks and blisters liable to occur in the best plate iron and steel?

Ans.—A blister is a slight wart or swelling produced in a boiler plate by the overheating of the iron, at a point where the latter is unprotected by the water, owing to the formation of scale, or low water in the boiler, or excessive or ununiform firing.

(b) Without due care to prevent the water running low in a boiler, and without proper care in firing; or if scale is permitted to form on the inside of the shell, the boiler plates exposed to the fire are liable to be blistered, regardless of the quality of the iron or steel of the boiler plates.

Ques.—(a) What causes expansion? (b) In what direction is expansion greatest? Give reason for your answer.

Ans.—(a) Expansion is caused by heat; or, in the case of gases, is the result of a reduction of pressure. The heat absorbed by a body drives the molecules of matter farther apart.

(b) Expansion takes place in all directions; but, in a solid body, the expansion is greatest in the direction of its greatest dimension, because in that direction there is the greatest molecular movement.

Ques.—How would you proceed to clean a boiler?

Ans.—To avoid the undue accumulation of sediment in a boiler, it is a common practice among engineers to partially blow off the boiler while it is under steam. When doing this, however, it is important to observe that there is plenty of water in the boiler before opening the blowoff valve. This valve should be opened gradually and when the pressure in the boiler is not too high. The fire should be banked and the pressure allowed to fall to one-third or one-fourth of the normal working pressure; and the valve must be again closed before the water level can fall low enough to expose the tubes of the boiler.

In order to effect a more perfect removal of the sediment, or if it is necessary to remove scale from a boiler, the latter must be completely blown off; but this always results in the hardening of any scale that has formed within the boiler, owing to its being dried quickly by the heat of the boiler after the water has been removed. To avoid this result, it is better to let the boiler go out of service and cool down before drawing off the water. The scale is then more readily removed than when it is dry and hard. In scraping a boiler to remove the scale, care must be taken not to injure the plates, and all joints must be carefully examined to ascertain their condition. All stay-rods, bolts and braces must likewise be carefully examined and tested.

Coal and Coke News

Washington, D. C.

No decisive action has as yet been obtained with reference to the Alaska coal lands leasing bill. It is, however, asserted that the bill will be finally disposed of before the adjournment of Congress. The latter event now appears likely to occur not later than Oct. 17, the leaders having lately made exceptional efforts to arrange a plan that would enable Congress to get away sooner than had been anticipated some time ago, when it seemed as if the session might be so extended as to run into and merge with the new session, which opens, in the natural course of things, at the beginning of December.

Should the Alaska bill be adopted, as is now generally expected, the program as affecting the territory of Alaska will be deemed to be complete, and progress will at once be undertaken in applying the comprehensive system of legislation which will have been placed on the statute books for the benefit of the territory.

The construction of the Alaska railroad, which was provided for some time ago by Congress, will be pushed, and it may be expected that government efforts to develop the coal resources of the territory will become especially active. This is with a view to securing a better and cheaper supply of fuel for the Pacific coast, and incidentally of furnishing the navy with the resources of fuel which it is believed by experts to require in order that it may be strategically in a better position for the future.

Heavy Commodities Should Pay Their Share

The nearer approach of the hearings on the renewed 5 per cent. rate case indicates a probability that the advocates of the side of the roads will endeavor to make good their contention that the heavy commodities which the Interstate Commerce Commission exempted from the operation of the higher rates in the former opinion should be allowed to be included in any advance that may be granted.

Coal representatives will do their utmost to prevent the admission of the heavier products to the class of commodities which may be subjected to the advance, and it is now thought that a reargument, at least to some extent, to show why the advance should not apply to these articles, may be necessary.

It will be contended by opponents, according to current expectations, that not a few of these industries are likely to profit from the war demand and to be able to exact higher prices for export ,and probably in the domestic trade as well. On the strength of this, it will be urged that they ought to be made to bear their share of the work of supplying the increased income needed by the roads. It is still believed that the commission will, however, be likely to adhere to its former position in the matter.

HARRISBURGH, PENN.

The frequency of first-aid contests among the miners, suggests the wide scope of improvement that has been going on in recent years. The encouragement of first-aid work was nothing more than was to be expected from the coal companies. Conditions are far different from what they were some years ago when miners seriously injured were given only the most inexpert attention and suffered the worst of physical agony while they were conveyed many miles to the nearest hospital, and at a time when hospitals were few and far apart.

There is no doubt that the crude methods then in vogue resulted in the death of many miners whose lives could have been saved by prompt and expert attention of the kind now provided at all of the mines. From a small beginning the system has been developed until the first-aid corps actually take the place of the doctor so far as efficient preliminary aid is concerned.

Commendable interest has been shown in other ways. The conveniences established at some of the collieries are a real benefit to the employees. The schools supported by some of the companies for imparting technical instructions in mining and in popular branches are not as universally popular as the companies would like to see them, but in some districts they are an unqualified success.

Some coal companies have spent large sums of money in establishing playgrounds and indoor and outdoor recreation centers, all voluntarily. In the report of the celebration of the Susquehanna and Mineral R.R. coal mining companies, is a statement from Morris Williams, president of the companies, advocating the enactment of a workman's compensation law and casting a shameful reflection upon the Pennsylvania legislature for its past neglect.

There will always be criticism and dissatisfaction among the employees, but over and above the complaint is the fact that the employers have done and are doing much for the welfare of the men who toil underground.

Big Production, Little Trouble

The September production of anthracite coal was the largest of any September in the history of the industry. Official figures of the Bureau of Anthracite Statistics, to be made public shortly will show that the September output was approximately 6,000,000 tons. The previous record for September shipments, made in 1912, was 5,876,496 tons.

In the anthracite field the labor situation is declared to be quieter than it has been for years. There have been one or two instances of local troubles, generally due, it is stated, to some newly elected leader and not sanctioned by the district officials of the United Mine Workers of America. Many of the large producing companies report they have had no trouble for several months.

PENNSYLVANIA

Anthracite

Pottsville—It has been announced by the Philadelphia & Reading Coal & Iron Co. that there will be no further shut downs of the mines on weekdays, except on church and legal holidays. It is stated that the demand for all domestic sizes of coal is heavy.

Scranton—Mitchell Day, Oct. 29, will be observed here with a big parade, to be participated in by mine workers of the city and vicinity. This was the unanimous vote of representatives of 25 locals in a convention recently held here.

Sugar Notch—No. 9 colliery, Lehigh & Wilkes-Barre Coal Co., which has been closed for the past four months, following a cavein which allowed the water of a pond to flood the workings, resumed operations on Oct. 1. More than 700 men and boys are employed at the colliery

Plymouth—The Department of Education of Pennsylvania has notified the School Board that the state will share in the expense of successfully operating vocational schools in the borough, to the extent of paying two-thirds of all expenses A school in mining suitable to prepare applicants for miners' certificates, mine foremen's and assistant mine foremen's certificates, etc., will be opened about Oct. 14.

Nanticoke—The Truesdale colliery, owned and operated by the Delaware, Lackawanna & Western R.R. Co., during the month of September mined, prepared and shipped to market 107,065 tons, which for this colliery is an increase of 200 tons over any previous month. The mines worked 24 nine-hour days, which makes the average tons handled 4668 every nine working hours. The officials and 1900 men and boys employed at the Truesdale have just reason to feel proud of the new record.

Wilkes-Barre—Striking miners at the Dorrance colliery of the Lehigh Valley Coal Co., who refused to work on Sept. 16, on the grounds that they were being unjustly dealt with in regard to the amount of topping required on each car, returned to work on Oct. 1, and the matter will be presented to the company officials by the grievance committee within a few days. The officials since the inception of the strike steadfastly refused to consider the complaint of the men until they would return to work and present the grievance in the regular manner which is now being done.

Hudson—Fire of unknown origin recently completely destroyed the engine house at the Delaware colliery of the Delaware & Hudson Co. The fire was not discovered until it had gained great headway, but was soon overcome by the work of the volunteer firemen. The amount of damage has not been made known.

Bituminous

Pittsburgh—Announcement was recently made that salaried employees of the Pittsburgh Coal Co. not included in the wage agreement with the United Mine Workers of America or other labor unions would suffer a reduction of 10 per cent. in wages. The order was so worded as to apply to employees receiving $100 per month or more.

A long continued period of dry weather has interfered with coal operations in the neighborhood of Pittsburgh. Many of the mountain streams have dried up and mines and quarries have been severely handicapped. Some coal mines have been obliged to shut down, as the price of coal is so low as not to justify the hauling of water.

Jerome—New coal operations are to be located approximately a quarter of a mile below the plant of the Jenners-Quemahoning Coal Co. For the past six weeks, work has been progressing on the construction of a side track and the driving of the slope. The C Prime bed of coal will be worked. John Gibson, Jr., is the manager and owner of the new operation.

Connellsville—Much interest has been manifested lately in an order granted by Judge J. Q. Van Swearingen whereby the Colonial Trust Co. was granted a judgment against the Isabella-Connellsville Coke Co. for $7,043,796. When the court convened, the attorneys reresenting the plaintiff company presented a petition to the court, asking that judgment in the amount named be given against the defendant on account of failure to make an appearance.

The total production of coke for September showed one of the greatest curtailments since the beginning of the year. The month's record showed a total of 1,009,741 tons, as compared with 1,310,333 tons for August, or a loss of 300,000 tons for the month.

Lilly—The first pay of the miners at this place since the first week in April was that of Sept. 26, when the men received about $14,000. Labor troubles have now been adjusted and the condition of the market promises steady employment and good times in Lilly for some months ahead.

Church Hill—The tipple of the Dutch Hill mine burned on Oct. 2. The mine had been sold recently to the Monterey Coal Co. The loss will be about $3000.

The Hillville mine in the Allegheny Valley, which was involved in the late failure of Frank Williams & Co., of Buffalo, has been leased by the receivers, G. B. Bassett, Jr., of Pittsburg, taking the position of sales agent. The mine has a capacity of 500 tons daily.

WEST VIRGINIA

Grafton—A bed of the well known Red Stone coal is being opened at Pyrconnel. The coal is found to be of a quality superior even to the Pittsburgh coal.

Beckley—At the instance of Deputy Mine Inspector L. B. Holiday, W. S. Fink, a mine forman at Sprague, was recently fined $50 for violating Sect. 10 of the State Mining Law, which provides that breakthroughs shall be driven at intervals of 80 ft. along the mine entry.

Charleston—The coal market is now so restricted that many operators along the Kanawha River are experiencing difficulty in disposing of their product. In some instances, slack is being sold as low as 10c. a ton. At another place, the slack is being dumped on the ground at a cost of 10c. per ton, and the lump and larger sizes only sold.

According to Governor Hatfield, the workman's compensation act of West Virginia is working satisfactorily. It is costing the state but 5 per cent. of the premiums collected for administration, has a surplus of about one-half of the amounts paid in, and has taken care of 16,500 claims during its first year in operation. Under the operation of the law 174 widows, 288 children, 38 dependent parents and 63 disabled workmen are being cared for by the state.

Wheeling—The Parrs Run coal mine, located about a mile from Moundsville, was recently sold to a company of Ohio coal men, headed by H. E. Loomis, of Cleveland. The property includes about 1200 acres of coal land and a modern mine which is in operation. This mine is a comparatively new one and employs about 100 men. It is understood that the new owners contemplate making extensive improvements.

Thomas—Superintendent A. Beveridge, of the Davis Coal & Coke Co., at Coalton, W. Va., was recently wounded in an attempted hold-up for the purpose of securing $4100 in miners' pay envelopes. Mr. Beveridge was making his customary trip from the Thomas office with money to pay off the employees at mine No. 41. He had proceeded about half his journey when he was fired on from ambush, his horse receiving several shot in the neck, and he himself being struck in the arm. The horse bolted, carrying him in safety to mine No. 41.

Huntington—A friendly suit of rather unusual nature will soon be filed by the United States district attorney, growing out of the recent Glen Alum tragedy, when the payroll was robbed and several men were killed. The money was in a mail pouch, but was recovered from the robbers after it had been taken. The Government could not identify it, and will therefore sue to recover from the sheriff, who has the money, an amount equal to that found on the dead bandits. This method of settling the difficulty was the suggestion of the sheriff himself.

ALABAMA

Montgomery—No decision has yet been made by the Alabama Railroad Commission regarding the proposed increased freight rates on coal from the Birmingham district. The case has been on trial for the past two weeks, with practically every railroad and the principal coal operators as witnesses, and it is expected that a verdict will be given by the 10th of the month.

KENTUCKY

Louisville—The Eastern Kentucky mine operators are rather pleased over the showing made in the recent prohibition elections in which, in 9 out of 15 counties, the "dry" element voted saloons out altogether. The operators are pro-prohibition because of the higher standards possible in the mining communities when no liquor is permitted to be sold. Probably the direct effect is felt more in Bell County, where the remaining saloons in the Middlesboro section were voted out, so far as the mines are concerned.

Cannel City—The Kentucky Block Cannel Coal Co. has reopened its mine No. 6 after it had been shut down for two years. The mine is a mile and a half from the central-power plant and the coal, containing about 50 per cent. of volatile material, is shot from the solid without being undercut.

Whitesburg—R. T. Peters has begun a coal operation at Viper, on the Louisville & Nashville, near the Letcher-Perry line, and announces that he will begin shipping coal in the next few days. He is an experienced operator and expects to develop a mine that will give employment to several hundred men.

OHIO

Coshocton—The directors of the Ohio Cannel Coal Co. are arranging to develop a large tract of coal land in Bedford Township, Coshocton County. S. C. Priest will be in charge of the development.

INDIANA

Petersburg—D. J. Mackey has sold the Hartwell mines to the Mackey Coal Co., of Evansville, Ind., for $75,000. This includes four miles of railroad, two mines, 2240 acres of coal land, and the town of Hartwell, with 70 miner's houses.

A month's shutdown of the S. W. Little coal mines, at Little, near here, is announced while repairs and improvements are being made in the mines. For the last several months these mines have not been running more than two days a week. They employ 400 men during normal seasons.

Terre Haute—Members of the 150 locals of the Indiana Mine Workers have received nomination blanks, preparatory to the biennial election of officers. Each local may nominate one candidate for each of the offices, the election, under the Australian system, to be held the second week in December. Nominations must be in Oct. 25 and nominees have a few days in which to signify whether they desire to accept the nomination and become candidates.

Brazil—Two new mines are to be sunk south of Knightsville, the Crawford Coal Co. putting down one of them, and the names of the men behind the other mine not yet being made public. It is reported the Miami Coal Co. will sink a mine at Ehrmandale and that a coal-stripping pit will be established near the site of the old Kokomo mine. There is a large body of block coal that can be put on cars by a steam shovel, with the handling of only 10 to 12 ft. of dirt, it is said.

ILLINOIS

Edwardsville—At the receivers sale here on Oct 3, Thomas T. Brewster, general manager of the Mt. Olive & Staunton Mining Co. of St. Louis, purchased the property of the De Camp Coal Co. at the village of De Camp, 16 miles north of here. His bid was $5000. The property according to experts could not be duplicated for less than $100,000. There is a bond issue of $90,000 against the property and unsecured claims of about $15,000. The mines have been in the hands of the receiver since Dec. 6, 1913. The sale must be approved by the Madison County Court.

Duquoin—The Majestic mine, near here, was badly wrecked by an explosion on Oct. 1. The explosion occurred shortly after the shot firers had finished their work and left the mine, and only one person was underground at the time, a member of the night shift, as far as is known. It is reported that it will take some days to find out the extent of the damage to the inner workings of the mine, and at this time it is unknown whether the explosion was caused by powder or gas.

Hallidayboro—The mine of the Muddy Valley Mining & Manufacturing Co. here, belonging to the W. P. Halliday estate at Cairo, and consisting of 5700 acres of coal lands, with surface, with all the mine buildings and properties and several farms, was sold to a syndicate composed of several West Virginia men and one investor from Pennsylvania, by S. J. Burkitt, of Mowequa, Ill. Thirty-six residences are included in the sale, which compose most of the buildings of the town of Hallidayboro. These holdings have been a part of the Halliday estate for a period of about 30 years.

Belleville—In the Circuit Court here a jury returned a verdict of $10,000 against Donk Bros. Coal & Coke Co. in favor of Pete Ragaina, who was injured in a premature explosion while employed as a shot firer.

East St. Louis—The rumor, reporting that the Prairie mine of the Aid Coal Co. of St. Louis would likely be abandoned on account of squeezes, is denied by officers of the company, who state that the mine is in shape to operate at once and can produce 2000 tons per day. They state that the mine has not had any squeezes in a period of about two years.

Peoria—The Wolschlag mine, between Hollis and Bartonville, was recently reopened. The upper works of this operation were destroyed by fire last summer, but have been entirely rebuilt. They are now said to be fireproof in every way, being constructed of steel and concrete . Electric power is used in place of steam.

Canton—It is generally believed that the old Black Hawk mine No. 1 will soon be reopened. This operation was opened first about 20 years ago, and worked well until about four or five years ago. For the last six months the company has had the engines at work pumping out the water, and for two weeks, gangs of men have been cleaning up the débris.

NORTH DAKOTA

Mandan—Farmers in this vicinity are making search for an 8-ft. bed of coal which is said to have been discovered by members of a government mineral survey party. One of the government crew said that the coal bed is the best in western North Dakota, but he was under orders not to reveal its whereabouts.

UTAH

Storrs—One of the five boilers in the steam power plant of the Spring Cañon Coal Co. at this place exploded on Sept. 28, killing two men and seriously injuring three others; also putting the power plant and mine out of commission for some days. It is said that the failure of this boiler was due to a faulty patch on the boiler shell. The boiler itself was hurled about 200 yds., the building in which it was housed was totally demolished, and one of the other five boilers was badly injured, while the rest were put out of commission.

PERSONALS

C. L. Earnest has resigned his position as cashier of the Northfork National Bank to accept the general managership of the Fiat Rock Coal Co., of Bluefield, W. Va.

Jas. A. Richards was recently appointed District Inspector of Mines for the Calgary District of Alberta. His address accordingly changed from Royal View, Alberta, to Calgary.

A. H. Wood, of Petros, Tenn., president of the Petros Coal Mining Co., and consulting engineer for the Turley Coal Co., at Turley, Tenn., is organizing a company to open a mine in the Harlan field of Kentucky, and expects to start development at an early date.

John Stannis, of Mt. Braddock, Penn., was recently presented by the miners of that place with a gold watch appropriately engraved. Mr. Stannis resigned to accept the position of assistant mine foreman at the Phillips works of the H. C. Frick Coke Co. Mrs. Stannis was also presented with a silver tea set.

J. M. Page, of Lafollette, Tenn., superintendent of Rex Mine No. 1, of the Lafollette Coal, Iron & Ry. Co., has resigned. G. Walters, superintendent of Gem mine, at Peabody, has succeeded Mr. Page, and Joseph E. Hendren, mine foreman at the Gem mine, has been promoted to the position of superintendent of that plant.

C. E. Sharpless, general manager of the Nanty Glo Coal Co., the Dixon Coal Co., the Atlantic Coal Co., and the Irona Coal Co., all operated by allied interests in Pennsylavnia and West Virginia, and formerly for several years in the employ of the Berwind-White Coal Mining Co., at Windber, Penn., recently changed his residence and address from Cresson, Penn., to Ebensburg. This change in location did not involve any alteration in either duties or positions filled.

CONSTRUCTION NEWS

Chattanooga, Tenn.—Kerby & Jones were recently awarded the contract by the Chattanooga Gas & Coal Products Co. for grading the site of the coke-oven plant to be erected in Alton Park. The contract includes all grading for foundations, buildings, ovens, and for two miles of railway. The contractors immediately made bond to have the entire work completed by Nov. 1.

Portsmouth, Ohio—Work has been started on the Chesapeake & Ohio spur line from Portsmouth to Columbus, which will parallel the N. & W. between the same points. The construction of a bridge across the Ohio at Portsmouth, at a cost of $3,000,000, is a part of the work to be handled. The building of the new line is the result of the court decision regarding the handling of Chesapeake & Ohio traffic over the N. & W. line, which had been for years regarded as practically a branch of the Chesapeake & Ohio.

Toledo, Ohio—It is stated on what appears to be reliable authority that the receivers of the Cincinnati, Hamilton & Dayton Ry. Co. expect to proceed at an early date with the enlargement of the company's docks and the purchase of new coal-hoisting machinery for use in Toledo. Enlargement of the Cincinnati, Hamilton & Dayton docks above the Fassett street bridge is considered a necessity because of the remarkable increase in the amount of lake coal handled there. The tonnage of coal handled at the dock this year will be the largest in the history of the road. It already exceeds last season's record by 600,000 tons.

Pittsburgh, Penn.—With the opening of three new mining plants by the Pittsburgh Coal Co., three model mining towns will be brought into existence, and approximately 3000 men will be given employment. This work is now being pushed with all possible speed, all of the new plants being on the Montour R.R. The first of the new plants will be three miles south of McDonald; the second, adjacent to Venice, and the third near Hill Station. It is expected that the houses in each town will be ready for occupancy within a short time. A 75-room hotel for miners will be built in each of the towns also. Playgrounds and ballgrounds will be constructed and equipped in the most modern way while the distinct novelty of the new houses will be out-door bath houses. It is believed that this will enable the miners to leave the grime, which is ordinarily carried into the house, behind in the outsde bath house where the change of clothes is made.

NEW INCORPORATIONS

Gadsden, Ala.—The Brown Coal Co., with a capital stock of $2000, has been incorporated. The company will develop a tract of coal land in Blount County, not far from Oneonta. Watt T. Brown, of Ragland, Ala., is president.

Columbus, Ohio—The Whyel Coal Co., of Columbus, has been organized with a capitalization of $10,000, and will engage in coal mining. The incorporators are George Whyel, C. M. Crooks, F. S. Crooks, R. J. O'Dell and W. T. Gano.

Clarksburg, W. Va.—The J. E. Long Coal Co. has been incorporated with a capitalization of $10,000, and will engage in mining. J. E. Long, of Phmiladelphia, is the head of the company, D. D. Britt and others, of Clarksburg, being interested.

Birmingham, Ala.—The Wadsworth-Cahaba Coal Co. has been incorporated with a capital stock of $5000. W. C. Beck is president; L. E. Patton, vice-president and treasurer, and Paul Lanier, secretary. The office is 1107-8 American Trust & Savings Bank Building. The new company has taken over a mine of the Wadsworth Red Ash Coal Co., at Helena.

STATEMENT OF THE OWNERSHIP, MANAGEMENT CIRCULATION, ETC., OCT. 1, 1914,

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The balance of the stock issued (less than 1% each) is owned by 70 employees, 3 ex-employees, and 14 others who are wives, daughters or relatives of employees.

Known bondholders, mortgagees, and other security holders holding 1 per cent. or more of total amount of bonds, mortgages or other securities. Mortgage on building held by Dime Savings Bank, Brooklyn, N. Y.

C. W. Dibble, Vice-President,
HILL PUBLISHING COMPANY.

Sworn to and subscribed before me this 30th day of September, 1914.

RICHARD L. MURPHY,
Notary Public.
(My commission expires March 30, 1915.)

INDUSTRIAL NEWS

Columbus, Ohio—Authority has been granted to the Little Miami Railway Co. to issue $306,500 additional stock to compensate the Pennsylvania system for improvements on the line.

Central City, Penn.—The completion of the electric-power installation for the operation of the Berwind-White McGregor mine near here is being pushed. The Berwind-White company is also having more new houses erected for the use of its miners at the new plant.

St John's, Newfoundland—The wreck of the Dominion Coal Co.'s collier "Cacouna" and the safety of her crew were recently reported here. The "Cacouna" from St. Johns for Sydney, Nova Scotia, went ashore at Ferryland between this port and Cape Race. The vessel was built at Newcastle in 1884, and had a gross tonnage of 1451 tons, and is believed to be a total loss.

Buffalo, N. Y.—A Buffalo furnace interest recently closed a contract for 10,000 tons of Connellsville furnace coke for shipment during the month of October at $1.65 per ton. Coke is reported as offered at this price for delivery during this month, although dealers are not willing to accept less than $1.75 for shipment during the balance of the year and some are asking $1.85.

New Orleans, La.—During the past few months, self propelled steel barges have been running between the Alabama coalfields and New Orleans, thus beginning the utilization of a great system of inland waterways. In the past 20 years, the government has spent $8,000,000 in making the waters of the Tombigbee, Warrior and Black Rivers navigable for vessels of 6 ft. draft to connect the Alabama coalfields with tidewater.

Philadelphia, Penn.—It is said that exports of bituminous coal to Mediterranean countries has continued to increase since war in Europe was declared and are now far more than double their volume some weeks ago. On the other hand, exports to South America have not increased as rapidly. It is believed, however, that eventually exports to South American countries will prove a tremendous asset to the United States.

Beech Creek, W. Va.—A new and extensive coal operation is being developed in Boone County, on Beech Creek, and it is expected that coal will be taken out in about two months. The new undertaking is that of the Boone County Coal Corporation, J. C. Blair, manager. This firm owns large tracts of land in Boone County and several mines have been operated on lease on its holdings. As soon as the spur track to the mine is completed, work will be begun on the tipple and the town.

Birmingham, Ala.—Representatives of coal-producing companies in the Birmingham district are preparing to go to Panama and South America, and it is expected shortly that a movement will be started that will require many hundred thousand tons of coal to be shipped through Mobile, New Orleans and Pensacola. Brokers in Mobile have notified connections in Birmingham that they are in position to handle any amount of coal, and that the harbor facilities there are in good shape and ready for any and all emergencies.

Cincinnati, Ohio—The Chesapeake & Ohio has filed here its appeal from the judgment against it in favor of the estate of Thomas G. McKell in the sum of $125,000, in the celebrated case which has been pending since 1902. The original suit was for $3,500,000, alleged to be due as damages for the failure of the railway company to carry out the terms of an agreement said to bind it to purchase all the coal mined by McKell in his West Virginia properties. The judgment appealed from was rendered in the third trial of the case.

Harrisburg, Ill.—The Wasson Coal Co. is rapidly becoming a prime factor in the coal production of Illinois. At present, new mines are being opened at Harrisburg, Ill., and Vincennes, Ind. These are of modern construction operated with electrical equipment, such as coal cutters, locomotives and hoisting, pumping and ventilating machinery. Orders for 21 "Type C" locomotives have been recently placed with the Morgan-Gardner Electric Co., this being one of the largest orders for mine locomotives ever placed in Illinois.

Columbus, Ohio—Unless the Hocking Valley Ry. Co. wins its contentions in the Ohio Supreme Court, it will be compelled to pay a penalty of $1000 per day for failure to institute electric service for passengers on the Wellston and Jackson Belt Line. A suit to that effect has been filed by the Ohio Public Utilities Commission in the Jackson courts. The question hinges on the authority of the Commission to designate the kind of service a utility shall render to the public as the Hocking Valley company proposed to start steam service.

Washington, D. C.—The U. S. Bureau of Mines in coöperation with the U. S. Geological Survey, has undertaken comprehensive investigations pertaining to the problem of mine caves and surface support. The immediate work of the mining engineers and geologists will comprise detail studies of the extensive open cut and underground mining operations in southwestern New Mexico. The field investigation will be conducted with special reference to earth pressures and surface subsidence in relation to geological formations and mining conditions, also in relation to the equipment and efficiencies of the large mechanical installations in operation there.

Washington, D. C.—An interesting new exhibit has just been placed in the U. S. National Museum by the Division of Mineral Technology, consisting of a model of a complete by-product coke plant. This model constructed in the Museum shops is in the form of a relief panel 28 ft. long and 7 ft. high on a scale of $^1/_{30}$ actual size, with the different proecsses following in sequence. In connection with this model there is an exhibit showing the development of the coke industry from the earliest crude form of merely burning coal in the open to the present highly complex system of distilation without combustion, preserving and utilizing all the by-products.

Newport News, Va.—Shipments of steam coal from Hampton Roads ports during the month of September were greater than ever before in any single month. They reached the aggregate of 1,271,772 tons, or at the rate of more than 15,000,000 tons yearly. The Norfolk & Western R.R. put 690,348 tons over its piers. The Chesapeake & Ohio followed with 331,098 tons, and the Virginian dumped 250,335 tons. Of the total amount shipped from Hampton Roads, about 300,000 tons, or one-fourth, was exported to foreign countries, South America, the West Indies, Italy and Greece. It is believed that during the past month, Hampton Roads became the greatest coal port in the world, passing Cardiff, which heretofore had lead in coal exports. It is believed also that Hampton Roads will keep its lead and that the coal trade there will become far greater than it is at present.

Cincinnati, Ohio—Opposition has developed to the issue of receivers' certificates of the Cincinnati, Hamilton & Dayton to the amount of nearly $3,000,000 for new rolling stock, in consequence of which receivers Judson Harmon and Rufus Smith have decided to delay the matter until a more opportune time. The Central Trust Co., of New York, indicated its intention of formally protesting to the court against the granting of the issue, on the ground that it would imperil the security of liens held by the company securing bonds for which it is the trustee. The high rate of interest which would have to be paid at present is felt by the receivers to warrant the postponement of the application until a later date. While it is felt that it would be possible to secure the desired rolling stock at very favorable prices, on account of existing conditions, the financial situation would involve excessive interest rates, and nullify this advantage.

Coal Trade Reviews

General Review

Anthracite collieries continue on a full time basis but the demand has slowed up temporarily. Considerable bituminous coal available and current business generally discouraging. Large preponderance of finer sizes still demoralizing the interior markets. England increasing her export shipments.

The spurt in anthracite, caused by some unexpectedly cold weather, has been succeeded by a moderate slowing up in the demand, though conditions are about normal for this period of the year. The buying has only eased off for the time being, pending a return of colder weather and the opening of the fall business. But even now the mines are working up to full time, dealers and wholesalers accumulating all the possible stocks in anticipation of a heavy rush shortly. The difficulty in obtaining ready money has also been a factor tending to restrict buying.

While there is an excellent undertone in the bituminous trade, the current business continues discouraging, and it is generally felt that there will be no renewed activity until the cessation of the European war; prices are only moderately firm, and the agencies are generally short of orders. There is considerable coal at the distributing centers, but a most encouraging feature of the situation is the almost complete absence of the usual customary heavy price cutting that ordinarily marks a depressed situation. The demand for export coal has not been so great, and reports from abroad indicate that England is again resuming her shipments in this trade. Clearances at Tidewater have been fairly regular, but these do not by any means make up for the loss in the internal consumption.

The Pittsburgh market could hardly be more stagnant. All hope of any final rush in the Lake trade has been definitely abandoned, and there is scarcely any demand at all for free coal, while prices are low and exceedingly irregular; the circulars are only nominal and have been entirely abandoned on current business. It is difficult to find any improvement in bituminous coal in any direction, and none can be expected until there is a revival in general manufactures. There is more coal on track, and slack is becoming more difficult to move all the time.

The warm weather has resulted in a distinct slackening up in the domestic business in Ohio, but the production is keeping up fairly well, and the market is not notably changed. Manufacturing operations are still heavily restricted, and with a large surplus of the finer sizes, it is difficult to see how even a long stretch of cold weather will create any general activity.

There is vigorous competition in all directions in the Southern markets, but prices are fairly steady though at somewhat below the customary fall level. Unconfirmed reports of large sales in the export trade has created a hopeful feeling in some sections, but this is probably more than compensated for by the depressing effects of the European war. Prices are fairly steady, but operations are much restricted.

In the Middle Western market an unexpected slump among the high-grade coals has further accentuated the demoralization prevailing in the steam sizes. The customary fall increase in the circular has been put in effect at some points, but so far it is purely nominal. There seems to be no hopes for better prices until the colder weather creates a demand from apartment houses, and there is a more general resumption in industrial circles.

ATLANTIC SEABOARD

BOSTON

Pocahontas and New River demand is light, but no significant change in price. A better tone noted although spot market is not improved. Export inquiry irregular. Georges Creek shipments nearly normal and Pennsylvania grades steady. Stove shortage still a feature in anthracite.

Bituminous—The market on Hampton Roads coals shows no material change. The volume at the piers continues large but clearances have been fairly regular, and there is perhaps a better tone to the situation than for two or three weeks past. Prices less than $2.85 f.o.b. are still being made, but they are not regarded as quite so significant. The agencies are short rather than long of orders for October, but it is hoped that the advancing season and the resumption of full time in some of the mills will show results before the month is over. Shipments on contract show only a slightly better tonnage and the spot market here is conspicuous by its absence. Cargoes on consignment are being absorbed very slowly up the line, and prices for inland delivery cannot be said to be any firmer than a week ago.

Inquiry for export is spasmodic, and shippers are not counting on much more than normal business in that direction for the present. Many of the purchases made in early August have now been filled and new orders on satisfactory terms are not plentiful.

The supply of Georges Creek for this market shows a steady increase and shipments are coming forward almost as regularly as early in the season. The largest part of this tonnage is placed on contracts and there has been no variation in price.

Certain of the more favorably known Pennsylvania grades are having better demand and prices are fairly steady. Clearfields are in ample supply at Philadelphia and New York, but in spite of this there has been no marked concession in price. All-rail there is about a normal movement from all the fields.

Anthracite—The shortage of stove is still the prominent feature of current trade. All the companies have a comfortable margin of orders to work on, and on the other hand, there is no special pressure to get coal forward promptly. With stove coal the desirable size the dealers are confining their orders for the most part to the regular sources of supply, and the various independent houses are, therefore, doing rather less than usual in this territory.

Bituminous prices at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.25@1.65	$1.67@1.77	
Philadelphia*	2.15@2.80	2.50@2.90	2.92@3.02	
New York*	2.40@3.10	2.80@3.20	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.80@2.85
Boston†				3.60@3.78
Providence†				3.63@3.73

* F.o.b. †On cars.

NEW YORK

Bituminous market is still marking time pending some new developments. Anthracite slowing up moderately but about normal for this period. Mines working full time.

Bituminous—The New York soft-coal market continues dull and uninteresting, so far as new business is concerned. The stocks at Tidewater are only about normal, while there is an entire absence of demurrage coal and the higher grade fuels are rather closely held. The lack of the customary large surplusses, which usually prevail at Tidewater in time of a heavy market, is considered indicative of the excellent condition of the trade, but it is also a significant fact that the operators do not regard the outlook as favorable or they would not be holding the coal back as they are.

On the other hand, there is a decidedly optimistic feeling in trade circles, and there are indications of an excellent undertone. Except in isolated instances, mines seem to be working slightly better, and the movement on contract has picked up some. Of the leading producers, the Berwind White Co. continues the worst sufferers, their operations being curtailed down to from two to four days per week as a result of the more or less complete suspension of the big liners. It is noted, however, that the bunkering demand from the tramp steamers has been unusually heavy recently.

The New York market is not quotably changed, though prices are probably somewhat more steady at the former level as follows: West Virginia steam $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—A moderate slowing up in hard coal is noted, though not of important proportions, the trade being very close to normal for this period of the year. The rather sharp spurt of a few weeks ago, caused by some unseasonable

weather, has given way under the influence of the higher temperatures prevailing over the past week, and the trade has settled down into a temporary lethargy, pending the opening up of the customary fall business. One of the features restricting a more general buying is the shortage of money.

In the larger sizes the situation of broken coal is normal as usual, the collieries just making enough of this grade to take care of the demand. Egg coal is the heaviest of any of the domestic sizes, being quoted down to fully 20c. off the circular. Stove coal continues the leader, commanding premiums in all directions, except where sold in connection with some of the heavier grades. Nut coal is normal at the circular. In the smaller sizes, pea is in good demand, though there is plenty available, while rice is moving in fairly good volume, and the buckwheats are notably off. The shipments on egg and nut coal are plentiful, but stove is coming forward very slowly. The collieries are all working full time.

The New York hard coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.65@5.10	$5.05	$4.60@5.05
Egg	5.35	5.10@5.35	5.30	4.80@5.30
Stove	5.35	5.35@5.45	5.30	5.30@5.40
Chestnut	5.60	5.50@5.60	5.55	5.45@5.55
Pea	3.55	3.45@3.55	3.50	3.40@3.50
Buckwheat	2.80	2.70@2.80	2.50@2.75	2.25@2.75
Rice	2.30	2.10@2.30	2.00@2.25	1.50@2.25
Barley	1.80	1.70@1.80	1.75	1.50@1.75

PHILADELPHIA

Conditions in anthracite market still indicate an improvement. Demand well maintained. Stove leading feature. Bituminous remains inactive, with curtailed operations still in effect.

Anthracite—While the past week has not been conducive to the consumption of the coal, at the same time, there is every indication that the trade is swinging into line for the winter business. All sizes seem to be in fairly good demand, with stove the feature, and still being used as the lever for the movement of other sizes. The steam sizes still continue to bother the operators, who find themselves hard put in some cases, to move it. While the current contracts are absorbing large quantities, at the same time, their requirements will necessarily be limited until the cold weather opens up. Pea coal is essentially a domestic fuel in this market, and very few, if any, buy in larger than one- to two-ton lots. When this class of trade begins to take on coal the congestion of the small sizes is likely to disappear.

In the face of this condition, one hears of few concessions on the small sizes; perhaps 10 to 15c. per ton in occasional cases, but the operators as a whole seem to feel that the time has arrived to strictly uphold the so called circular. Chestnut is also selling off circular, but not to the ruinous extent of the last three or four months.

Prices at Tidewater rule about as follows:

	Circular	Individual
Broken	$4.75	$4.40 @ 4.50
Egg	5.00	5.00
Stove	5.00	5.00 @ 5.10
Chestnut	5.25	4.90 @ 5.00

Bituminous—Very little improvement was noted in this branch of the trade during the past week. While considerable coal is moving on contracts, the outlook for new business is not favorable.

BALTIMORE

Feeling of depression continues. Demand light and prices poor. Anthracite trade on household call fair.

President Willard of the Baltimore & Ohio R.R. has stated that there would be no business resumption of a general nature until after the close of the European war which agrees with the views of many of the coal men. Others, however, are still hopeful that the next few months will see a gradual resumption.

There can be no doubt about dullness in the coal fields of Pennsylvania, Maryland and West Virginia. Curtailments and complete cessations in operations are reported from a a number of districts. Coal was freely offered to the trade in Pennsylvania at from 95c. to $1 for low grades, with best grades at around $1.30. Western Maryland had steam coals on the market around 80 and 85c., and a like figure was quoted for some West Virginia steam fuels. Gas three-quarter was plentiful around 85c., with run-of-mine at 75c. and slack offering down to 30c.

In the face of such a market there was not so much enthusiasm over the fact that export records were broken in September, as might otherwise have been the case. Italy and South America drew more heavily than usual and the export figures jumped to 128,178 tons for the month, the largest on record. Less charters are noted now, however, and it is expected that the exports the present month will drop back around 80,000, or less.

Coastwise movement remains featureless. Vessel bottoms are more than abundant for the domestic, as well as the foreign trade.

Anthracite is reported in fair call for household purposes. Steaming coals are dull.

HAMPTON ROADS

Shipments fair but not so heavy as previous week. Prices practically stationary. Dumpings for September break all previous records. Total for the month, 1,271,772 tons.

Shipments of coal from Hampton Roads during the past week have ben fair although the end of the week there was somewhat of a decline. Foreign shipments have been made to Canal Zone, Vera Cruz, Port of Spain, Rio, Curacao and Kingston with coastwise cargoes going to Boston, Bangor, Providence, Everett, and Jacksonville. The demand for export coal during the last few days has not been so brisk. This is believed to be due to the fact that England is again coming forward with coal for foreign shipment.

Prices remain practically at circular although there have been rumors that some of the small shippers are offering coal at a slight reduction from the circular. There has been a little demand during the week for nut and slack but so far as can be ascertained only a small quantity has been sold. The accumulation of cars on the various railways yards is still somewhat above normal with a fair amount of coal in transit.

All records in coal dumping over the tidewater piers were broken during the month of September when a total of 1,271,772 tons were dumped over the Lambert's Point, Sewalls Point and Newport News piers. Of the total quantity dumped 690,348 tons went over the piers of the Norfolk & Western, 331,089 tons over the Chesapeake & Ohio and 250,335 tons over the Virginia Ry. pier at Sewalls Point. As will be noted the Norfolk & Western dumped 108,924 tons more than the Chesapeake & Ohio and Virginia combined and while both the Norfolk & Western and the Chesapeake & Ohio show a decided increase over last month's figures, the Virginian shows a falling off.

COAL CHARTERS

The "Journal of Commerce" reports chartering as follows: As has been the case for some time past, trading was largely for transatlantic account, and a moderate demand continues to come from the same sources for boats for October loading. In all other trades, including West India, South America, China, Japan and Australia, freights are exceedingly scarce for either prompt or forward loading. There is a moderate supply of boats available for early delivery, but they offer sparingly at the rates indicated by charterers, owners ideas being somewhat above the basis of recent fixtures. The sailing vessel market shows no indication of improvement, either as regards the general demand or the rates bid, and only a limited general business was reported in chartering. Tonnage of various kinds is quite plentiful, and the general tendency of rates favors charterers.

Coal charters have been reported as follows:

Vessel	Nationality	From	To	Tons	Rate
Auchenblae	British	Baltimore	Cienfuegos	2500	
Aero	Norwegian	Philadelphia	Cienfuegos	1092	
Fanny C. Bowen		Philadelphia	Calais		$1.10
Courtney C. Houck		Baltimore	Tampa	1357	
Isabel B. Wiley		Philadelphia	Point-a-Pitre	611	
Republic		Philadelphia	Point-a-Pitre	680	
Francis M.		Baltimore	Key West	1096	1.25
Augustus Welt		Baltimore	Mayport	1111	
Maud Palmer		Baltimore	San Juan P. R.	1485	
Henry W. Cramp		Baltimore	Mayport	1448	
Brin P. Pendleton		Philadelphia	Calais	821	
John B. Manning		Philadelphia	(to the sound)	955	0.60
Ben Nevis	British	Baltimore	Genoa	2525	

Note—Steamers are indicated by **bold face** type, all others being schooners.

COKE

CONNELLSVILLE

Coke market stagnant, except for sale 10,000 tons prompt furnace at about $1.65. No inquiry. Shipments somewhat decreased.

The only activity in furnace coke for some time past was the sale about a week ago of 10,000 tons for October shipment to a Buffalo consumer, the purchase being necessitated in part by the withdrawal of Dunbar byproduct coke, now to be used locally as one of the Dunbar furnaces is being blown in. The price is believed to have been about $1.65 at ovens. The whole coke market is utterly stagnant, consumers not evincing enough interest to develop any quotations to speak

of from producers. We quote as nominally representing the apparent market level: Prompt furnace, $1.65; contract furnace, $1.75; prompt foundry, $2.25; contract foundry, $2.25, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Sept. 26 at 247,221 tons, an increase of 3526 tons, and shipments at 248,063 tons, a decrease of 8474 tons, production and shipments about balancing.

BUFFALO

The reports from the coke trade continue unfavorable. Shippers are unable to interest consumers beyond the line of their immediate wants, so that the prices are constantly sluggish and in some grades little more than nominal. Quotations remain on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

BIRMINGHAM

Both furnace and foundry coke are very quiet, with no improvement in sight.

LAKE MARKETS

PITTSBURGH

Market completely stagnant and prices still more irregular, even $1 being occasionally shaded for mine-run. Lake shipments poor. Mining at 50% of capacity.

The local coal market is about as stagnant as it could well be. There is hardly any demand for free coal, and none at all for contract. Prices are extremely irregular, and on some divisions even $1 a ton is not minimum for mine-run. For the best Pittsburgh gas coal, however, $1.10 would probably have to be paid, and possibly $1.15. Slack is offered at all prices, in a few instances at less than 50c. Lake shipments have declined a trifle in the past week or two, but not much. Practically all hope has now been abandoned that there will be any spurt in shipments, as it is already near the end of the season, and the entire Lake movement is likely to show a decrease of more rather than less than 25% from the record tonnage of last season.

There begins to be considerable doubt whether any new circular prices will be announced. The old circular prices, of a year ago, have been entirely lost sight of for months when it came to naming actual quotations against inquiries, but as a matter of history they are repeated in our report: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district. Mining operations are about 50% of capacity.

BUFFALO

Considerable coal on track. Slack difficult to move. Quiet all through the bituminous trade. Disposition to ship in excess of orders. Good anthracite trade in spite of warm weather.

Bituminous—There is more coal on track than is good for the trade. Several jobbers confess to large amounts of coal for which they blame the mines. The supply of slack is increasing all the time and sales are made at a sacrifice.

There does not appear to be any improvement anywhere in bituminous; the salesmen keep everybody so far overstocked that it is impossible for a really genuine demand to exist anywhere and this will doubtless continue till there is a big revival in factory work. If Europe must buy soon there should be some start in that direction, but it is all a matter of prediction so far. One difficulty with the trade is the refusal of the railroads to buy.

But in spite of these adverse conditions there are shippers and jobbers here who claim that their business is growing steadily, month by month and is larger now than it was a year ago; this would seem to indicate that there is activity somewhere. The change in the bituminous trade is mainly in slack, which goes begging everywhere. Other quotations remain on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley sizes are about 25c. less.

Anthracite—There is an improvement in practically everything. Egg, which was dull for sometime, is stronger and pea has moved more actively of late. Stove and chestnut are strong. While there has been a falling off in Lake shipments of late that is merely on account of the excess amount on the Upper-Lake docks. Trade is good there, but there was too much carried over from last winter.

The local anthracite trade is much better than the recent long run of warm weather would seem to warrant. Should it come really cool now the demand would increase very rapidly. The spurt in August on account of the war has about been discounted, so that the future looks good. The railline trade is reported brisk.

Lake shipments for the week were 124,750 tons, for September, 428,426 tons and for the season to Oct. 1, 3,156,781 tons. The September decrease is about 20% from the same month last season and it is doubtful if there will be room enough developed on the Upper Lake docks to lessen the falling off. The amount shipped last season to October was 3,840,936 tons.

TOLEDO

Nearly a million and a half tons of coal passed through Toledo during September. Ore tonnage light. Domestic coal affected by weather conditions. Steam grades a little stronger.

The changing weather conditions have kept the coal dealers in a most uncertain position. The domestic market here is hinging entirely on the weather. The steam market is showing a little more strength but the demand has not been up to normal. The Lake movement continues fairly active and the reports from the customs office shows that 1,420,044 tons of coal passed through this port during the month of September, of which 458,896 tons were for Canadian ports. The ore tonnage was extremely light amounting to but 66,580 tons for the entire month of September. Prices as quoted on the Toledo market follows:

	Hacking Valley	Cambridge	Pomeray	Massillon	W. Va. Splint	Pocahontas
Lump	.....	.....	.....	$2.50	.....	$2.25
Lump	.....	.....	.....	2.50	.....	2.25
Re-screened Lump	$1.70	.....	$1.75	.....	.....	....
Domestic Lump	1.60	.....	1.60	.....	$1.60	
1¼ Lump	.....	$1.40				
¾ Lump	.....	1.20				
Egg	1.25	.....	1.35	.....	1.15	2.25
4-in. Black	.....	.....	.....	.....	1.75	
Nut	1.15	.....	1.25			
Washed Nut	.....	.....	.....	2.50		

COLUMBUS

Trade quiet because of the continual warm weather. Steam business is still slow while Lake trade is active. Prices unchanged.

With continued warm weather there is a distinct slackening in the domestic trade in Ohio markets. This has not affected the situation to any extent as production is keeping up fairly well, but on the whole the tone of the market is not as satisfatcory as formerly. No new circular was issued Oct. 1, and it is doubtful if any change in prices will be made before Nov. 1.

The domestic demand, which has been the backbone of the trade, is quiet all along the line. Stocking up on the part of private consumers is not as active as formerly and dealers have been cancelling orders or deferring shipment. Their stocks are sufficiently large to take care of present needs. Retail prices have not suffered by the slump and cutting among dealers has not been resorted to at all.

The Lake trade is still fairly active as the demand from the Northwest continues good. Docks of the Upper Lake ports are generally free from congestion. Chartering of boats is going on actively and the Lake movement will probably continue until the close of navigation. Steam business continues dull in every particular and there is no immediate hope for improvement. Manufacturing is still slow and purchasing agents are loath to lay in surplus supplies. Much of the buying for steam purposes is on the open market although a number of steam contracts have been concluded within the past few weeks.

The market for fine coal is still weak but a number of shippers profess to see an improvement in this branch of the business. Production in Ohio fields has been fairly good under the bad conditions. Pomeroy Bend reports a normal output and the same is true of certain districts of the Hocking Valley. Jackson and Crooksville have produced about 80% of the average. All mines are idle in eastern Ohio.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Re-screened lump	$1.70	$1.75	
Inch and a quarter	1.60	1.60	$1.50
Three-quarter inch	1.45	1.45	1.45
Nut	1.15	1.40	1.15
Mine-run	1.15	1.15	1.15
Nut, pea and slack	0.30	0.35	0.30
Coarse slack	0.20	0.25	0.20

CLEVELAND

With receipts of 150 cars over Sunday the Cleveland market is demoralized. Prices are off 10 to 15c. and the Lake trade is rapidly slowing down.

Hocking coals have been dumped into northern Ohio steam markets until spot prices have been forced down

10 to 15c. and though shipping prices are nominally the same as a week ago, 5 to 10c. a ton less would be acceptable for fine coal. Panhandle slack was offered recently at 45c. at the mines, $1.45 Cleveland, with other fine coals at very nearly the same.

Lake front coal docks are going on a single day shift and by the middle of the month only one or two docks will be working day and night. A number of ships have been ordered laid up this week and by the middle of the month fully 30 vessels will be out of commission for the season. The Upper Lake docks are loaded to capacity and, even though space were found later in the season, the supplies of coal are sufficiently large to carry the dealers and trade over until next season when new coal will be available.

No. 8 field will not ship any Lake coal this season. It is now a question whether any of this coal for commercial purposes will be produced this winter. Operators are discussing Apr. 1, 1915, as the probable date for resuming mining.

In the Bergholz field two mines were closed last Saturday because the coal produced under the mine-run contract was too fine and dirty. At another mine it was necessary to fine the men for allowing too much extraneous matter to get into the coal. At a third property an attempt was made to suspend two miners because of the slate in the coal, but a strike followed and the operator was forced to take back the men.

Prices for current shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.75				
Lump, 6 in.			$2.45		
Egg	3.75				
Egg, 6 in.			2.10		
Lump, 1¼ in.		2.40	2.25		
Lump, ¾ in.		2.30	2.10	2.00	2.05
Mine run	2.75	2.15	1.95	1.90	1.95
Slack	2.40	1.50	1.45@1.50	1.50	1.50

CINCINNATI

Light demand for screenings continues the main feature. Movement of the domestic grades slow though demand is good. No immediate relief in sight.

Plants operating on a curtailed basis will buy little coal until cold weather compels them to use more for heating purposes. But even cold weather will not cause the factories to open up, nor furnish more business to any industry and as the industrial depression is the principal cause of the slow steam market, some other stimulant must be looked for. Reports of reviving export trade indicate the probability of greater activity among local manufacturing plants than has been the case for some time which should help the situation materially.

The domestic movement is still good, both with the operators and the retail trade. The season is now late enough to make it easy for consumers to appreciate the closeness of cold weather, and deliveries are consequently being made in good volume. Prices for the prepared grades are normal, but this can hardly be said for screenings or any other grade of steam coal.

SOUTHERN

BIRMINGHAM

Market rather quiet. Many rumors regarding large sales, but no confirmation.

This week has brought out no decided change, either on steam or domestic coal. The local demand for steam coal is quiet, and lump coal is moving only in small quantities. There have been reports of several large sales of Alabama coal to foreign countries this past week, one of which was 1,000,000 tons to Greece, but they cannot be confirmed. Blacksmith coal is in a satisfactory condition. Sales of pig iron are light.

LOUISVILLE

Vigorous competition in all directions. Prices fairly steady though at less than the customary fall schedule. Operations restricted.

The domestic movement is holding up fairly well but the general activity is sharply reduced from what it normally is at this time of year. The effect of the war in Europe is more depressing if anything.

Salesmen are active in all sections and competition is vigorous. It was expected that some business might develop on the Eastern coast but the companies have found competition as keen there as closer at home. As a rule there has not been much slashing of prices, though these have not been advanced as much as usual this fall. Occasionally contracts are rewritten on the old basis though a number have been bid in by new companies at lower figures. This applies to steam coals only.

In Southeastern Kentucky where most of the mines resumed full-time operations toward the close of the summer, there has been a return to the three-day a week basis again. Occasionally full time operations are the rule where operators are particularly well situated.

Block coals range widely, from $1.75 to $2.25 a ton, f.o.b. mines, with egg sizes at from $1.25 to $1.50. Nut and slack of the best grade is plentiful at from 50 to 60c. and the lower grades from 25c. down to nothing, some mines permitting it to be hauled away free. The Western Kentucky screenings are hard to sell at any price.

MIDDLE WESTERN

INDIANAPOLIS

Weather against trade and mine schedules are reduced. Screenings situation about the poorest ever known. Domestic grades moving fairly well. Some Oct. 1 advances at mines.

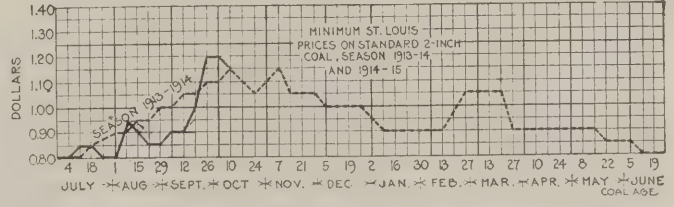
Mid fall weather is having an adverse effect on the coal industry, making current demands comparatively small. The demand for domestic grades continues fair, mainly because of anticipatory buying. The screenings situation is becoming worse than it was last year. It seems that 40c. is regarded as a good price in the open market. Mines are compelled to sacrifice them in order to be able to produce domestic coal to fill orders.

Lump coal sells at $1.75 at the mines and mine-run, No. 4, at $1.20. The mine schedules are somewhat reduced and cars are now in ample supply. Railroad buying has not improved notwithstanding the exports of wheat and flour are the largest in the history of the trade. Buying by industrial plants is not up to normal for the season. Prices were raised Oct. 1 at some of the mines, 10 to 15c., probably those that had not made the similar advance noted a week or two before. This is on domestic grades, in order to get a fair average when screenings are sacrificed, and also because it has been the custom to shove the price up Oct. 1.

ST. LOUIS

Heaviness in the steam sizes still the controlling factor in the market. Some mines are caught up on domestic orders.

An unlooked for depression in the demand for high-grade coal caused a slump about the first of the month, and this, together with the demoralized condition of the steam market, brought about a deplorable condition. Several of the mines in Williamson and Franklin County, however, are well sold up on lump and egg, and are behind in their orders. This is chiefly on account of their inability to move the steam sizes, which have been accumulating on the tracks and has resulted in the railroads refusing to give these mines equipment for their lump and egg orders.



Other mines, more fortunate in moving their smaller sizes, are now caught up on the lump and egg orders and are finding it somewhat hard to get a fair price for those sizes. The steam market shows no improvement. The washed market on Nos. 1 and 2 is picking up some, but the other sizes are dull. In the Standard field screenings are still given away for the freight, and the top of the market is about 10 to 15c. on exceptionally good coal. Even with this condition, Standard 2-in. lump can be bought for as low as $1.05 in some cases, although the circular is $1.10 to $1.15.

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump			$1.25	$1.10@1.15	$1.15
3-in. lump			1.40		
6-in. lump	$1.60@1.85		1.50	1.25@1.35	1.40
Lump and egg	1.85@2.15	$2.25			1.35
No. 1 nut	1.25@1.35			0.75@0.80	
Screenings	0.25@0.35		0.80@0.85	0.05	0.20
Mine-run	1.05@1.10			0.75@0.80	
No. 1 washed nut	1.55@1.65	2.25	1.50		
No. 2 washed nut	1.30@1.35		1.35		
No. 3 washed nut	1.10@1.15				
No. 4 washed nut	1.00@1.05				
No. 5 washed nut	0.15@0.20				

KANSAS CITY

Market slow as a result of the warm weather. Gas supply will not be plentiful this winter. Collections slow.

A long series of warm days in Kansas City has retarded the usual starting of fires, and the ordering of coal. The steam plants have not generally begun operations yet, and some that started the furnaces in September have drawn the fires. The retail trade is also largely waiting, though there are reports that promises of higher retail prices in October stimulated orders in nearby towns. The retail prices have not yet been advanced here. Later reports indicate that the improvements necessary to provide plenty of gas probably cannot be made in time for the cold weather now approaching. Collections are difficult, and it is suggested that this situation is also a deterrent on coal orders, retail customers postponing purchases as long as possible.

PORTLAND, ORE.

No further advance in prices anticipated. Car shortage not yet felt. Business brisk owing to increase in wood prices.

Coal dealers here are doing an active business and are having no trouble now in getting supplies from the mines or making deliveries. In fact the business is running smoother than for a long time and on a very satisfactory basis. There was some suspicion that prices would advance on Oct. 1 but dealers say this will not be necessary and no advances are now expected for some time unless it should be on lower grade coals. The railroads have managed to furnish all the cars required, and orders have been filled quite promptly.

Coal Contracts Pending

Contract No. 1—Columbus, Ohio—The Ruggery Building is in the market for 300 tons of West Virginia slack coal. Shipments are to be made at the rate of 25 tons per day, beginning Nov. 1, delivery to be made at Columbus, Ohio. All communications should be addressed to J. A. Shahan, 60 Ruggery Building, Columbus, Ohio.

Contract No. 2—Norfolk, Va.—The United States Government is in the market for 2000 tons of bituminous coal. All communications should be addressed to E. Eveleth Winslow, Lieutenant Colonel of Engineers, United States Engineer Office, Norfolk, Va.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for September and the first nine months of this year and last year were as follows:

	September		9 Months	
	1914	1913	1914	1913
Phila. & Reading	1,101,296	888,060	8,869,552	9,504,550
Lehigh Valley	1,290,327	1,031,376	9,550,799	9,671,928
Cent. R.R. N.J.	824,604	788,038	6,560,049	6,795,406
Del. Lack. & West.	893,098	834,345	7,138,223	7,357,984
Del. & Hudson	647,974	605,071	5,354,593	5,303,075
Pennsylvania	575,898	533,439	4,697,325	4,610,332
Erie	727,950	669,364	6,169,528	6,119,302
Ont. & Western	185,045	222,086	1,727,512	1,919,308
Total	6,246,192	5,572,279	50,067,581	51,281,885

NORFOLK & WESTERN RY.

Destination of shipments over this road for August and the first eight months of this year and last year were as follows in short tons:

	August		Eight Months	
Coal	1913	1914	1913	1914
Tidewater, foreign	96,491	190,454	1,128,573	1,253,347
Tidewater, coastwise	372,908	328,279	2,597,566	2,570,213
Domestic	1,955,074	1,932,075	12,412,256	13,646,631
Coke				
Tidewater, foreign	.....	.....	27,199	197
Domestic	126,515	79,156	1,067,032	748,134
Total	2,550,988	2,529,964	17,232,626	18,218,522

SAULT STE. MARIE CANALS

Coal shipments through the Sault St. Marie Canals for August and September were as follows:

	August			September		
	Canal			Canal		
	U. S.	Cana.	Total	U. S.	Cana.	Total
Anthracite	238,952	54,107	293,059	142,063	20,847	162,910
Bituminous	1,808,341	275,440	2,083,781	1,427,127	296,475	1,723,602

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for July, 1913-14, and for the seven months ending July, 1912-13-14, in long tons:

	7 Months			July	
Imports from:	1912	1913	1914	1913	1914
United Kingdom	2,697	3,464	8,258	116	26
Canada	765,981	678,611	588,904	76,666	78,190
Japan	18,216	63,665	30,983	9,103	8,215
Austria and Tasmania	80,585	77,634	128,018	15,679	2,699
Other countries	1,924	2,810	1,881	1	150
Total	869,403	826,184	757,044	101,565	89,280
Exports:					
Anthracite					
Canada	1,606,457	2,411,892	2,175,407	378,692	328,175
Other countries	39,435	37,021	36,257	2,282	10,822
Total	1,645,892	2,448,913	2,211,664	380,974	338,997
Bituminous,					
Canada	5,367,821	7,120,245	4,525,830	1,576,481	1,005,859
Panama	289,825	321,507	168,898	42,725	17,450
Mexico	210,786	350,961	190,363	18,515	38,571
Cuba	646,462	772,366	616,574	88,088	77,880
West Indies	447,769	377,464	355,246	33,236	42,239
Argentina	.....	48,626	112,408	20,899	15,320
Brazil	.....	187,555	100,530	50,786	4,612
Uruguay	.....	.....	45,594	.....	.....
Other countries	1,114,514	829,288	973,641	145,394	138,056
Total	8,077,177	10,008,012	7,090,084	1,976,124	1,339,987
Bunker coal	4,319,514	4,409,370	4,525,876	676,257	681,370

FOREIGN MARKETS

GREAT BRITAIN

Sept. 25—Inquiries are on a limited scale, while supplies of all qualities are plentiful. Prices are weaker in consequence and are approximately as follows:

Best Welsh steam	$4.08@5.28	Best Mountmouthshires	$4.14@4.26
Best seconds	4.44@4.68	Seconds	3.96@4.08
Seconds	4.26@4.38	Best Cardiff small	1.80@1.92
Best dry coals	4.44@4.68	Seconds	1.20@1.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash payment.

Freights—The demand for tonnage is not so active but rates are about unchanged and are approximately as follows:

Gibraltar	$1.68	Aden	$2.22
Malta	1.68	Colombo	2.28
Marseilles	1.64	Sabang	2.28
Algiers	1.44	Singapore	2.46
Genoa, Savona	1.74	Las Palmas	1.80
Naples	1.74	St. Vincent	1.92
Venice, Ancona	1.86	Rio Janeiro	3.18
Alexandria	1.92	Monte Video	3.06
Port Said	1.86	Buenos Ayres	3.30

The London coal trade has at last begun to show signs of returning activity. The increasing export trade has given confidence to buyers, and the volume of trade doing is increasing. The delivery trade, however, continues weak, but factors and merchants are buying more freely for stock. Manufacturing qualities are in good demand, and kitchen coal and bakers' nuts are also moving better. Gas coals, although very low in price, are improving, but slacks and small nuts are still weak and plentiful. The seaborne market shows no change.

The coal markets in the provinces have benefited by the cooler weather which has prevailed during the week. On the other hand, too, there is an increasing enquiry from friendly and neutral countries. Financial conditions are still prejudical to business, and this disadvantage has been severely felt at Cardiff, where little new business has taken place, the market in general being dull and void of special feature. On the Tyne, whilst the volume of business does not appear to have greatly expanded, the undertone of the market is good. The West Yorkshire market has become depressed, but that in the South shows a slight improvement; the reduction of output and a fair demand has served the purpose of steadying the market. In Lancashire the house coal trade has improved owing to the colder weather. The Scottish coal trade may be said to have changed little, and remains very quiet.

It is officially announced that on Nov. 4 the general moratorium will be terminated.

The South Metropolitan Gas Company has increased the price of its gas owing to the continued high price of coal.

It is announced that the Portuguese railway contract for steam coal has come to this country. This is the first coal contract which has been diverted from Germany by the war.—"The Colliery Guardian."

COAL AGE

Vol. 6 NEW YORK, OCTOBER 17, 1914 No. 16

"Tom, I want you to clean up your moral record before I put you on as trackboss in this mine," said a mine foreman to an applicant for a job. He continued, "I know you have a pretty good name as a worker, but I know further that if you had a stronger moral reputation your control over men under you would be better, and your efficiency and usefulness to this company would be greater. You know as well as I do where you are weak, so we need not dwell on that matter. And I want you to understand that I'm not preaching, for I have no right to do that; I am only talking sense based on experience".

"I know what you mean all right," said the other, "but I'm not sure I can do what you want me to." "Well, you'll not get your job until you show me that you're going to try and you'll not hold your job a minute after you stop trying," replied the foreman.

This conversation took place recently at one of the large bituminous mines of western Pennsylvania. The mine foreman in question is a man whose past is none too clear, and he knows it. But he knows, also, that from the time he resolved some ten years ago to clean up his record he has been a different man, rising rather slowly perhaps, but consistently, to a point where he now has attained the respect of all the people in the community in which he lives. Moreover, he has won a reputation as an excellent mine foreman, alive and hustling, getting results for his company and a square deal for his men.

His method of dealing with the applicant for a job was of the right sort. When a man of ability comes along, there is no use in turning one's back on him if he happens to be morally weak. On the other hand, it would be equally foolish to utterly disregard the man's reputation, and thereby indirectly encourage him in his weakness. The thing to do with such a one is to help him to help himself, and the best way to do it is to make his helping himself a part of his job. That this pays must be perfectly clear when one stops to reflect that it is well nigh impossible for a man to strive to make a clean name for himself without at the same time raising the quality of his work.

Wherever the morality of a community is good, then it is almost certain that the physical conditions of the town and mine are clean, and that due attention is paid to questions of sanitation. It is a great deal easier and more practicable for a mine foreman to insist upon moral cleanliness on the part of his men if he has his mine in clean condition, if his roads are free from dust and rock, and if all low places in the entries are drained to prevent their becoming sumps.

An outside foreman, likewise, can do much to promote moral cleanliness by paying scrupulous attention to the physical condition of the plant under his charge. If the grounds around the various buildings are slovenly and dirty, the chances are that the outside foreman and his men are correspondingly careless of their own cleanliness. If, on the other hand, the office is surrounded by well-kept grounds, the shops and power-house cleared both inside and outside of oily waste and other refuse, then it is evident that there is an efficient foreman in charge, and there is little doubt but that his organization is well aware of the advantages of cleanliness.

After Safety First, we ought to have Sanitation Second, and sanitation ought to be both moral and physical.

Why This Persecution of Coal Men?

A RECENT edition of the New York American ran a large cartoon by Windsor McCay on its editorial page scolding coal men generally and holding them up to view as robbers and oppressors of the human race. The picture was headed, "The Same Old Hold-Up Game," and showed a portly gentlemen known as the coal trust wrapped in furs standing out in a blizzard, going through the pockets of an unfortunate shivering citizen. Underneath the cartoon the editor had written, "The Coal Trust is counting on winter to tie the consumer hand and foot while he goes through his pockets. It is the usual game and is worked every time cold weather threatens, and cold weather threatens every year."

Just why the metropolitan press persists in rebuking the coal industry at every opportunity we do not comprehend. Coal is produced under the most hazardous conditions. The men who mine the product are among the highest paid workmen in this country, ranking third in the great coal state of Pennsylvania. There isn't one mining company in ten that has averaged fair interest on its investment during the past decade. Coal prices are more stable year in and year out than the prices of any other widely-used commodity. Government officials who have collected facts support all these contentions.

Then why must the coal producer engaged in an industry filled with lurking dangers be subjected to continual criticism. The fuel industry in this country is second only to agriculture, employing in all departments considerably more than a million men. Is this business of mining a separate industry standing alone and not linked to the national prosperity? Are we outcasts just because we lead all others in "Safety" and "Welfare" work? Must we be marked as a criminal class just because we do not forever shout our virtues from the housetops?

The coal business will bear the light of day and we trust sometime, somehow, somewhere, a great newspaper editor will send an honest man to our coal fields and have him search out the truth and write it as he sees it. The European war leaves 5,000,000 bales of cotton in the hands of our southern planters, and everyone, coal men included, is asked by Mr. Hearst, to turn to and lend a helping hand. This is all as it should be and we applaud the worthy intent back of the move; but, cotton growing does not encompass all the industrial life of America, and there are other lines that at least should have encouragement if not material help.

We pay 5c. for 10 roasted chestnuts on a New York street. A good looking rosy-cheeked apple costs us another 5c. Potatoes are 5c. a quart, etc., etc., yet we hurl invective at the coal man who sells us his product at the same old price whether times are good or bad. Once sold the coal is gone forever. The mine owner can't grow any more. In 20 years his property, houses and all, is without value. Apples, potatoes, chestnuts and a hundred other things to eat are rotting on all our farms, and next year the ground will grow more, and in 20 years the farm will still be there producing as usual, probably enhanced in value.

Mr. Hearst, turn your attention to the retail dealers who sell the things we eat and who have the audacity to insist that the so-called free markets of Manhattan be closed in order that the small dealers can charge whatever they please for the things we must have to subsist on.

The coal industry is a worthy business engaged in by the strong daring men of our race. Close our mines and every wheel from New York to San Francisco will stand still. Compared with such a calamity, the present European war's effect on our business life is but a midsummer zephyr. Therefore, be fair, and let an occasional shaft of generous encouragement supplant the unwarranted rays of bitter malevolence that are so often turned on us.

Explosion at Mulga in Alabama

By Henry S. Geismer*

SYNOPSIS—The Mulga mine again explodes, this time killing 16 men. Hirsch electric lamps play an important part in the rescue work. A negro miner saves 9 of his comrades. The safety precautions adopted by the owners at Mulga were elaborate and seemingly complete.

A gas explosion occurred at the Mulga mine of the Woodward Iron Company at Mulga, Alabama, at about 9 a.m., Oct. 5, killing 16 men and injuring 11 others. Of the killed, 8 were white and 8 were negroes. Among the injured, it is possible that two are fatally injured.



General View of Surface Plant at the Mulga Mine

The explosion occurred either in the eighth or ninth heading off the north haulage. All of the men killed were found lying along these two entries with the exception of two men who were found inside the neck of No. 18 room on the eighth right. Several of the men were killed outright, but most of them were apparently overcome by afterdamp.

The miners use open lamps in the mine and as several rooms were marked up by the fireboss in his early-morning inspection, as containing gas, it is possible that the gas was ignited by a miner's lamp. The explosion was not felt in any of the entries except the eight and ninth, which are close together, the seam being worked on the double-entry system and men in other parts of the mine did not even know that an explosion had occurred.

The number of men in these two entries was above normal on the day of the explosion because there happened to be a trackman and two helpers also a rockman and one helper working in these entries; all of these men were killed. Most of the men who worked in the eighth and ninth right headings were either killed or injured.

The men go to work between the hours of 6 and 7 a.m., the entrance gates being locked at 7 a.m. As the entries where the explosion occurred are only about three-quarters of a mile from the hoisting shaft, it would seem that all of the men must have been at work more than an hour when the explosion occurred.

The Fans Were Not Injured

The explosion did not affect either one of the fans nor was the mine damaged at all, so rescue work was started immediately. Helmets from the U. S. Bureau of Mines rescue car, under charge of E. B. Sutton, arrived early in the afternoon and from then on the work of exploring the two headings was carried on rapidly. Before the arrival of the helmets, eight bodies had been recovered.

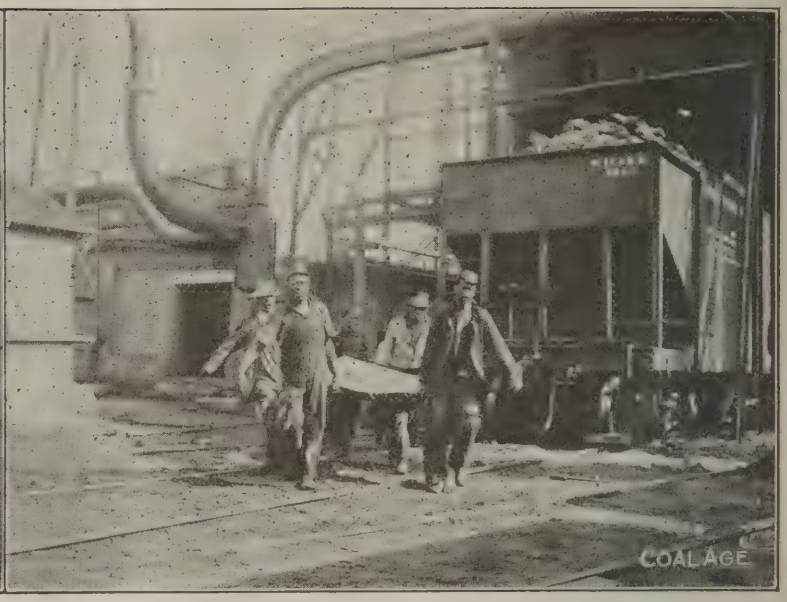
*Birmingham, Ala.



Relatives and Friends of Victims Assembled at Shaft Just after the Explosion Occurred



One of the Rescue Party



Carrying Bodies to the Morgue

The last body was taken from the mine about noon of Oct. 6.

On the morning of the explosion, M. W. Campbell, a demonstrator for the Hirsch Electric Mine Lamp Company, of Philadelphia, Penn., had equipped eight miners with electric lamps to demonstrate their value. One of these lamps was in use in the ninth right heading and another was in use in the tenth right heading further inside. Neither one of these lamps was extinguished by the explosion and this fact undoubtedly assisted in the work of rescue, as there were no safety lamps in the immediate vicinity of the explosion and time would have been lost.

The Mine Is Well Equipped

The mine is one of the best equipped mines in the South; coal is cut by electric machines and hauled by electric locomotives. Two fans are in use, either one of which has considerable excess capacity over total requirements and both of them are arranged for steam and electric drive. A modern and efficient sprinkling system has been installed throughout the mine and all of the rooms, as well as the entries, are constantly sprayed. No dust is allowed to accumulate and the system of inspection is of the best. The coal is shot by shotfirers after all the men leave the mine and safety powder is used.

For some months after the mine was opened, safety lamps were used exclusively as a considerable quantity of gas was always present, but after perfecting the ventilating system and greatly increasing the quantity of air, the presence of gas was rarely detected and by a careful inspection with firebosses, all danger from this source had been considered as eliminated.

The mine has always generated dust, but it is not allowed to accumulate, and with the splendid system of sprinkling in vogue, danger from this source has been eliminated as far as possible. The recent explosion seems to bear testimony to the effectiveness of the manner of dealing with the dust problem. All of the headings had visible moisture on the top, sides and bottom.

The mine is on the well known Pratt seam and is reached through two 3-compartment shafts 220 ft. deep. One is used for hoisting and the other for ventilation, but it is planned to use both for hoisting in the near future. The seam is nearly level and has a thickness of about 4 ft. 6 in. The mine is located on the A. B. & A. also the Ensley Southern Railroad.

All of the officials of the Woodward Iron Company, including A. H. Woodward, vice-president; B. E. Purser, general superintendent of mines; J. D. Dalrymple, superintendent; S. L. Morrow, chief engineer, and Tom Black, mine foreman, remained at the scene of the explosion until all of the bodies had been recovered. The commissary was thrown open to the rescuers and with the as-



Colored School at Dolomite Mine of the Woodward Iron Company

sistance of Mrs. S. R. Stevenson and Mrs. J. E. Edwards, no one in attendance at the scene of the disaster whether working or not, was allowed to go hungry.

Chief Mine Inspector, C. H. Nesbit and four of the associate State Mine Inspectors, Tom H. Tinney, W. P. Smith, Frank Hillman and David Kelso, remained on hand to render any assistance possible. Several employees of the T. C. I. & R. R. Co. under the direction of Gen. Supt. John F. Meager also rendered valuable assistance as they were all experienced helmet men.

The hero of the day seems to have been Harry Jackson, a colored miner. He was one of the men wearing a Hirsch electric lamp and after the explosion he went in the ninth right and lead out 9 miners who were in the dark almost overcome with afterdamp. And Jackson was not the only colored man whose actions bordered on the



PLAYGROUNDS AT A WOODWARD IRON CO. MINE

heroic. All during the day and night whenever volunteers were called for, the colored men always volunteered in numbers beyond the requirements and they never hesitated for a moment in carrying out any instructions given them.

With each added explosion it becomes evident that the state is well supplied with trained rescue men and the value of their services is coming more and more to be realized.

The men who came to the top after the explosion, were so badly excited that many of them failed to hang up their checks and so some confusion was experienced in trying to account for all of the men supposed to be at work.

The average daily output of the mine is about 1250 tons and approximately 325 men are employed. On the day of the explosion 284 men were inside. The output comes from two main haulageways starting at the shafts and running at right angles. The miners are about evenly divided between the two territories. All of the bodies will be buried at Woodward.

The complete list of the dead is as follows:

WHITES	
Edward King, aged about 40 years, married	John Polinsky, foreigner
Charles Campbell, aged about 30 years, married.	John Kooternick, foreigner
W. M. Long, aged about 28 years, married.	NEGROES
Robert Dubick, aged 39 years, married.	Gerry Brogdon
Joe Malkoski, foreigner	Bert Webster
Wiley Pilposki, foreigner	Tom Mitchell
	Sam Chatman
	Scot Garrett
	Warren Wheeler
	Hamp Swansey
	Carey Howard

The life of H. E. Williams, one of the injured miners is despaired of.

Extracts from a Superintendent's Diary

We mining superintendents are fated to view death in various forms and from many angles. And because we are so often made to feel the mystery of death, we speculate much on the mystery of life.

All of the roads to death wind through our experiences, and with but little imagination, they often seem the roads to life also.

Explosions, fights, strikes and endless accidents, all exact their toll from our community, and the circumstances of death vary from the whimsical to the sublime.

Today we may find ourselves following the frightfully maimed body of a miner (who was all but killed instantly by a fall of rock in his working place) on its journey from the pit mouth to his home; and before we can find courage to leave him alone with his dazed and weeping wife, the victim expires. A few motions of the hands, several incoherent words, a smile and the separation is complete for eternity. His last wish, his last thoughts swallowed up with the great mystery of death.

Tomorrow we may be summoned to a dying one who, instead of parting from us with motions and signs that only the Good God can interpret, lingers long, talks freely and impresses us with the mystery of life rather than the mystery of death. He is a man who has made but a dim mark in the world during his lifetime. Always he has had a grim struggle to keep body and soul together and has only succeeded in that by denying himself of every comfort and pleasure. He tells us that he is ready to die, although he has enjoyed life immensely, and we marvel.

After his death it transpires that in spite of his straitened circumstances, he was constantly assisting women and children through endless complications and tragedies. A little sympathy here, a kind word there, or perhaps just the right advice to a family on the verge of annihilation has caused them to take courage and fight their way to a brighter future. The death of the guiding one opens the lips of the guided and for the first time the camp learns of the things he achieved in secrecy.

He considered his life futile and yet his memory will be honored for a generation in homes where his influence came as a blessing.

Nor is the passing away of those who have fared better according to worldly standards always without surprises. We may have known them as liberal and public spirited and yet when they come to die they insist that they are afraid of the hereafter because they have had so little thought of anything except self. And when all of the facts come to light, as they generally do, it appears that their going away has not affected vitally the current of a single life, and outside of their immediate family they will soon be entirely forgotten. When their gifts were solicited and accepted, there seemed to exist a crying need for them, but now in looking back we realize that somehow we must have been mistaken in analyzing the need or in applying the relief.

And so we gradually learn to admit the futility of trying to judge men by any standards at our command as well as the uncertainty of tabulating successes by what people seem to have accomplished. And although all of our philosophizing does not clear up any of the mysteries of life, still it helps us to accept things without constantly questioning God's purposes.

Dr. McHenry's Chart

The American Mine Safety Association expects to distribute a series of Safety Circulars. The first of these contains the illustration accompanying this article and shows the relative frequency of injuries received in the nine-year period between Mar. 11, 1905 and June 20,

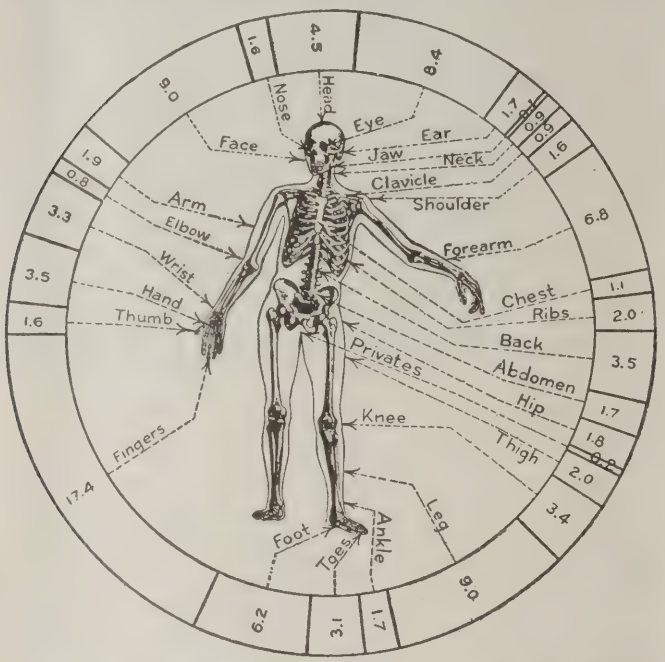


Chart Showing Distribution of Mine Injuries

1914 at a certain bituminous coal mining operation. In all, 6908 injuries have been recorded and tabulated.

The chart was prepared by Dr. Ralph F. McHenry, chief surgeon of the Penn-Mary Coal Co., of Heilwood, Penn. The percentage of reduction of non-fatal injuries in the nine-year period is 49.81. Fatal injuries have been reduced 40 per cent. It is evident that the first-aid work has been not only a cure but a preventive of accident.

The injuries may be further divided as follows: Fractures, 4.4 per cent.; lacerations, 38.2 per cent; contusions, 33.5 per cent.; burns 5.2 per cent.; punctures, 18.56 per cent.; dislocations, 0.23 per cent.

The Problem of Timbering Anthracite Mines

Chief James E. Roderick of the Pennsylvania Department of Mines calls attention in his latest annual report to the gigantic and increasing costs of the anthracite mine operators, laying especial stress upon that of mine timbering.

"Of the many problems that confront the mine management," he writes, "the most serious is the timbering of the mines. With every passing year this problem becomes greater and more difficult to solve. Not many years ago, the initial cost of opening an anthracite colliery was deemed a serious obstacle to the undertaking; the great cost of keeping mines free from water was another annoying and expensive feature, but the timber problem now overshadows all others.

"This is a phase of the mining business which the general public knows little about, and yet the timbered gangways and drifts cover a vast extent. In the anthracite region the Philadelphia & Reading Coal & Iron Company has more than 800 miles of gangways and there is a total of 2000 miles of these underground ways in the Schuylkill region alone."

Yellow Pine Most Generally Used

Chief Roderick tells of the efforts of the operators to prolong the life of the timber by methods of preservation, and adds:

"Most of the timber now used in the anthracite mines is yellow pine from the South, and one of the largest anthracite companies, owing to the great demand and impossibility of getting timber in the North, has been sending its own cars South to expedite shipments."

When one reflects that a billion tons of water, or thirteen and a half times as many tons as the coal produced during the year, must be pumped out of the anthracite mines every year, and that the timbering is an even greater expense than this, the cost of placing this vast forest below ground seems staggering. According to a recent calculation, based on the material costs of a number of the larger companies, the anthracite operators spend $2,593,280 a year for mine timbers and "lagging" and nearly as much again for lumber. The use of steel timbers which are being adopted for permanent gangways on account of their longevity will add to this amount for the next few years, but it will mean a final saving in the replacement bills of the companies.

It is only by increased efficiency in every department and the introduction of mechanical labor-saving devices that the operators have been able to keep the price of anthracite down to its present level. The only changes in the wholesale price of anthracite since 1902 have been an advance of 25c. a ton in 1912 to offset the 10 per cent. increase in wages granted to labor that year and the increased cost of materials, and an advance of 10c. a ton this year to meet the expense of the new Pennsylvania State tax of 2½ per cent. of the value of the coal at the mines.

The Coal Supply of Italy

Italy is almost entirely dependent for its coal requirements upon foreign countries. It produces an inferior quality of lignite only, and that in a very limited quantity. In 1912, its production only reached 660,000 metric tons. Since 1900, the coal consumption of Italy has increased greatly, in consequence of the marked growth in population and the rapid gains in industrial progress. In 1913, the importation of coal, coke and briquets rose to more than 11,000,000 tons, of which France furnished 92,000 tons of coke, and Belgium 6000 tons of coal, 7000 of coke and 400 tons of briquets. By far the greatest part of its coal imports is drawn from England, which in 1913 reached 9,800,000 tons of coal, 71,000 tons of coke and 253,000 tons of briquets.

Although the United States has been finding a market in Italy for coal for the past 25 years, the deliveries have not been important, comparatively speaking; in 1913, they amounted to 281,000 tons. Germany furnished, in 1913, 892,000 tons of coal, 183,000 tons of coke and 133,000 tons of briquets.

As Austria cannot meet its own coal requirements, there is practically no exportation to Italy.

Note—Extract from a paper in Gluckauf, Aug. 22, 1914, by Dr. Ernst Jungst, Essen, Germany. Translated by Henry B. Binsse.

The Verner Theory of the Counter-Current and Where It Leads

By a Mining Engineer

SYNOPSIS—The writer contends that the article by Samuel Dean appearing in the issue of Aug. 22 fails to prove the correctness of the Verner theory of the counter-current, which theory, the writer believes, contradicts the laws of nature. Moreover, he suspects that the theory has done much harm by inducing shotfirers to reduce ventilation before igniting their shots with results which statistics appear to show are disastrous.

The discussion in Coal Age about John Verner's theory of a counter-current in coal-dust explosions appears to have had a revival following the article by Samuel Dean, which appeared in the issue of Aug. 22. The synopsis heading this article states: "The British Experimental Station accepts many of John Verner's conclusions as published in these columns."

As suggested by James Ashworth in the Sept. 19 issue, it would be interesting to know which of Mr. Verner's conclusions has been accepted. A student of explosion data does not find either in Mr. Dean's article or in the five reports issued by the British Commission, any avowed support of the theory.

Proving the Inrush Theory

The information given under the subheading in Mr. Dean's article, "Proving the Inrush Theory," while evidently accepted by Mr. Dean and by Mr. Verner, judging by his letter in the Sept. 26 issue, as proving their case, does not appear at all convincing. The pressure curve given is meaningless as it does not show the atmospheric line, and give the relative pressures and time intervals; also, to interpret the results, the distance between the pressure manometer and the shot must also be known. The observations of the swinging board placed at the mouth of the gallery, and of the dust and flame are also indefinite without records of the time intervals starting from the instant when the shot was fired. The chief difficulty apparent in all the discussions by Verner and Dean, is that they do not separate the effects of the igniting shot and of the explosion proper.

Vibratory Waves Are Universally Produced by Blasts

A study of the data and pressure curves obtained by any of the experimental stations shows conclusively that the air waves, started by a shot, travel at the rate of sound waves, 1100 to 1150 ft. per sec., the exact speed depending on the size and character of the gallery. These air waves are entirely independent of those due to the explosion, and are exactly the same in a test in which there is no coal-dust loading as when a violent explosion ensues.

Any violent vibration would set up waves similar to those indicated in Mr. Dean's incomplete sketched curves. But they will be different from those produced by a blast from an explosive because the impulse set up by the latter is due to the rapid evolution and expansion of heated gases, displacing a portion of the air previously in the neighborhood of the shot, the displacement of the air in the gallery being increased in the case of a shot fired near the inner end of a closed gallery by the inertia of the column of air set in violent motion.

The gases cool rapidly and no one with any knowledge of physical laws would deny that there would be an inward rush of air to fill the void, or partial vacuum. This would necessarily be a vibratory movement while atmospheric equilibrium was being reëstablished. One may, with a paddle, give a violent impulse to water in one end of a water trough, and there will be a return wave of almost the same size, followed by waves to and fro, until friction on the sides has absorbed the energy originally imparted.

The Use of Springs Makes the Indications Doubtful

When the blownout shot is a large one, the inrush following will be correspondingly large. It may easily carry in dust if present, also produce many effects like those noted by Mr. Dean; although in considering the importance of different movements of the board it may be pointed out that the use of springs to suspend and hold the board in the middle, does not commend itself as being good for scientific observation, since the springs when stretched, through the movement of the board in one direction would tend to pull it back with equal violence in the other direction, followed by other swings to and fro retarded only by the friction of the air and rod, thus making it impossible to draw any conclusions as to the movements after the first beyond the fact that there were other violent movements of the air, which everyone would concede in advance.

Now *if the inrush of air immediately following a shot* accompanied by eddying and dust raising, whether followed by an explosion or not, or, if the vastly greater inrush following an explosion of coal dust, constitutes Mr. Verner's so called "theory," it would seem to be acceptable to most if not all students of explosion phenomena; but there appears to be another feature in this theory, if his explanation is understood, namely, that there is an "inrush of air along the bottom" in the face of an advancing explosion of coal dust.

The Theory Violates Natural Law

This is the feature which appears incomprehensible, as it seems to be so completely in violation of the fundamental laws of physics. How can there be coexistent a great pressure of expanding gases and in the same area of combustion, a depression or void? According to manometric records in the galleries of England, France and the United States, the pressures due to an explosion may rise to over 100 lb. per sq.in., registered at the side of the passageway. When these pressures are high and the pressure or explosion zone is advancing at the rate of 1500 to over 2000 ft. per sec., how is it conceivable that anywhere in that zone, either at the floor or anywhere else, there can be an area of depression, or pressure below atmospheric which would cause a cool current of air to approach the high-pressure area and, as it were, dive under it?

Alleged Proofs Fail to Convince

Verner and Dean apparently accept two phenomena as "proofs" of their theory. These are the movements of débris toward the origin of an explosion, of which there can be no doubt and the reported statements of men that they felt incoming currents of cold air. As to the validity of these latter assertions there may be some doubt, for the men were without question in much mental agitation at the time.

They accept these as proofs without taking into account the *time* when the movements of débris or air took place or the relation of such movements to the path of the explosion.

All will concede that an inrush of air follows a shot, and continues in point of time until atmospheric pressure has been reached. If coal dust is present and ignites, a pressure is rapidly built up by the hot gases of combustion, which force their way in every direction where the pressure is lower. Also there is a great inrush following any explosion, and doubtless there is a partial vacuum, or depression of over half an atmosphere, say 7 or 8 lb. per sq.in., following an extensive explosion (records of five pounds have been reported), which unquestionably brings back over the path traversed by the explosion, many movable articles, often of considerable weight. The visible effects of this inrush or return current seem to be improperly attributed to the mysterious "counter-current."

The movement of air in the vicinity of a mine fire has been cited as evidence of similar conditions in the vicinity of an explosion. It has been said that the ingoing current of cool air along the floor, passing under the hot gases and smoke from the fire, resembles in its action Verner's counter-current. The conditions are not parallel; first, a fire compared to an explosion is stationary, and second, there is no pressure caused by an open fire, but only a small depression below atmospheric pressure. This is created by the hot gases, which, being lighter than air, rise and cause the heavier cool air to flow in below.

Blownout Shots Only One of the Causes of Explosions

If we are to get at the "bottom" of the Verner theory, it does not seem wise to confuse the issue by paying too much attention to the movements surrounding a blownout shot; according to authentic reports, there are many other ways in which coal-dust explosions have been caused, such as overcharged, but effective shots of long flame-producing explosives, pockets of firedamp and ignition of coal dust by electric arcs from grounding of trolley or power wires. No one can sanely question that at the point or origin of a coal-dust explosion, there must be violent agitation and eddy action of the air to bring the dust into action, for in very few instances is there sufficient coal dust in the air beforehand.

It is to be noticed that Parfitt and Verner in the Sept. 26 issue of Coal Age, endeavor to combat that part of Mr. Ashworth's letter in the Sept. 5 number, in which he says "that no such reverse current could be produced until the force exerted by the powder or other explosive had expended its energy. It would seem that at the point *C* (points on either side of the mouth of the borehole shown) in the figure, the air would be in a state of compression, instead of a depression or vacuous condition" existing, as he (Mr. Parfitt) stated, assuming "that the shot was fired in the face of a heading."

Is There a Vacuum during an Explosion?

Mr. Ashworth's opinion seems founded on laws of physics, and is supported by the data obtained at the various experimental galleries. For instance, in the Altofts experiments to which reference has so often been made, the cannon was placed in a gallery which was, to all intents and purposes, open at both ends. The gases and flames in many of the tests not only went in the direction the cannon was pointed, but also back past the cannon due to the pressure created by the shot and the explosion (see experiment 116 and others).

There was further direct proof of the pressure surrounding a shot reported in Bulletin 56 of the U. S. Bureau of Mines, entitled "First Series of Coal-Dust Explosion Tests" at the experimental mine, given on p. 39, where in the endeavor to start an explosion from the outside of the mine through a gallery, the cannon was placed against a plank stopping and a hole cut in the same opposite the borehole. The report states "The plank stopping was burst *outward* by the effect of the shot," although it failed to cause an explosion.

An issue might be raised with Mr. Ashworth about the last part of his statement "that when a shot blows out, the heated gases and particles of solid matter are projected into the main roadway, where the blast stirs up the dust. *At this initial moment, the immediate atmosphere in the vicinity is quickly rendered devoid of oxygen, which makes an explosion of the dust and gases at that point impossible.*" Mr. Parfitt considers this as supporting Mr. Verner's theory.

Explosives as Manufactured Support Their Own Combustion

The question is, why should the atmosphere be devoid of oxygen unless the combustion of firedamp or coal dust has already begun. In other words, Mr. Ashworth and Mr. Parfitt evidently overlook the fact that manufactured explosives of all kinds have their self-contained supply of oxygen, which is nearly enough for complete oxidation, though some further burning may continue in the atmosphere.

The gases from the blast would contain a large percentage of inert gas, but as compared with the amount of air present in an entry of ordinary size, the quantity of gas would be small (and it could easily be figured). Further, the heated condition of the gases and the formation of gas of a most highly inflammable character like CO would offset, in effect, any slight decrease in total oxygen available for the combustion of coal dust in the vicinity.

To What Does the Argument Lead?

In conclusion: If for the moment we assume there is a "counter-current," where does it lead us? What does it mean? Does it bring us any nearer to the prevention of explosions? It has been hinted that it suggested the cutting off of the supply of air in the mine, and this method has been practiced by shutting down the fan at shotfiring time in some Western states, including Mr. Verner's state, Iowa, and notably in Kansas and Oklahoma, which states are reported to have more explosions from shotfiring than occur in any two other coal-mining states in the country of many times their output. One

mine is said to have had three in a single year, and another operation two in one month.

Is that what the theory leads to? If it does not, it should be made clear that it only deals with the internal mechanism of an explosion, is of theoretical interest only, and has no relation to the prevention of such unfortunate occurrences as otherwise the general mining public which has neither the time nor the means of studying the matter, is liable to be seriously misled.

Opportunity for Export of Mineral Fuels

In its reserves of mineral fuels, the United States holds an impregnable position as a world power in industry and commerce. Our production of coal overtops that of any other nation and, in fact, nearly equals the combined output of Great Britain and Germany, the nations that rank second and third.

Inasmuch as the United States leads the world not only in coal production, but also in low cost of coal mining, and apparently possesses the greatest reserves, it follows, as was pointed out by Campbell and Parker in 1908, that foreign countries will obviously look more and more to the United States for their supplies of coal. The lower cost of production in the United States, which is due largely to the favorable location of the coal beds and the extensive use of mining machines, is offset in Great Britain by the proximity of the coal mines to the seaboard.

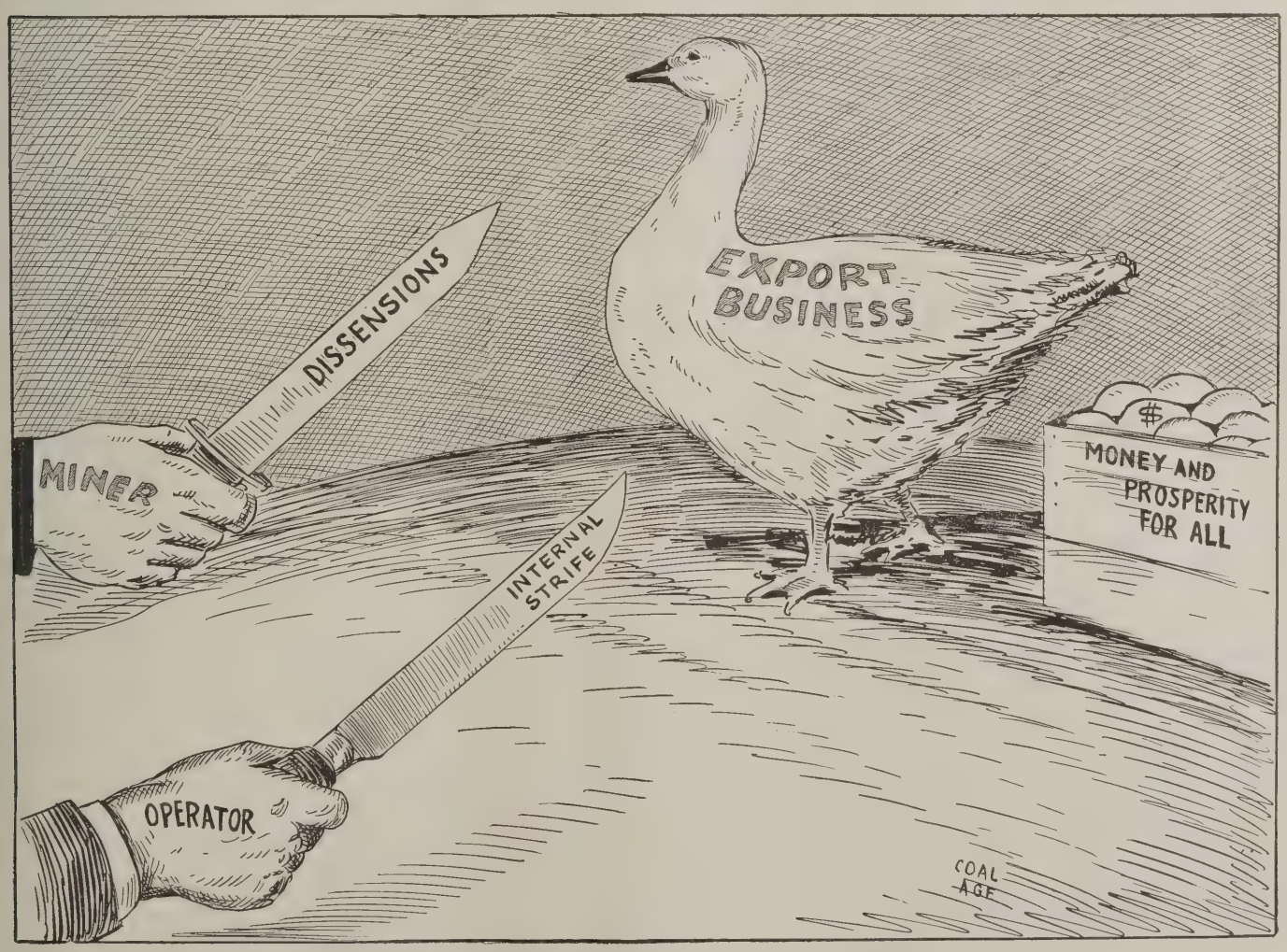
The wages paid in the United States are higher than in any country of Europe. This country's preëminence in the production of petroleum is even more conspicuous, so that the opportunity for exporting mineral fuels presents no immediate problems for the domestic producer.

Mining Active in Virginia

The mineral production of Virginia increased in value from $14,995,842 in 1912, to $17,178,580 in 1913, according to the U. S. Geological Survey.

Virginia ranks relatively high among the states in the variety of mineral substances produced on a commercial scale, but somewhat low on the list in the value of the production. Virginia is the leading state in the production of iron pyrite used in the manufacture of sulphuric acid, and in the production of manganese ore, and is the only state in which rutile is produced. It also ranks first in the production of soapstone, most of which is manufactured before being marketed into heat and chemical-resisting articles; such as hearthstones, mantles, griddles, sinks, etc.

The product of chief value, however, in the state is coal, which represents something more than 50 per cent. of the total value of the mineral production. The production in 1913 amounted to 8,828,068 tons, valued at $8,952,653, against 7,846,638 tons, valued at $7,518,576 in 1912, an increase of nearly a million tons.



Don't Kill the Goose That Lays the Golden Eggs

Electrification of the New River Co.'s Mines

By Edward L. Sayers*

SYNOPSIS—Shortly after organization, the New River Co. equipped all of its mines with direct-current apparatus. Today, it is rejecting this equipment and placing in its stead alternating-current machinery of modern design.

The New River Co. was organized in 1906 to carry on a general coal-mining business in West Virginia. Shortly after organization, it purchased a number of other concerns, some operating and some still in the development stage, and later it opened up new mines.

At present it owns 14 mines in the Dunloup Creek district and six in the Cranberry or Beckley district. The first of these operations was opened up in 1893, at Macdonald, and the last was put into working condition at Price Hill, in 1908.

At the time the New River Co. acquired these mines, only one or two were equipped with electric generating units, while now there are 25 direct-current generating units at the mines, ranging between 60 kw. and 250 kw. in capacity. In line with the progressive policy of the management of this company, a contract has been executed with the Virginian Power Co. for a supply of alternating current, and an entirely new equipment is being installed.

The Virginian Power Co. recently ran transmission lines into this region from its central power station on the Kanawha River, near the mouth of Cabin Creek. The line through the Dunloup and Cranberry districts is shown on the accompanying map, as is also the plan of distribution to the several mines.

At Scarbro there is a general meter station for measuring the energy used in the Dunloup Creek District, and near Cranberry there will be a similar installation for measuring the power consumed in that district.

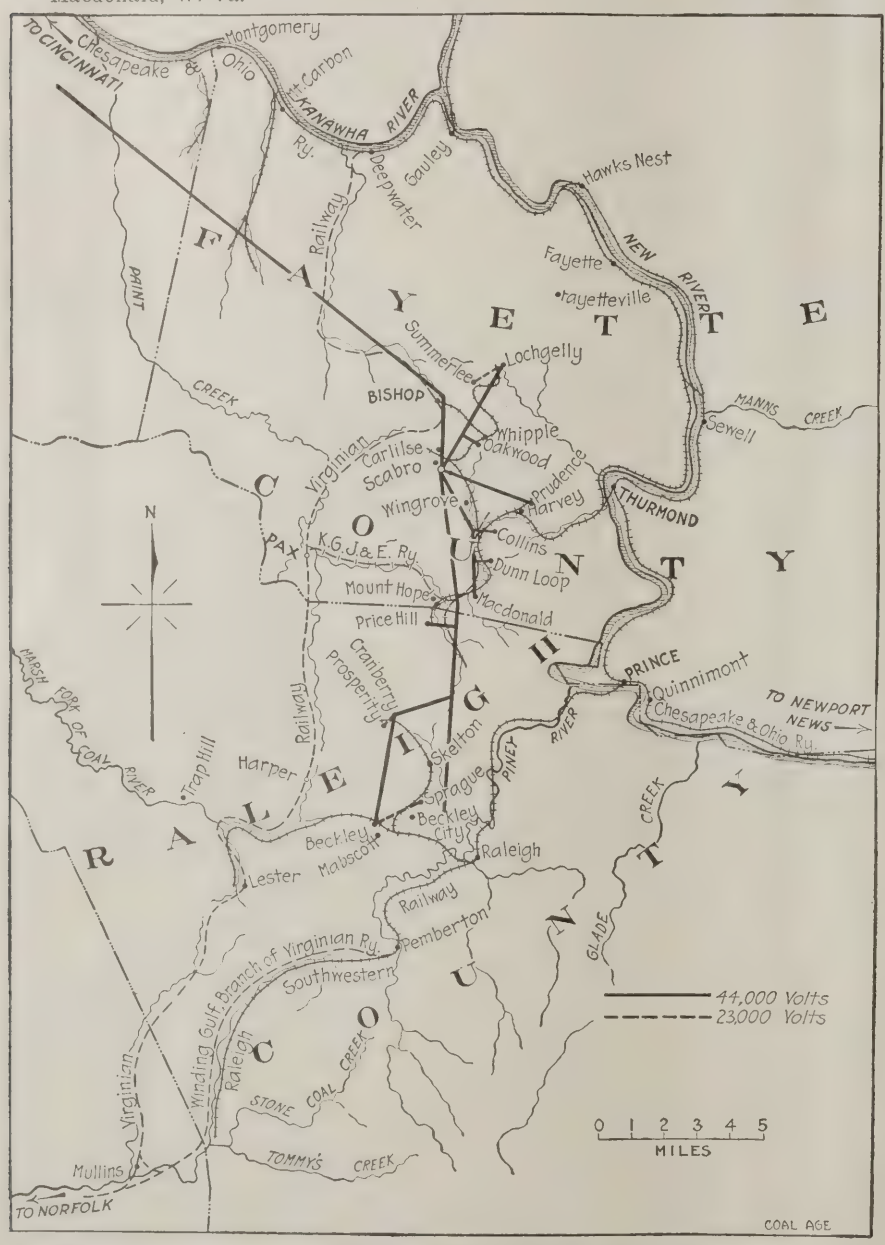
The alternating current supplied on the main transmission line is 44,000 volt, 60 cycle, three phase. Distribution lines of 44,000-volt potential radiate from the Scarbro metering station to Lochgelly, a distance of four miles; to Prudence, three miles, and to Macdonald, five miles, while a 2300-volt line runs to Carlisle and Oakwood, about one mile away. The line to Lochgelly provides for Summerlee through a transformer station at the former point, and Whipple is taken care of by a similar station on the branch line opposite the mine.

The line to Prudence supplies power to Harvey, which in reality is operated as one mine with the former operation. The line to Macdonald picks up the load at Collins and Dunn Loop, at which points there are separate transformer stations stepping the potential down from 44,000 to 2300 volts for use in the motor-generator sets and the large pumps, and from this voltage to the lower pressures used for lighting, ventilating and pumping.

The main transmission line between Scarbro and Cranberry will be tapped near Price Hill, and a transformer station there installed to lower the voltage for use at that mine.

From the metering station near Cranberry, a 44,000-volt line will be

*Macdonald, W. Va.



Map Showing Location of the New River Co.'s Mines in West Virginia

run to Cranberry and to Beckley, while 2300-volt lines will be built from Cranberry to Prosperity and from Beckley to Sprague. Mabscott is supplied with direct current from Beckley.

Scarbro-Wingrove, Summerlee, Whipple, Lochgelly, Cranberry-Prosperity and Carlisle-Oakwood are shaft mines, the average depth of which is about 475 ft. The standard hoists selected for these mines have two conical drums varying from 6 to 9 ft. in diameter, driven by 400-hp., 2300-volt induction motors, at a speed of 600 r.p.m. In the case of the Cranberry mine, the shaft of which is 467 ft. deep, a maximum rope speed of 1910 ft. and an average of 1655 ft. per min. are guaranteed. The time of acceleration is 6 sec., of retardation 5 sec. and of caging 7½ sec., and the overall mechanical efficiency is 80 per cent.

Hoists will also be installed at Beckley and Sprague, which are slope mines. The old d.c. voltages of 250 and 550 are being retained in the mines for electric haulage, and motor-generator sets using 2300-volt alternating current and delivering 300 or 600-volt direct current are being installed at the various plants.

Pumps have been standardized into three types, as follows: 3½x4-in. horizontal triplex pumps mounted on trucks with 5-hp. d.c. motors for 1000 r.p.m., and either 250 or 500 volts, depending on the standard of the mine; 5x12-in. horizontal duplex pumps driven by motors ranging between 15 and 35 hp., and 10x18-in. horizontal duplex pumps driven by 90- to 125-hp. motors. On these larger machines, 2300-volt alternating current is employed.

The standard ventilator now being installed is a 9x4-ft. double-inlet exhausting reversible fan, driven by a 50- or 75-hp. motor taking 2300-volt alternating current and operating at 580 r.p.m.

All of this new equipment embodies the latest improvements in mine machinery, and, in fact, it has always been the policy of the New River Co. to keep abreast of progress in methods of mining coal. At the time it acquired the mines in this district, it discarded practically all the machinery then in use, at once installing new and modern equipment. Times have changed since then, however, and now practically all of the equipment then representing the best practice in coal production must be disposed of, giving way to the still more modern and efficient alternating-current machinery.

Some Notes on the Panama Canal Routes and Coal Markets

SYNOPSIS—While the canal route will materially shorten the distance from the Orient, it does not bring the Atlantic seaboard coaling ports closer to any important industrial or manufacturing center. Southern ports have the greatest advantage. Competition with oil is an important consideration.

The Panama Canal will not bring the Eastern seaboard of the United States distinctly nearer to any one of the manufacturing countries of the world. Accordingly, one is not to expect that the opening of the great waterway will seriously affect our exports of coal. We are annually exporting to foreign countries in the neighborhood of 23,000,000 tons of coal and coke, having a value of about $69,000,000; but the great bulk of this goes to Canada. The canal may change the situation somewhat, but nothing radical need be expected at once.

China and Japan will be brought considerably closer by sea to New York and New Orleans, but these two countries are themselves producing about 35,000,000 tons of coal. That their importations from other regions are comparatively small is illustrated by the fact that from Great Britain they get only about 45,000 or 50,000 tons annually. Eastern Australia and New Zealand will be very much nearer to our Atlantic Coast by sea, but this district is mining about 14,000,000 tons. If these two districts of the Western Pacific—one in the north, the other in the south—are importing coal in any considerable amount, they are not getting it from the United States nor from Great Britain.

Shortening of Routes

The western part of South America will be brought into a much closer maritime relationship with eastern United States. As this entire district produces but a moderate amount of coal itself,* and as it has already become a buyer, we may expect that the canal will have an immediate effect upon American coal exports to this quarter of the world.

The particular countries involved are Colombia, Ecuador, Peru, Bolivia and Chile. Two of the principal ports are Callao, Peru, and Valparaiso, Chile. The following tabulation exhibits the change brought about by the canal in respect to all-sea routes from ports in the eastern section of the United States.

Shortening of Sea Routes Between Eastern United States and Western South America (in Nautical Miles)

Port	Through Straits of Magellan	Through Panama Canal	Decrease
Distances from New York—			
Callao	9603	3392	6211
Valparaiso	8460	4637	3823
Distances from Hampton Roads—			
Callao	9505	3136	6369
Valparaiso	8273	4437	3836
Distances from Philadelphia—			
Callao	9603	3302	6301
Valparaiso	8371	4603	3768
Distances from Baltimore—			
Callao	9629	3260	6369
Valparaiso	8397	4561	3836
Distances from Charleston—			
Callao	9521	2924	6697
Valparaiso	8289	4225	4064
Distances from New Orleans—			
Callao	9986	2744	7242
Valparaiso	8754	4045	4709

Callao is not now one of the leading South American ports, in so far as coal is concerned; yet its position makes it representative of the northern part of the coast in respect to distances.

It should also be remembered that the Panama Railroad and the National Railroad of Tehuantepec even now offer as short a route as the canal will. The one railroad has approximately the same location as the canal,

*Chile is the chief producer of coal in South America. In 1913, it produced some 1,400,000 tons. This was far short of the requirements, as she imported some 1,200,000 tons, nearly all of which came from Great Britain and Australia.

and the other crosses Mexico at the most southern point of the Gulf of Mexico. These routes can scarcely come into competition with the canal in respect to shipments made in bulk despite the partial offset of the charges through the locks. The change from ship to railway and from railway to ship involves heavy expenses. These are not due simply to the mere cost of unloading and loading, but to the difficulty of handling the ships economically. A ship that discharges her cargo to the Panama R.R. at its Atlantic terminus must be forthwith supplied with a return cargo. This is a difficult condition to meet and even then the freight rates through the canal would probably be considerably less on bulk shipments.

If, then, there is any coal business in western South America, it will in all probability go through the canal. Bolivia and Columbia do not participate in this business and Peru makes only a small showing. But the latter country has been buying coal. In the fiscal year 1907-1908, she purchased 30,925 tons of bituminous coal from us, the valuation being $90,251. In the fiscal year 1909-1910, she dropped to 84 tons, but the following year there was a partial recovery, the total being 19,446 tons.

Shipments from the United States to Peru and Chile

Shipments of coal from British ports are indicative of the existence of some business. Apparently, these shipments have been pretty well confined to Peru and Chile. Australia also shipped considerable to Chile.

SHIPMENTS FROM THE UNITED STATES TO PERU AND CHILE

Country	1908	1909	1910	1911	1912	1913
Peru	30,925	11,350	84	19,446	39	9,209
Chile	59,963	28,282	39,183	26,688	29,751	112,067

It is evident from this table that Peru and Chile are both in the market for coal. We may assume that the United Kingdom and Australia will be our chief competitors in the period following the opening of the canal. The canal will put our Atlantic seaboard in a much better position than the best situated of British ports. The route from Cardiff to Valparaiso via Panama Canal is but little shorter than by way of the Strait of Magellan. So that coal shipments might go either way in unbroken cargoes. The enormous advantage possessed by our Atlantic seaboard is one which should be taken under consideration. With such an advantage, it would seem that we ought to do a considerable business from the ports of Philadelphia, Baltimore, Hampton Roads, Charleston and New Orleans.

As between American ports, a consideration of the lengths of the sea routes points to the southern ports as the ones which should handle and develop this South American business; Philadelphia might also be included. Norfolk and Charleston are the most southern of all the coal ports within reach of the Atlantic Ocean. Baltimore, while somewhat more distant by sea, is quite near to a great bituminous coal field. New York is not a natural port for this business, being more remote both by sea and rail. Eastern United States ports from Philadelphia south are the chief ones concerned.

Coal in Competition with Oil

The coal resources of western South America are apparently rather limited. Chile is producing about 1,300,000 tons annually. The others are mining a negligible amount. These countries are increasing their manufacturing industries. The business now being done with them by the United Kingdom, Australia and the United States is relatively small. But the Panama Canal will put us in a more favorable position to get a large share of the business, even if it be granted that conditions have heretofore been against us.

In recent years, oil has entered the field as a competitor of coal. This substitution is being energetically pushed especially in respect to railways and ships. In California and Russia, the railways are making extensive use of oil. Russia, for example, uses annually on her railroads 650,000 to 700,000 long tons. It would also seem that the naval authorities in the United States were abandoning the use of coal in respect to new ships. Thus, the United States has now, either built or under construction, 4 battleships, 41 destroyers, 30 submarines, 1 monitor, 3 tank ships, etc., all designed for burning oil and nothing else. The U. S. Navy uses oil at the rate of about 30,000,000 gal. per year. Whether the British Navy will definitely commit itself to oil, it is perhaps too early yet to say. The indications are that it will do so in large part or entirely when the authorities are convinced that an adequate supply will at all times be available.

From a consideration of such facts as these, the conclusion would seem warranted that the next few years will witness important displacements of coal by oil. It may be expected that this movement will affect to some degree the shipment of coal from the United States to the west coast of South America. Whatever oil this district consumes, as its industrial development goes on, will come presumably from four oil fields. These are California, Texas, Mexico and Peru. If the British Navy goes over to oil, we may expect the shipments of best quality Welsh coal to fall off and disappear. But this will hardly affect the exportation of coal from the United States.

However, the supply of mineral oil seems to be limited, so that we may expect the price to advance constantly with the widening of the field of application. The coal supply of the world, and of the United States in particular, appears to be well-nigh inexhaustible. Oil consumption may temporarily retard exportations from attaining their full proportions and also result in a shading of coal prices. But unless some great unexpected sources of supply are discovered, coal will undoubtedly continue well in the lead.

What's the Use?

By C. W. Crawford*

The inducement to builders of hoisting engines to fall over each other in a scramble to furnish a higher class of such machines is meager. Heretofore any old rattletrap that would wind a rope was good enough to hoist coal. Coal has been so plentiful and so easily secured that operators did not discover any dignity in the trade of making engines. Only the sale of coal and the manipulation of coal lands commanded their enthusiasm. So easy it has been to "make good" in coal mining that many of the leading operators have become millionaires (?) and the rest are following in their wake with fair prospects.

The output of coal per each mine is increasing as rapidly as the engines can be pushed to further duty, and

*President, Crawford & McCrimmon Co., Brazil, Ind.

the engineers can be induced to handle their machines more rapidly, regardless of increased risk. Engines that may be rated as small ones are made to do the duty of larger machines by rapid rotative speed and by using small winding drums.

Engine builders are not encouraged to design better machinery, but the same kind their fathers built— and it must be cheap. No innovation nor even a streak of brains is cared for. Greasy mechanics don't know what is wanted in hoisting coal anyway. Engines are made (for this purpose) just as they were 50 years ago with whatever added display the builder can afford for his own gratification, or for a talking point against his competitor. However, upon one point all are agreed—the engines must be more easily handled than formerly. The engineer demands this, and the operator encourages it for the greater output; and the builder in securing greater ease in handling scores a good record, but the operator gets the money.

It usually happens that the operator is the purchaser of new machinery outfits for coal mines, and he assumes that the existing styles are good enough, and but little inquiry is made about better methods. Local preference occasionally prevails but usually only the price is considered, and then ill considered. The battle of prices is generally centered on the hoisting engine regardless of the example of the shrewd dealers in less important detail equipment. And it frequently happens the buyer pays more for a fan to ventilate his mine than he does for the hoisting engine. Or he pays a liberal price for a separator in the installation of the pipe line, that might be made by his engineer, out of pipe fittings, that would be infinitely better and at almost no expense.

Without decrying the quality of any of these goods, the care in the choice of the hoisting engine would seem to be the more important, inasmuch as it is the money maker, while the others are only accessories. But it is unfair to disparage the existing engines, for they are usually well made—for the price—but incomplete. No security against a runaway is provided.

No security against overwinding that will stop a runaway cage having a million foot-pounds of energy stored in it, acting in the space of a few feet and in a fraction of a second of time is vouched safe. It is no censure to the engineer to say he might become paralyzed, or he might drop dead during a hoist—similar accidents have happened.

It is never mentioned in the books or in the advertisements that the momentum of a cage and load at rapid runaway speed is extraordinary, and no estimate of the strength of any device that will stop a cage and load instantly is ever offered nor of the breaking stress or of the energy stored in a 20-ton winding drum revolving at high speed.

That such stress is extraordinary is attested by the number of broken ropes and the number of men killed by falling cages. The excuse of the operators that they all use safety catches cuts no cheese, for they all know such devices are not wholly and always reliable. But they are only culpable in that they do not demand something that is reliable. If such a device were wanted and asked for, it would be forthcoming. It need not be very expensive—the cost of one smashup would pay for it, and then some.

But, however, this is a deeper problem than most men know or think. In a bad runaway the momentum of the heavy winding drum added to the pull of the engines usually parts the rope. The factor of safety doesn't count, and the investigating committee and the coroner finish the job. Dead men have no rights, to speak of, and relatives and insurance companies get the worst of it.

A safety device to be absolutely safe and reliable would be a whole lot different from the "as if" devices generally used and would necessarily add somewhat to the cost.

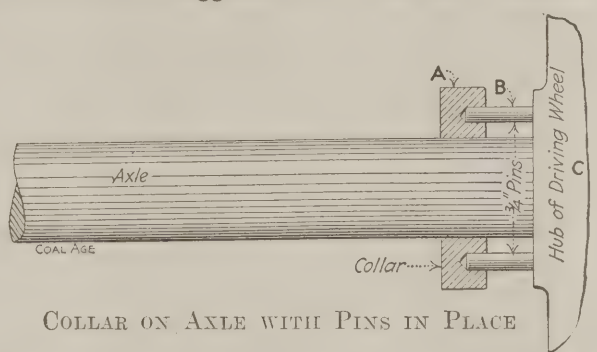
And there's the rub. That is the sticker that heads off the incentive to improve. A few radical improvements are needed, such as a system of expansion and a steam separator. But why contend against the choice of the operators, or the rebuff of the boiler makers? What's the use?

A Scheme to Prevent Collars from Shifting on Locomotive Axles

By Frank Walker*

Repair men who have locomotives of the outside-frame type probably know how nice it is to have the collars slip on the axles, causing the gears to rub on the gear pans, thereby destroying them.

I have tried a good many remedies for this condition but the one here suggested is the best one I have found,



Collar on Axle with Pins in Place

and after it is applied, I have no further trouble from that source.

The accompanying sketch is almost self-explanatory. Remove the collar *A* from the locomotive axle, and drill two holes in the face next the driving wheel and insert two pins of such length as to hold the collar the proper distance from the wheel, which distance should be ascertained with accuracy before the collar is removed.

Production of Madison County Illinois

Thomas Cunningham, of Edwardsville, mine inspector of Madison County, Illinois, has filed his annual report, showing conditions of the Madison County mines for the year ending June 30, 1914.

During the year 26 mines were in operation, employing 4545 men, who dug 3,689,544 tons of coal. The report shows that 8 men were killed, or one for each 461,192 tons of coal mined. There were 85 nonfatal accidents. In the preceding year there were 12 deaths and 116 nonfatal accidents. Four of the men killed during the last year were killed by electricity.

The miners used 46,372 kegs of powder during the year, or a total of 1,159,200 pounds of powder, an average of one pound to each three tons of coal.

*Vandergrift, Penn.

The Coal Field of Sebastian County, Arkansas

By Edward F. Hackett*

SYNOPSIS—The coal is found in what are known as the Backbone Ridges, and is of a quality low in volatile matter and in ash. Although the measures have a decided dip, the mining conditions are generally favorable.

In the Backbone Ridges of Sebastian County, Ark., occurs the outcrop of the coal measures from which is produced the famous Arkansas smokeless coal. These ridges beginning in Le Flore County, in eastern Oklahoma, enter Sebastian County between the towns of Bonanza and Hackett, extending thence eastwardly for several miles, where they split, one part bearing northeast and the other east and south.

At Bonanza the coal dips to the north at an angle of about 10 deg., outcropping along the foothills of the ridge. The outcrop runs practically due east to Jennie Lind, where it turns to the northeast and rounds the point of the ridge, coming back on the south side. At Greenwood the coal is worked by slopes. It here dips to the south at an angle of about 10 deg., the thickness of the seam varying from 4 to 5 ft. The field is here comparatively narrow and the coal bed comes to surface on the north side of the east prong of the Backbone Ridge.

At Excelsior the field narrows to about 1½ miles. West of this point there have been located several small slopes which show the coal to be from 3 to 4 ft. in thickness, and to maintain a uniform pitch of from 8 to 10 deg. About two miles east of Hackett the coal decreases in thickness to 24 in. in some places.

Hackett is probably the oldest mining town in the county, coal having been first produced here in the year 1884 by the Kansas & Texas Co. This operation was, however, abandoned in the year 1890. West of the town is located the Branner Coal Co.'s slope. At this point the coal dips due south at 10 deg., and shows 4 ft. in thickness.

An analysis of the fuel obtained from this slope shows the following results: Volatile matter, 13.10 per cent.; fixed carbon, 80.01; ash, 6.89; B.t.u. content approximately 13,000.

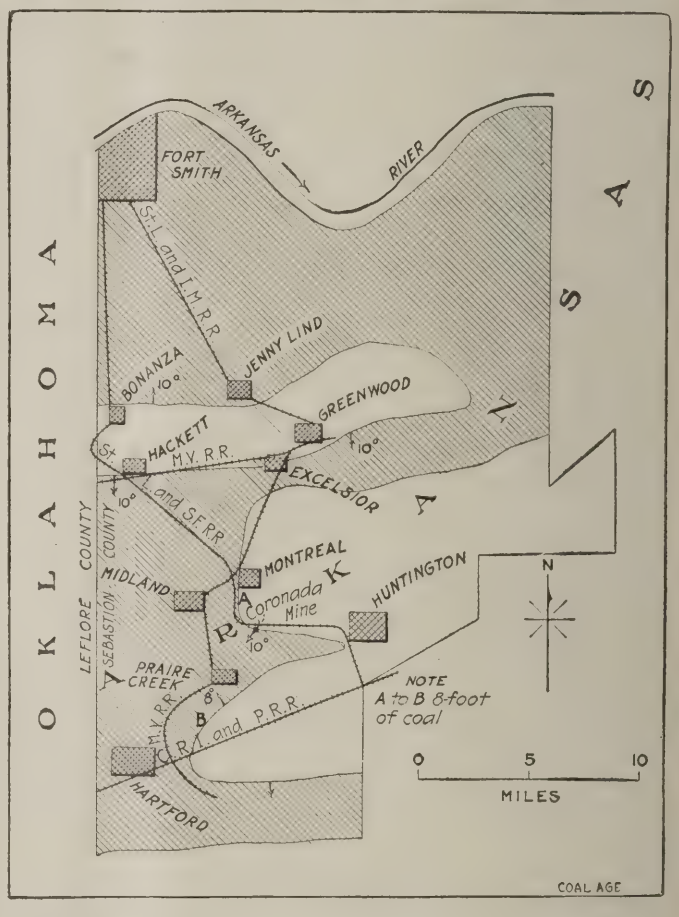
About two miles west of the Branner slope the outcrop again enters the State of Oklahoma, and is then known as the Panama Segregation by the U. S. Geological Survey.

On the south outcrop, which turns south from Excelsior with the ridge, no developments have been made until Montreal has been reached. This latter place was for several years one of the mining centers of the state, but has been abandoned for some time. At this point, the coal averages three feet in thickness and was worked by slopes and by stripping.

From Montreal to Coronado, located on the St. Louis & San Francisco R.R., the coal averages about 3½ ft. in thickness, but the outcrop has been pretty well worked out.

From Coronado mine on, or between approximately the points *A* and *B* on the accompanying map, the coal increases in thickness, but carries a dirt band 10 to 12 in. thick. The upper bench averages 3 to 3½ ft. in depth, and the bottom from 3½ to 4 ft., the two measures remaining in close proximity throughout the Coronado, Huntington and Prairie Creek districts to a point near Hartford. In the Prairie Creek district, however, the dirt band decreases to about 4 in. in thickness.

At Hartford, the bottom vein disappears and only the upper bench is worked. This dips practically due south and shows from 4 to 4½ ft. of clean coal. The country east of Hartford being rough and without transportation facilities, little development has been made in this section.



Map Showing Coal Areas of Sebastian County, Ark.

The mining conditions in Sebastian County as a whole are good, the roof being of excellent quality and requiring but few props in the 8-ft. coal.

Practically all of this coal bed is overlaid with a stratum of hard, tough sandstone. Firedamp is found in small quantities, but open lights are used exclusively throughout the fields, accidents from gas explosions being extremely rare.

The mines are worked upon the room-and-pillar system. The usual method of preparation throughout the field is by passing the run-of-mine coal over shaking screens. As a rule four sizes are made, the slack passing through a

*Spiro, Okla.

⅝-in. screen, the pea through a 1¼-in. screen and the nut through a 2½-in. screen.

The Arkansas state law calls for payment on the run-of-mine weight before the coal is passed over any screen. This, together with the soft nature of the coal found in Sebastian County, and the practice of shooting from the solid, causes the slack production in this field to be extremely high.

Arkansas as a state has no legal requirements for either mine inspectors, mine foremen or fireboss, or, as he is called here, "gas boss." In fact what laws have been put upon the statute books from time to time are widely scattered, and it would require an attorney-at-law some time to sift them all out. Consequently, with the exception of a few of the major statutes, the balance remain upon the books and are unknown to the general mining public. It is quite probable, however, that the present chief mine inspector, Mr. Thomas Shaw, of Midland, has done more for the safety of miners and mining interests throughout the state as a whole in the past 12 months than has ever been accomplished before.

Don'ts for Outside Foremen*

1. Don't forget that your position and responsibility demand strict sobriety, and do not hire or allow to remain in your employ any subordinate official addicted to the use of liquor.
2. Don't fail to see that the provisions of the mine law, so far as they apply to you, are obeyed and carried out.
3. Don't fail to see that all dangerous machinery and all dangerous places are properly protected as required by the mine law.
4. Don't wait until some other official calls your attention to dangerous conditions; detect them yourself and have them remedied.
5. Don't wait until the fire insurance inspectors come around and report to you dangerous conditions.
6. Don't fail to have a signal apparatus placed at important points in every breaker, washery or tipple, for promptly notifying the engineer to stop machinery in case of accident.
7. Don't fail to observe the law governing minimum age of oilers, breaker engineer and other employees.
8. Don't fail to keep all steam boilers in safe condition, properly equipped and examined.
9. Don't forget that thorough and efficient examinations and inspections before accidents bring better results than the same work after an accident.
10. Don't forget that we expect you to help us educate the employees to take care of themselves, and this can best be done by personal instruction and attention.
11. Don't get excited if anything goes wrong; keep your head.
12. Don't fail to correct or discipline anyone you find doing anything wrong or violating the rules.

*From Susquehanna Coal Co.'s Book of Instructions.

A Reinforced-Concrete Lining for Mine Shafts

What is believed to be an entirely new application of reinforced concrete was recently undertaken at the Glenmeller Collieries, at Haltwhistle, Northumberland. This consisted of lining two new shafts with concrete slabs reinforced with expanded metal.

These slabs, which were cast in molds on the site, were made 3 ft. 1 in. long, 1 ft. 6 in. wide, and 5 in. thick. They were reinforced near their concave surface with expanded steel of a cross-section of about ¼ sq.in. per foot of width. They were tongued and grooved to allow of their being fitted and keyed into each other, the joints being later filled with cement grout so that the slabs formed a monolithic cylinder when placed in position.

A hole was left in each slab about 1 in. in diameter to allow of its being slung and lowered into position after it had been allowed to season for a reasonable length of time. This hole also served as an inlet for cement grout to be injected into the filling behind the slabs after they had been fixed in place.

The two shafts in question were sunk through water-bearing strata which had been previously treated by the Francois method of cementation. During the process of fixing the reinforced lining in position, the space between the lining and the face of the strata was filled with ordinary concrete into which cement grout was injected after the reinforced lining had been secured in place. This rendered the shaft water-tight.

It is said that this new lining possesses certain advantages over the ordinary brick lining as it is more impervious to water and requires no outlay in upkeep expenses once the work is completed. The shafts lined as described above have been subjected to ordinary working conditions for some time past.

Coal Markets of Cuba

Practically 96 per cent. of the anthracite coal imported into Cuba during the fiscal year ending June 30, 1913, came from the United States. In other words, of the total amount imported into Cuba for that period, which was 228,238 tons, valued at $774,333, 220,965 tons, valued at $731,636, came from the United States.

The total amount of bituminous coal imported into Cuba for the above named period was 1,125,094 tons, valued at $3,630,750; of this amount, 1,118,347 tons, valued at $3,598,121, or about 99 per cent., came from the United States.

Some of the largest consumers of bituminous coal in Cuba are:

The Spanish-American Iron Co., Santiago de Cuba.
The Juragua Iron Co., Santiago de Cuba.
The Cuba Copper Co., Santiago de Cuba.
Cia. Electrica de Santiago, Santiago de Cuba.
The Santiago Ice Co., Santiago de Cuba.
The Santiago Brewing Co., Santiago de Cuba.
The Cuba Railroad Co., Camaguey, Cuba.
The Guantanamo & Western R.R., Guantanamo, Cuba.
Julian Cendoya, Santiago de Cuba.

American Institute of Mining Engineers—The next annual meeting of the Institute will be held in New York City beginning Feb. 16, 1915. Papers to be presented at this meeting should be in the hands of the Secretary of the Institute not later than Nov. 23, 1914, and as much before that date as possible. If a manuscript is received after Nov. 23, the editorial staff will lend its best efforts to having it prepared in time for the meeting, but cannot give assurance that it will be ready in time. Bradley Stoughton is secretary.

The United States Bureau of Mines, in coöperation with the United States Geological Survey, has undertaken additional and more comprehensive investigations pertaining to the problem of mine caves and surface support. The immediate work of the mining engineers and geologists will comprise detailed studies of the extensive open-cut and underground mining operations in southwestern New Mexico. The field investigations will be conducted with special reference to earth pressures and surface subsidence in relation to the geological formation and mining conditions, and the equipment and efficiency of the large mechanical installations in operation there.

To make your boiler settings tight, scrape them thoroughly and make a thin mix of fireclay or cement or both and let the brick absorb all the mixture they can. Then paint the brick over with an asphaltum-base paint of a kind which will not run at the temperatures which the bricks will attain.—Bromley in "Power."

Lehigh Coal and Navigation Co.



1—Tamaqua Breaker. Built 1910. Wood Construction; Capacity, 2500 Tons. 2—Coal Washery near Hauto, Penn., Known as Hauto Washery. Reclaiming Coal from Hauto Refuse Banks in the Vicinity of the Washery. Capacity, 1200 Tons per Day. Electrically Driven. 3—No. 8 Old Breaker. Built 1873—Abandoned 1909. Replaced by Coaldale Breaker. 4—No. 9 Old Breaker. Built 1876—Abandoned 1909. Replaced by Coaldale Breaker. 5—Nesquehoning Breaker. Built 1908. Capacity, 4000 Tons. Equipped with Modern Machinery. Steam Power. 6—Coaldale Breaker. Built 1909. Construction, Wood. Capacity, 4000 Tons per Day. Breaker Is Equipped with 41 Lehigh Valley Plunger-Type Jigs. Steam Power.

Power Department

Power Generation at Collieries*

SYNOPSIS—Although the utilization of exhaust steam in low-pressure turbines may appear economical, the internal-combustion engine is more efficient than a steam plant. It is believed that the vertical, double-acting, two-cylinder, two-cycle engine will be the favorite of the future for colliery work.

Until recent years economy in fuel at collieries does not appear to have been considered of any great importance. Even at the present day it does not receive at many pits the consideration that it deserves, and wasteful engines for pumping, ventilating, haulage, etc., are used, the consequence being that millions of heat-units are thrown away into the atmosphere every hour in the form of exhaust steam.

In more modern installations greater care has been exercised. Where economy in fuel has received serious consideration, low-pressure steam turbines have been installed to make efficient use of the exhaust from already existing steam engines, and thus provide an economical means of developing electrical power for distribution throughout the colliery.

Economical as this system may appear at first sight, it can only be looked upon as a kind of makeshift; the fact that the most economical prime mover of the present day is the internal-combustion engine must not be lost sight of. Whenever a steam plant is now installed for power-generating purposes at a colliery, the same can only be looked upon as a temporary arrangement if the colliery in the future has to compete with pits equipped with modern power-generating equipment.

Gas Engines Are Suitable

The gas engine is admirably suited for colliery work. In cases where inferior coal is available, it can be used most economically in gas-producers of the recovery type; and where the total power required is considerable, the return for the byproducts reduces the cost of gas to a negligible quantity. Where byproduct coke ovens are employed, the surplus gas can be used to advantage in the gas engine, and, of course, for iron works the most economical use for the blast-furnace gas is in this form of prime mover.

Against all this it will doubtless be argued that the gas from recovery producers can be used for generating steam in boilers to drive steam engines or turbines, and also that coke-oven gas can be used in a similar manner; but the fact is indisputable that gas can be used in internal-combustion engines far more economically than in any other way.

Economical as the generation of power by gas engines proves to be, there is another source by which the overall efficiency can be increased, and that is by the use of boilers heated with the exhaust from the engines. The use of such boilers is now becoming general. They will evaporate, roughly speaking, from 2¼ to 2½ lb. of water per hour per brake-horsepower developed by the engine.

The utilization of coal gas principally from coke ovens having a calorific value of from 400 to 450 B.t.u. is receiving more attention every day, and this gas—although somewhat richer in hydrogen than ordinary illuminating gas—is an excellent one for driving gas engines. It is perhaps somewhat strange that more use has not been made in the past of surplus coke-oven gas, and, generally speaking, of gas engines in connection with colliery work.

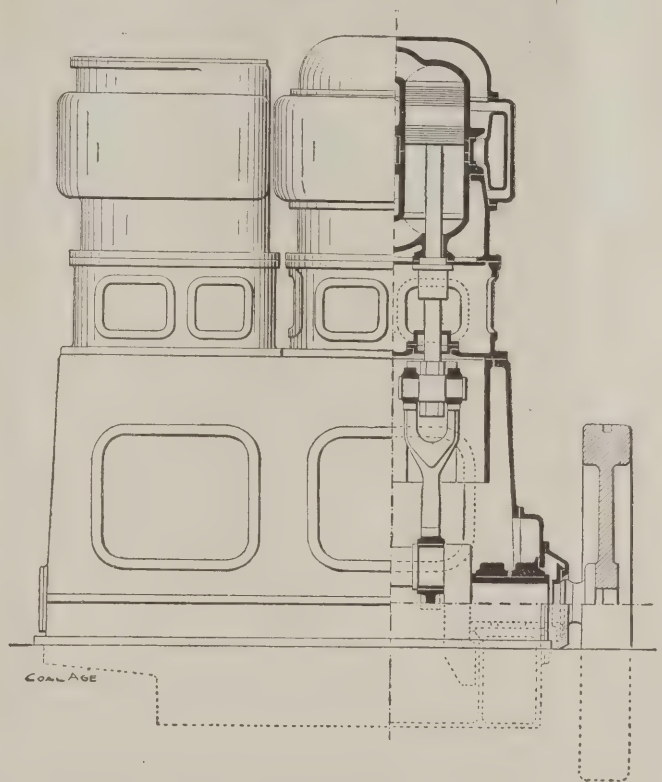


Fig. 1. Part Section of a Valveless Two-Cycle, Vertical Gas Engine

The Experimental Stage Is Passed

Owing to failures during development in the early days, managers still hesitate to install large gas engines. The vertical type has, however, long since passed the experimental stage. It is the one most suited for direct connection to electric generators, owing to the possibility of running at fairly high speeds.

The absolute reliability of the high-speed, forced-lubrication, inclosed steam engine has been demonstrated by thousands of examples: consequently, it is to a similar type of gas engine that the colliery manager will naturally look in the future for driving electric generators in his power station.

One of the weak points in connection with large single-acting vertical gas engines is the frequent necessity

*From a paper by John Davidson on "Development of the Internal Combustion Engine for Power Generation at Collieries," presented on June 4, 1914, at the sixtieth general meeting in London, of the Institution of Mining Engineers.

for cleaning out the cylinders. So long as the pistons are exposed on the underside to the crank case, this difficulty cannot be overcome efficiently, as there is no means of controlling the amount of oil which passes up from the crank chamber.

Another weak point is the burning and failure of the exhaust valves, which require occasional cleaning and grinding-in, and many failures are still experienced because of the breakage of these parts. Another weakness is in the ignition gear, although, generally speaking, it must be admitted that failures from this cause are few and far between, provided, of course, that a modern reliable gear is fitted to the engine in the first instance. From the available statistics one infers that the freedom from breakdown in gas engines is very encouraging, and the weaknesses just mentioned may be looked upon as the only ones that are liable to cause occasional stoppage.

For long, continuous work, an engine which is simple in construction is the one most likely to prevail in the end. The tendency in development has been towards simplicity; but for large powers (owing to the prevalent desire to use air-cooled pistons) multi-cylinder engines, mostly of the tandem form, have found favor among engine builders, although this can hardly be said to be in the direction of simplicity.

If the engines are made on steam-engine lines, with double-acting two-cycle cylinders, the size of the working piston need be only about a quarter of that of the four-cycle single-acting type, and for the same power the strains are proportionately less; both these points are advantages in the case of large units.

In the case of single-acting engines, the pistons are usually called upon to serve as crossheads, and, although they appear to wear exceedingly well, this type will doubtless in the near future be obsolete.

The Type of Engine Favored

The author suggests that the double-acting two-cycle engine—built on substantial lines, which long experience in steam-engine practice has proved successful—will be the one that will ultimately be used by all large vertical engine builders. Representing this type, Fig. 1 shows in part section an engine made by Mather & Platt, Ltd.

The engine referred to is without valves altogether to the working cylinders; consequently it possesses great advantages in the direction of reliability for continuous work. As the engines are built on the two-cycle principle, separate air and gas pumps are required, but these are driven directly from the crankshaft; their valves also are operated direct from the same element in a manner similar to those of high-speed steam engines. Owing to this fact, no gears, camshafts, tappets, or springs are required, and the machine operates as silently as the well known high-speed steam engine.

Accessibility is of prime importance, and in modern engines this point has received most careful consideration. Even in vertical tandem engines we are informed that it is possible to open up and get at the lower piston within forty minutes on a 1000-hp. machine. This speaks very well for the design.

For long, continuous work, it is also of great importance that the bearing and working surfaces should be liberal, and the strength of the parts most carefully proportioned to resist the work which they are called upon to bear. In the type of engine illustrated, the only working parts are the main motion-work, which is of ample proportion, and so arranged that it can be well lubricated without waste of oil, the crank chamber being entirely separated from the cylinders by means of a distance-piece. Scraper-glands are fitted at the top of the crank chamber, as is the usual practice in high-speed steam engines. The oil is thus effectually prevented from being carried up into the working cylinders even by means of the piston rods.

The working cylinders are lubricated by mechanically driven lubricators having a separate pump to each feed. The supply of oil is thus reduced to a minimum. By this positive system of lubrication for the cylinders, it is possible to run the engines over exceedingly long periods without cleaning or any fear of their becoming clogged up with oil. This is a great advantage for continuous work.

As the pistons and piston rods are water-cooled, this does away altogether with the possibility of piston seizure and, as metallic packings are fitted to the piston rods—these having now been brought to a state of perfection equal to those used in steam-engine practice—no fear need be entertained concerning trouble in this direction, and the minimum of attention is required.

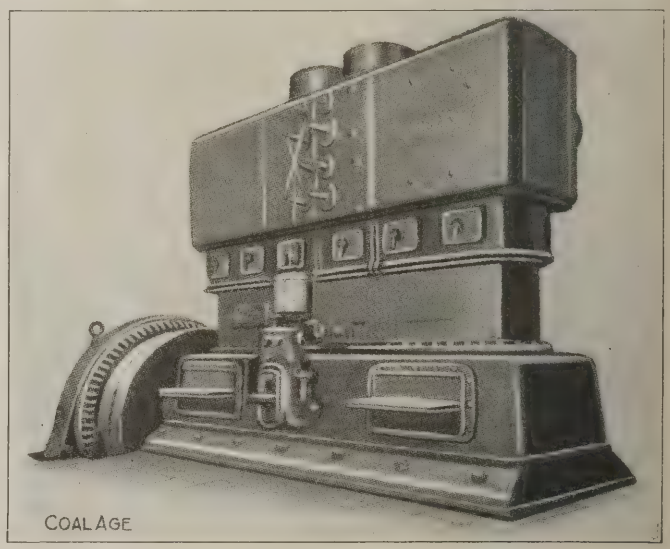


Fig. 2. A 1000-Hp., Vertical Inclosed Two-Cycle Gas Engine

In Fig. 2 is illustrated a 1000-b.hp., two-cycle, vertical, inclosed, forced-lubrication gas engine, which may be taken as typical of the type of machine toward which the trend of development is moving. This engine is built on lines similar to those shown in Fig. 1, all the working parts being lubricated by oil under pressure, and, as the engine is of the double-acting type, the turning moment is precisely the same as that of a steam engine. Owing to the absence of gears, valves and tappets, this four-cylinder engine operates as silently as the ordinary vertical steam engine, and the liberal wearing surfaces, combined with the smooth running of the machine, insure long life.

The Gas Must Be Clean

For continuous heavy service much has been stated with regard to the reliability of the gas engine, but the colliery manager must give careful attention to his side of the business—namely, the production of gas—if he ex-

pects reliability in his prime mover. In the case of boilers, softening plants have often to be installed; in a similar way, in connection with gas-producers and coke ovens, suitable cleaning and purifying appliances must be employed.

Sulphur has to be dealt with drastically, especially where big engines are installed, as in all these cases pistons and rods are of necessity water-cooled. In many instances too liberal a supply of water is used for the pistons, due to the attendants' exaggerated anxiety to feel safe, and acid fumes are condensed on the cool surfaces, causing corrosion. Again, any leakage of water into a cylinder containing sulphurous gas will cause trouble, so that great care should be taken in dealing with this matter. Dust forms another difficulty which requires consideration, but this is one that nowadays causes but little anxiety.

Unwatering a Mine

By I. D. Thomas*

SYNOPSIS—In removing the water from two slopes, two centrifugal pumps mounted on trucks and directly connected to electric motors were employed. These units were lowered as the water receded.

A few years ago a method was employed for unwatering a mine, with which the writer was familiar, that may be of interest to readers of Coal Age.

The mine in question being isolated from any of the other operations of the owners, it was decided that electricity would be the most economical power to use, and current was therefore purchased from a large local power company and transmitted for a distance of four miles at 4000 volts and then by means of transformers at the colliery, stepped down to 440 volts.

From the obtainable data, it was calculated that the property contained at least 100 million gallons of water and was making during the dry season about 800 gal. per minute.

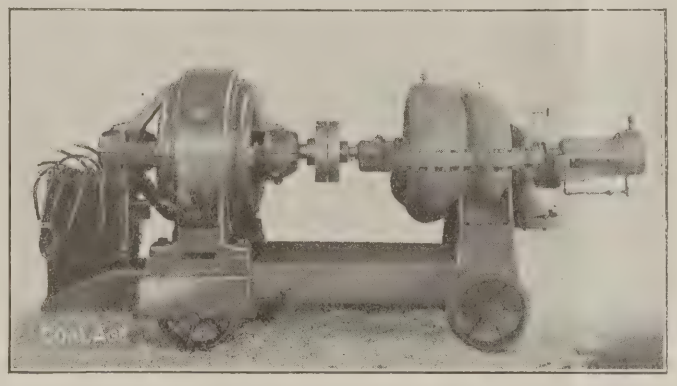


Fig. 1. The Pumping Unit Employed

the horizontal, with pump end down the slope. The pump builder assumed responsibility for the pump thrust and the motor builder responsibility for the motor thrust.

A shelf to carry the compensator was cast integral with the bedplate and the axles were bolted to the bedplate with U-bolts. To the motor end of the bedplate a heavy hitching staple was securely bolted.

To overcome variation in the angle of inclination, a flexible joint was placed next to the suction elbow and to this was fastened, by means of flange unions, a length of 8-in. wrought pipe, on the end of which the foot valve

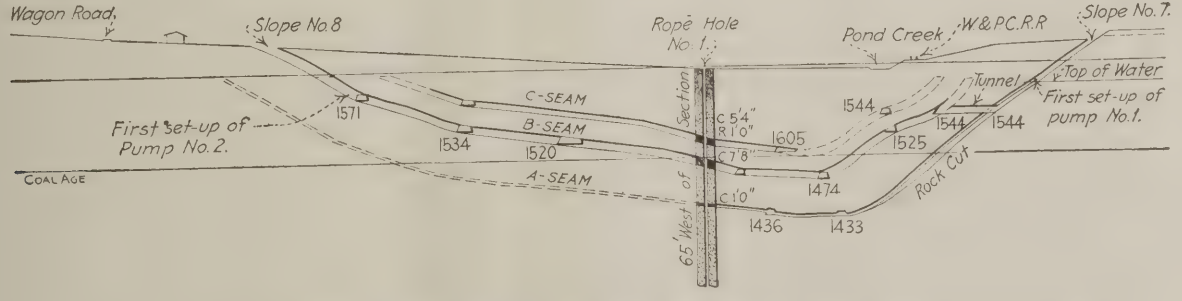


Fig. 2. Cross-Section of the Mine, Showing Successive Positions of Each Pump

On the property were two single-track slopes, one in the "A" or lower vein, driven on the south dip for a distance of 400 ft. to the basin, on an angle varying from 25° to 40°; and one in the "B" vein on the north dip, for a distance of 700 ft. to the basin, at an angle varying from 15° to 27°. Both veins were connected by a tunnel through the intervening strata at an elevation approximately 100 ft. above the basin of the lower or "A" vein; the water standing at a point about 40 ft. vertically below the mouth of the slope. The total head from the basin of the lower or "A" vein was 225 ft. In the "A" vein slope the roads were intact; but had been removed in "B" vein slope when property was abandoned.

The many advantages embodied in the centrifugal pump, chief of which, in considering a proposition of this kind, was its maximum capacity for minimum clearance dimensions, led to the selection of this type of water-lifting apparatus, two of which were purchased for the purpose.

The pumps selected were of the two-stage type, capable of delivering 1000 gal. per min., against a total head of 225 ft. at 1200 r.p.m. These were direct connected by means of flexible couplings to 100-hp. motors, and so designed as to operate at any angle up to 40 deg. from

and strainer were placed. To support the weight of the suction pipe, a small skeleton steel truck, to which this pipe was clamped, was so placed that the weight was properly distributed and strain removed from the pump.

On the discharge end was placed in the order named; an elbow, a valve, an 8-in. wrought-iron pipe, a flexible joint and an 8-in. wood pipe to the surface.

Hoisting equipment having been installed while the transmission line was being constructed, one pump was located in each slope (see Fig. 2) and secured to the hoisting rope and lowered by means of a hoist as the water receded, the suction and discharge pipes being lowered with each pump, extensions to the discharge line being

*Harleigh-Brookside Coal Co., Hazleton, Penn.

put on at the surface. As the compensator was mounted on the bedplate, it was necessary to connect only three wires at each move, this being accomplished readily by the use of tube couplings.

Owing to a deflection of $\frac{1}{16}$ in. in the bedplate, some difficulty was encountered on the first set-up, on account of the inboard bearing heating, but on subsequent set-ups this was entirely overcome by removing the bolts from the coupling connecting the pump to the motor, and carefully leveling the unit by means of wood wedges inserted between the rail and the bedplate, then replacing the coupling bolts.

Eight men were employed in moving pumps, and as many as four moves per day (two for each pump) were sometimes made; the record move having been made in one hour from the time pump was stopped until it was again pumping to the surface. In no instance did relocating require more than three hours, this time being due to meeting obstructions in the slope. The property was entirely unwatered in 30 days.

John Wesley Boileau

Apparently disheartened by the prospect of becoming a hopeless invalid, John Wesley Boileau, a wealthy coal operator and club man of Pittsburgh, Penn., committed suicide by shooting with a heavy revolver on Oct. 7. About ten minutes prior to his death he had informed his wife that he contemplated such a deed. She secured possession of his revolver, and while carrying it to another room for safe keeping, heard the report of another weapon, Mr. Boileau having quite a collection of firearms in his own room.

Mr. Boileau was among the men who have been concerned with the development upon a large scale of the coal-producing fields of western Pennsylvania and West Virginia. Into this work he put a thorough knowledge of science, economics and commercial conditions. He was a profound student of coal-region geology, of the engineering problems involved in coal development, and of the business situation affecting sales of coal properties. So thorough was his knowledge of these matters that he was regarded as an authority by engineers, operators and investors alike.

Mr. Boileau was born Oct. 25, 1873, in Athens County, Ohio. He received his early training in the public schools of Morgan County, Ohio, but has been, throughout his entire life, a zealous student along lines equally scientific and practical.

In 1892, he took a position as clerk in a store, but soon left this to become a teacher, later becoming principal in the schools of Westmoreland County, Penn. In 1895, he took up engineering and contract work, in which he continued to engage for three years. In the meantime, however, he became interested in the coal-land business, and from 1897 onward specialized in this field.

He studied carefully every phase of the coal situation and the problems surrounding the development and sale of coal properties. The scope of his experience, the wealth of scientific knowledge which was his, and his keen sense of values, gained him recognition as an expert in his line of business. He has negotiated several of the largest sales of coal land both to investment and operating organizations that were ever consummated during recent years in western Pennsylvania and West Virginia. He was also identified with various coal and coke enterprises, being an officer and director of many such companies operating throughout western Pennsylvania.

Mr. Boileau had been suffering from ill health following a nervous breakdown for about a year. About a week before his death, he had a fall down the steps of his residence, striking his temple heavily, which rendered him for some time powerless to move. Since that time he complained continually of a pain in his head, until finally he apparently became possessed with the idea that he could never recover.



JOHN W. BOILEAU

Mr. Boileau is survived by his wife, one daughter, and one son, John Wesley Boileau, Jr., also his parents, one brother and one sister.

With Mr. Boileau, the City of Pittsburgh loses a valuable and respected citizen, while the coal industry in general suffers the loss of one of the men who has done much to bring the industry to its present status. It was largely through his untiring efforts and influence that the City of Pittsburgh secured the testing station of the Bureau of Mines.

The Meeting of the American Institute of Mining Engineers

The meeting of the American Institute of Mining Engineers at Pittsburgh on Sept. 8, 9 and 10 was a great success, over 200 members being present. The Institute should be a powerful instrument for good in the coal, coke and petroleum fields, but for years it has been lamentably weak in all.

At the experimental mine a test was made of the Rice barriers, and they proved their value under the conditions to which they were exposed. Exhibits of their mode of action were shown outside the mine, and the visitors watched a cement-gun operator coating a surface with "gunite" reinforced by wire netting, and also inspected the recently completed work of the gun underground.

On the last day a visit was made to the Bureau of Mines where some interesting demonstrations were made, somewhat similar to those shown the Coal Mining Institute of America at its last visit. Next week we hope to give a full account of the meeting.

Editorials

Small Potatoes

In the issue of Oct. 3, we published a letter from Geo. N. Lantz of New Straitsville, Ohio, on the situation in the coal fields of that state. It seems extremely logical. Hardly anything could be more convincing than his italicized words that: Equal labor demands equal compensation. We hesitate to differ with him. It is hard to place against his moral maxim, a stern economic truth. But here we write a more correct doctrine with a manifest disregard for the good will of those who term economics a heresy. The dictum runs thus: Wherever products are competitive and enter the market on equal terms, equal labor can demand equal compensation only when the products of equal labors are themselves equal.

We will for purposes of illustration imagine a miner's wife in colloquy with a farmer who is trying to sell potatoes. "Shure, thim p'raties aren't near as big as Thompson's and yer price is just as big. When you've pealed your p'raties there'd be nothin' left but the skins!" The farmer has a ready reply, "I have to work just as hard as Thompson to raise those potatoes and it ain't my fault if they're smaller." "Shure," says the good wife, "but it's p'raties I'm buyin', not yer labor. Maybe it ain't your fault thim taters is small, maybe it is, but they're small all the same, an' I'll have none of thim, so yer can carry 'em to Mrs. Smith or the company sture."

It is clear that the farmer must take a lower price than Thompson because his potatoes are less well nourished or a poorer variety. The market is not for his labor, his efforts, his soil fertility, not for anything but for his product and the reward of his labors depends not on his exertions but on what his basket reveals when he removes the burlap. That is the test the miner's wife imposes on his potatoes. The test of her husband's product is no less searching. If his coal contains large quantities of slack, whether he is to blame or not, the whole product cannot sell for as much and there cannot be as much profit in his labor.

Fortunately where the fine coal does not result from the miner's own carelessness, it is usually the outcome of the softness of the coal and accordingly it is frequently the case that the coal which makes the most slack is truly the easiest to mine and the scale which pays attention to the proportion of slack is therefore as morally defensible as it is economically sound.

We object to putting morality against economy for what is economical is usually moral. Surely no man would have a moral right to do work for which he is economically unfitted nor has any man any right to be utilizing material really unsuited for economic use if he makes the public pay for his misjudgment. There is every need that the economic law shall arrest the hand of the man who chooses to produce an inferior article at an excessive cost.

Ohio is paying a high wage scale; the miners, however, by reason of unsteady work are getting lower pay han in almost any state in the Union. So the miners are not profiting. Concurrently, the coal mines of Ohio were only mining 8 per cent. more coal in 1912 than 1907 whereas in the rest of the United States the increase in the output of bituminous coal in that time was 14 per cent. Clearly the Ohio operators were not giving any evidences of prosperity. The Ohio scale pays neither operators nor men.

The wage scale of Ohio has made the state backward in conversation, negligent of first aid, indifferent as to housing and largely unprogressive. If eastern Ohio finally settles down to the 47c. rate for machine-mined coal now demanded, there will still be mining, but the sales will be restricted to a smaller area and work will be intermittent and uncertain. For after all, the moral right to equal pay for equal labor is not recognized by the consumer; the right which appeals to him is equal price for equal product and no other cry appears to have merit.

The American Hermit

The efforts of our papers to boost "Made in America" goods might be looked upon as a distressing manifestation of narrowness had not Englishmen and Germans already shown us the way. It is up to us to have the manhood and the economic sense not to follow their mistaken lead.

Let us bring before our minds the man we really respect. Is he a man who is entirely self-sufficing, who fusses around day by day, doing his own chores, making his own clothes and procuring his sustenance from his own garden patch? Or is he a man who doing one thing or one class of things transcendently well, casts aside all other ends and attends only to such matters as suits his genius and his training best? Is the model of our life, in short, the hermit or the captain of industry?

The most profitable work of the nations of the world is that which they can do best, for which the peculiar conditions of the country fit them. They advance themselves most by performing the largest services. A nation with superlative advantages, such as we may well claim as ours, is foolish to endeavor to enter into competition with foreign countries wherever the struggle is merely equal. Of course, it must be understood that the question of equality will take into consideration transportation as well as production elements as they affect the problem.

Much of the aggressive nationalistic sentiment has, of course, not been unfortunate and it has merely caused the United States to acclimatize trade which should be normally ours. It has sometimes, however, put us in the ambiguous position of a one-armed man who enters himself in a baseball team just to show he is an all-around athlete. But such a desire to outshine in everything is merely vain glorious and the aim of our citizens should always be to seek the fittest trades for America rather than to absorb all trades whether suitable, merely sustainable or wholly unfitted to our conditions.

But those who urge us to be self-sustaining also want us to enter the world's markets, and such trade may be easily proved to be un-American if we accept the specious dicta of those same advocates of a self-sustaining America, for how can we sell goods without accepting any return?

To return to common sense: There is a demand in the United States for the expenditure of capital in many ways where the need for it is most evident and pressing. There are glaring inefficiencies right and left which have existed only because our products have in the past been so cheaply secured that we could afford to be lavish in their use. Where these inefficiencies can be removed and the removal pay good dividends, the capital should be forthcoming to permit it.

Then there are a number of trades which might profitably be established here which so far have not taken root. If they are well fitted for our conditions and can continue existence without subsidies, they should be established even if for a time they need protection and other governmental support. But to bolster up industries economically unfitted to our country is to withdraw capital from those purposes which have a better right to existence and have an equal need of financial support.

The "Made in England" and the "British to the Backbone" campaign has created no few enemies for England in Germany and elsewhere and has probably done absolutely no good because the nation is best served which buys always in the cheapest market and sells in the highest.

Anyone who has traveled around our coal mines will realize that an immense amount of capital is needed to make them economical in operation. Everyone also knows that the coal when it arrives at the market is largely wasted by inefficient use. Plants at the mine and the factory are both too often flimsy structures liable to fire. Money could be better spent in making the changes these conditions indicate than in attempting to build up certain mineral industries which must always be dominated by those abroad or to coax specific products from the soil to which neither our climate nor our fields are fitted.

Selling "Duty" Instead of Coal

There seems a lamentable lack of comprehension of the opportunities existing, exhibited by those operators whose mines are adjacent to brick and other clay-product yards and like industrial enterprises. In most cases brick kilns are heated by grates set around the periphery of each kiln. These openings are extremely weakening, and need constant replacement. Their removal would make for economy.

But the principal objection to their continued use as sources of heat are that they must be fired not with the cheapest kind of slack or refuse, but with run-of-mine coal. As a result the operator who should be helped by the presence of brick yards finds that they demand the same product which is needed for domestic trade. This condition of affairs is desirable neither for operator nor for clay-product manufacturer.

Another difficulty is that the clay-product man has to haul all the coal so used some thousands of feet and to distribute it in untidy little piles around his kilns, where it is often in the way of the wheelers, and, worse yet, it all has to be shoveled so that the kiln tender's work becomes one of drudgery. This drudgery removed, more skilled men could be obtained to do the work with resultant improvement of product.

How much better it would be if we were to generate heated gases at the mines with self-stoking grates, using slack or impure coal and lead some of these gases to the brick kilns and others to the boilers of the coal company's plant. There is no reason why a coal corporation should not provide the heat needed for the kilns at a certain stated figure, say the same rate as that hitherto paid by the clay-working company for coal at the mine. The gain to the clay worker would be derived from the saving in the haulage of the coal, in the cartage of the ashes, in the order of his yard, in the improvement of his kilns, in the reliability of his heat, in the saving of stoking labor and in use of the heat under his own boilers.

The Galena Signal Oil Co. has found it profitable to sell oil not in bulk but on performance. We believe coal can be sold somewhat on the same basis, and to even better advantage, by converting the stored heat of the coal into heated gases before delivery to the consumer.

Pittsburgh-Buffalo Company in Trouble

The Union Trust Company of Pittsburgh proposes to foreclose on the Pittsburgh-Buffalo Company. This will mean that John H. Jones, president and largest stockholder of the P-B Co., will be subjected to the greatest misfortune of his life. He has fought his way up in the coal business, from a humble position in the mines as a lad of ten to the top of the heap, and there is not a man who knows John Jones, but regrets the situation which now faces him.

Mr. Jones is not the kind of man who craves sympathy. He has conducted his own fights in his own way, always observing the rules of the game. However, it does appear to us that the Pittsburgh bankers might be more lenient in their demands on the Pittsburgh-Buffalo Company. Surely the present is not the time to tear down our business structures, if there is the slightest possibility of their weathering the depression created by a world war.

To attempt to sell a coal property now is surely unwise, for no company today could realize anything like a fair price for its holdings. If the Pittsburgh-Buffalo Company is disposed of before conditions have again become normal, the result will be a serious loss to the unsecured creditors.

Mr. Jones and his associates have promised, that if necessary to the full settlement of the company's debts, they will promptly assign their equities in the properties to a syndicate representing the stronger creditors, providing, of course, that the latter will protect those who cannot protect themselves.

Careful investigation by Dr. I. C. White and other prominent engineers discloses that the properties of the Pittsburgh-Buffalo Company are worth several times the debt the company owes. The coal business will improve rapidly when the European trouble is settled and the mines of Mr. Jones and his associates will not only settle their obligations but will pay a handsome return in interest to those who have had faith in them.

We need men like John H. Jones in the coal industry, and we earnestly hope the Union Trust Company officials will accord him a full opportunity to carry his work to a successful conclusion. Whatever the outcome of the present trouble, we predict that Mr. Jones will eventually surmount all obstacles in his path, and will win in spite of every handicap fate may temporarily place in his way.

The Labor Situation

SYNOPSIS—The executive officials of the U. M. W. of A. write the President that if the truce agreement is to be modified for the benefit of the operators, they also desire to make changes in it. The mayor and sheriff in Butte, Mont., have been removed for not protecting the Western Federation of Labor from the violence of the Industrial Workers of the World.

The United Mine Workers of America, through the president, secretary-treasurer and vice-president, have written to the President of the United States, protesting that if the operators are permitted to change the terms of truce, they also should be allowed to make modifications suited to their needs. They are justified, of course, in saying that their approval was accorded to the instrument just as it was presented to them, and in no other form, but their letter, in which they refuse to be bound by a modified form of it, is unnecessary, and even ridiculous.

But we must commend the operators for demanding that assurances be given them that there will be peace when the military forces are withdrawn ,and that the concessions they are required to make shall be reasonable. Their absolute right to protection from violence, for which they are now pleading with an autocratic President, should not be purchased at a high and arbitrary price set by a commission one of the two members of which has been employed to stir up strife against them. The operators most reasonably object to the figure at which they are to be ransomed from the violence of the agitators, especially as they are almost sure that even compliance will not assure safety.

The Miners' Statement

We publish below the statement of the miners:

We have learned through the press reports and otherwise, that the coal operators of Colorado have asked for certain modifications of the basis for a three-year truce of the mining trouble in Colorado, recently proposed by you.

Our acceptance of your proposal was based upon the assumption that it would likewise be agreed to without change by the coal operators.

There are certain features of the agreement which we, too, would like to have modified or changed. We did not ask for this because we felt that the occasion required full compliance with your very earnest wish. Our position now remains the same as when we forwarded you our letter of acceptance. We are willing to abide by the proposed basis of adjustment submitted by you.

If, however, there are to be modifications of any sections of the proposed basis in order to meet the requirements of the coal operators of Colorado, then we, too, ask the privilege of requesting a change in certain sections thereof.

We ask, in the event of any change, that we be given the opportunity of presenting our objections to certain features contained therein with a view to having them changed or eliminated altogether.

We repeat our acceptance of your proposed basis of settlement without change, providing only that the same will be agreed to by the coal operators of Colorado in like manner.

The quiet now pervading Colorado may perhaps make people think that the withdrawal of the troops will not cause violence. But there is no reason for such assurance while the men who have caused it before still remain on the ground, and, by the terms proposed, are assured of a place in the mines if the slowly acting courts do not intervene and exempt them from employment by declaring their criminality. Early in September, Roy Faddyoff, a private in Troop L, 11th United States Cavalry, was killed and his mangled body was found on the Denver & Rio Grande R.R. tracks. It is thought that he was attacked by strikers and killed while on guard, but, so far as we know, no one has yet been apprehended.

According to later reports, the President is intending to remove the United States troops as soon as the state militia is ready to replace them. We hope he will make provision of this sort, and will, moreover, first assure himself that the strength and financial support of the militia is adequate for a long campaign.

Contrast Between Conditions in Montana and Colorado

As a result of the recent rioting, the operators of the copper mines at Butte, Mont., have decided to operate their mines open shop. So the Western Federation of Miners is about to be beaten again, and as this defeat follows its surrender at Calumet, Mich., the affiliation of the W. F. of M with the United Mine Workers of America will be of no great benefit to that body.

It is interesting to note how different has been the action of the militia in Montana to that in Colorado. The soldiers in Butte have most methodically cleaned up the town, and their drastic action is due, we think, wholly to the fact that they have the union men in full sympathy with their aims. For far less activity in Colorado, General Chase was condemned in most unsparing language. So far from withdrawing United States troops before complete pacification, the administration, without even being asked for assistance, as prescribed by the constitution, moved federal troops to Fort William Henry Harrison, near Helena, Mont., from Fort Wright, Wash., so as to be prepared for every eventuality.

Ohio, Still Quiet, Hopes for Colorado Settlement

Quiet reigned in all of the mining districts of the Buckeye State during the past week. No moves have been made by either side of the controversy in eastern Ohio towards renewing scale conferences. The operators are content to leave matters rest as they are, and the miners are not yet disposed to sign up on the proposition of the operators, which is 44.61c. for machine-mined coal on the mine-run basis. This is the same as the Pittsburg scale. It is claimed that many of the rank and file of the miners' organization would be willing to sign up on that proposition, but they are prevented by the union officials and the policy committee.

William Green, secretary-treasurer of the national organization, visited eastern Ohio last week in a reported effort to borrow money with which to pay further benefits to the striking miners. Some benefits have been paid recently in store orders, and these have caused some dissatisfaction among the men, as they would prefer money. The difficulty in financing the strike will continue until the day when the Colorado troubles come to an end.

No developments of consequence have taken place in the Coshocton field, where the men are still out.

The Ohio Industrial Commission reports everything quiet in the fields where mines are in operation. The commission has not been called upon recently to make any special rulings as to the percentage of slack or the percentage of impurities allowable.

It is rumored that Industrial Workers of the World forces are again preparing to invade the eastern Ohio coal district, although their efforts at agitation among the striking miners were unsuccessful during the summer. The agitators believe that the situation is more favorable to their efforts, for the men have been longer away from the mines, and an appeal to disorder now will be more effective than at the beginning of the strike.

The Southwestern Coal Fields

A condition of peace prevails throughout the Southwestern coal fields; not a single strike is now in progress, and such minor troubles as arise are being straightened out with celerity. J. B. White, president of the United Mine Workers of America, who was in conference in Kansas City, Oct. 8, with officials of the operators' associations, in reference to contract matters, expressed himself as well satisfied with the outlook. Mr. White has in recent cases of complaints taken immediate steps to get the men to return to work, and they have responded quickly. The result of inquiries has disclosed that the shutdowns have been caused by misapprehensions, which are removed by a better understanding of the contracts.

W. L. A. Johnson, commissioner of the Southwestern Operators' Association, returned recently from Fort Smith and McAlester meetings, where he assisted in the organization of joint boards, one each for the states of Arkansas and Oklahoma. He reports conditions are very satisfactory.

Validity of Labor Organization

The Hitchman Coal & Coke Co., on behalf of the West Virginia coal operators, desired the Supreme Court, on Oct. 13, to review the action of the Fourth United States Court of Appeals, reversing the decision of Judge Dayton, who ruled that the United Mine Workers of America was an unlawful organization.

Judge Dayton, in the Federal District Court, enjoined W. B. Wilson, the present secretary of labor, and other officials of the United Mine Workers of America from attempting to unionize the mines of the Hitchman Coal & Coke Co. The labor leaders have endeavored to have Judge Dayton impeached.

The coal company has no absolute right to the review desired, but asks the court to exercise its discretion and grant the reopening of the case in recognition of the importance of the question involved.

Sociological Department

Concrete City in Bloom

Flowers of all colors are blooming in the flower pots around the trim houses of "Concrete City," the Delaware, Lackawanna & Western's model village near its big Truesdale Colliery. They are blooming too in the first and second story window boxes, and last month two officials of the company awarded first, second, third and fourth cash prizes for the best and neatest gardens and grounds.

John P. Evans carried off the first prize of $10, John Allen drew $5 for second prize, John Martin $3 for third prize, David J. Thomas $2 for fourth prize, and Benjamin Isaac secured honorable mention. But it was not so much the value of the prizes as the value of the improvement to their surroundings that made practically every householder in "Concrete City" enter the competition.

The New Swimming Pool

And this was not the only improvement in "Concrete City" this summer. A circular swimming pool with constantly flowing water has been installed in one corner of the big central square, and on hot afternoons many of the children, some in improvised swimming costumes and some with the alarming lack of them that characterizes New York newsboys when they make a surreptitious dash into the fountain in City Hall Park, disport themselves in safety in its shallow waters, for there are between eighty and ninety children in "Concrete City."

The village was started last summer and was described at length with illustrations in Coal Age, in Vol. 3, pp. 851-854. Twenty double houses were constructed around a big central square 300x410 ft. They are two-story structures 50x25, with flat roofs, dark green trimmings and little red chimneys which make an agreeable spot of color. The houses are practically of solid concrete, molded in one piece, after the idea of Thomas A. Edison, but built according to another man's patented adaptation of Mr. Edison's idea. Floors, walls, ceilings, stairways, even sinks and wash basins, are made in a mold of



A Street in Concrete City



A Prize Winner at the Recent Contest



A Yard Which Received Honorable Mention

"poured" concrete. The construction is such that, on occasion, the furniture may be removed and an entire house thoroughly washed out with a hose.

Each house contains eight rooms, and has stationary wash tubs, a buttery and a good dry cellar. The concrete is slow to heat, and the houses are as cool in summer as they are warm and dry in winter. Special precautions have been taken to prevent dampness. Little marquises supported by chains overhang the front steps, which have flower boxes on each side. A complete sewage system has been installed, and the square is bounded by shade trees and concrete walks which also lead to the front and side doors of the houses. The whole city is surrounded by a stout wire fence.

Many Facilities and Cheap Rents

There is much kindly humanity in the forethought which was expended on the interior fittings of the houses. Wooden strips are imbedded in the concrete floors so that carpets may be tacked down. Below the French windows, opening outward, window boxes for flowers are set in the walls. Window openings are generous, and there is plenty of light. The window and door frames and the doors themselves are of wood. There is ample space behind each house for a truck garden, and space in the cellar to keep a supply of coal.

The rent of these houses is $8 a month for single houses, and $16 for the two halves, or a double house. After the cost of administration, taxes, upkeep and improvements on the property such as sewers, grading, concrete walks and shade trees are paid, the income from it amounts to about 3½% on the investment. That the mine workers are not unappreciative is shown by the remark of a miner's wife:

"I paid $12 a month for a house not half as good as this over in Pottsville," she said. "The children are healthier here, the house is perfectly dry and cool, and it is easy to keep clean."

How It Pays the Company

The man in the best position to judge of the value of this model village is the foreman of the Truesdale Colliery, where the dwellers in "Concrete City" are employed. When asked if he thought it was a good investment, he replied:

"If all the people working at Truesdale were like the people living in those houses, it would be much easier for me. Labor which has to come here by an early morning work train is much harder to handle. The houses attract the better class of miners who live in them happily and contentedly. We rent them at such a cost that we make no financial profit, but I wish I had a hundred more of them."



The Children's Paddling Pool

Additional Men for the Rescue Stations

The Mine Rescue Station Commission of the State of Illinois, at its meeting at Springfield, Sept. 25, authorized the Manager, Oscar Cartlidge, to make arrangements with five additional men at each station—LaSalle, Springfield and Benton—to take training in mine-rescue and first-aid work not less than one hour a week at 50c. per hour, with a minimum of $1 per week compensation. While actually engaged in fire fighting and rescue work, the compensation of these men will be $1 per hour.

The men selected for this work must submit to a thorough examination by a physician, and agree in writing to respond to a call from the station at any time, day or night.

This resolution contemplated that each of the station superintendents and assistants should keep in training with their men, and be fit at all times to organize and lead their teams in recovery work. In this way, the Commission expects to be able to offer to the mining interests of the state the most thoroughly organized and efficient of rescue teams.

Discussion By Readers

Method of Working Underlying Coal Seam

Letter No. 4—In reply to the inquiry of G. E. Lyman, COAL AGE, Aug. 29, p. 357, I would say that there need be no fear of serious trouble arising from the overlying abandoned seams in this case, unless the abandoned workings contain a considerable accumulation of water or gas.

I agree with Mr. Lyman's suggestion that the best method to adopt is the retreating system, for mining the coal in the lower seam. The retreating system is, of course, expensive at the start; but, in the long run, it is by far the cheapest method to employ. It may often be necessary, however, owing to a limited capital, to consider the high first cost and to adopt a method that will allow quicker returns on the investment. With the exception of the longwall method of mining, which I do not consider practical in this case, the retreating system will produce more coal to the acre than any other system.

Assuming that the seam is level, I would adopt the double-entry system of mining, and split the air for each pair of crossheadings if there is much gas present. All headings and rooms should be driven on sights, so that the pillars left between them will be of a uniform thickness. When drawing back the pillars between the rooms, the inside ones should be kept, say from 10 to 20 ft. in advance of the next pillar outby. The work should be so arranged that before each pillar is drawn back to the heading, the corresponding pillar on the next pair of entries should be started. By this means, there will be less danger of coal being lost.

With proper care in the setting of posts in regular rows and a uniform distance apart, much timber can be saved. The number of rows at the face and the distance of the timbers apart will depend on the nature of the roof; but there should never be more than from four to six rows of posts, at the most. Great care is necessary in the drawing of timber, in pillar work, to insure the greatest safety. I would suggest that the fireclay underlying this coal can be utilized to advantage for the making of good brick.

It is possible that, as the work nears completion and the mine is soon to be abandoned, it will be an advantage financially to double-shift the work, so as to shorten the time during which there will be an ever increasing expense and a decreasing output of coal.

GEO. T. MAIN.

Republic, Ala.

The Practical Working of the Mine-Run System

Referring to the recent discussion of the working of the mine-run law in Ohio, the following sample letters will be of interest as illustrating some of the difficulties encountered in operating under this law and making the change from the screen-coal to the mine-run basis of weights and payments. Most of our mines have already experienced the problems discussed in these letters, the most of which are actual copies with the omission of the names of the parties sending and receiving the same:

Mr. ————, Weighmaster,
————, Ohio.

Dear Sir:

For your information, we submit the following figures:

Mine weights as shown by your sheets for the month of July, total, 29,894 tons.

Railroad weights for July, 29,260 tons .

You will note that the difference of 634 tons, between these weights, is a dead loss to us; and, at the present state of the market, represents a deficit of $570.60. It is needless to say that we would consider this amount a good profit on the coal. We cannot understand why a difference of this magnitude should exist and ask that you do your best to reduce or cut out this difference, in the coming month. Please do not misunderstand us; we only ask that you weigh the coal as closely as possible.

———— Fuel Co.,
Per ————, Sec'y.

Another letter reads as follows:

Mr. ————, Sec'y.,
———— Fuel Co.,
————, Ohio.

Dear Sir:

I am in receipt of your letter regarding the difference between mine and railroad weights for July. I beg to submit the following as a few of the possible reasons why a difference of greater or less magnitude should exist between the weigh sheets and the railroad weights:

1. Boney coal thrown out and not docked.
2. Coal used for fuel for boilers.
3. Coal lost in transit, or shrinkage due to the drying out of the coal on exposure to the air.
4. Low estimated average on mine cars.
5. Defective mine or railroad scales.

In reference to these possible causes, permit me to state the following:

1. The entire force of coal trimmers works every Sunday, cleaning up tracks and removing unsalable coal thrown out during the week. It is estimated that the amount of coal thus discarded by the trimmers will average 30 tons per week. As the miner is not docked for less than 100 lb. of dirty coal, it is apparent that much of the coal thrown out will not show on the weigh sheet. I estimate the coal thrown out and appearing on the weigh sheet will not average over one-half ton daily; or, say 3 tons a week.

2. The coal used for the boilers amounts to two or three cars each day. The exact weight of this coal will be found in the upper right-hand corner of the sheet. It may be that no allowance has been made for this coal, which would considerably reduce the shortage.

3. The shrinkage of coal in transit is due to two causes: (a) Loss due to the drying out of the coal, which is not inconsiderable. (b) Loss due to robbing, which will depend on the number of families on good terms with the trainmen; and the occasional robbing of cars for engine use or pumping stations.

4. In the present case, the shortage cannot be due to a low average on mine cars. This average was taken from cars that had been standing in the mine throughout the suspension and were heavier than cars in daily use. This average was so high that the checkweighman insisted on a new average being taken recently, which reduced it from 1830 to 1742 lb.

5. It is our custom to test the mine scales frequently, and these are invariably found to be correct. The matter of the correctness of the railroad scales is merely suggested.

We hope to reduce the shortage this month, in respect to the first three causes mentioned; but as to the rest I can suggest no remedy. I do not understand that you request any juggling of the scales to make the mine weights correspond more closely with the railroad weights; and to employ such a means would be foreign to my desire. I want to give a fair just weight both to the miner and to the company.

————, Weighmaster.

In connection with this correspondence, it is worthy of note that, under the screen-coal basis, the percentage of loss was estimated on the railroad weights, which procedure would not reveal the losses from the first three causes mentioned in the letter. It is possible that working on the mine-run basis, operators will need to figure on a larger percentage of loss, because it is not possible to entirely eliminate these causes.

The reply to the last letter, above, reads as follows:

Mr. ————, Weighmaster,
————, Ohio.

Dear Sir:

After carefully considering the items mentioned in your last letter, I have been able to account for 365 tons of the shortage previously named. This still leaves a shortage of 269 tons. Refering to your suggestion as to "juggling the weights," I have no such desire nor would I consent to such a proceeding that would mistreat the miner. What I desire is a correct weighing of the coal and the reducing of the shortage mentioned, as far as this is possible.

————, Sec'y
———— Fuel Co.

Another letter reads as follows:

Mr. ————, Sec'y.,
———— Fuel Co.,
————, Ohio.

Dear Sir:

Referring to our previous correspondence in regard to coal shortage, I have been carefully going over the entire matter and believe that I have discovered what may be a large source of error and loss. In examining closely a few of the empty trips, before they were taken back into the mine, I discovered that a considerable amount of coal was left in many of the cars. I have drawn the attention of the dumper to this fact, and he admits that he has been careless in the matter. In the future, greater care will be exercised in dumping the cars, and a close watch will be kept of the empty trips to see that all the coal has been dumped. I believe that this will eliminate much of the trouble in the future,

I will be glad to have you mail me the mine and railroad sheets for the last month, so that I can compare these and see what progress we are making in reducing our shortage.

I am also endeavoring to ascertain how closely we are loading the cars to capacity, and am keeping a daily record of the capacity of all cars loaded, together with my tonnage. I would like to know what percentage of overweight is reported on these cars.

————, Weighmaster.

The above letters show a persistent and determined effort on the part of the weighmaster to reduce the reported shortage of coal between the weigh sheets and the railroad sheets. It is not strange to find that the July shortage of 634 tons, which was later corrected to 269 tons, was reduced in August to 142 tons; and, further, that the September report showed only a shortage of 28 tons, which was considered as a satisfactory record.

A MINE SUPERINTENDENT.

————, Ohio.

The Foreigner in Mining

Letter No. 6—If the remarks of I. C. Parfitt, COAL AGE, Sept. 12, p. 440, were true, the coal operators of eastern Ohio would have to close their mines. I have faith to believe, however, that this is far from being the case. If it were true that a protracted stage of adolescence was necessary for the development of a foreign miner, the coal industry would not have shown the growth and prosperity that has marked recent years.

Looking backward from our present viewpoint that makes a fair perspective possible, it seems to me that these foreigners have shown great adaptability and made wonderful progress in learning the language, customs and habits of the American people and the methods employed in coal mining. It may be true, in isolated cases, that foreigners do so "regard liberty as unrestricted freedom for the indulgence of the animal propensities of primeval man." But, if this were true, generally, it would not be possible for me to sit here and write these lines, while hundreds of such a class of beings were all about me.

Further, at our mines, 2 miles away, equipped with large tipples, expensive power plants, five locomotives, fifteen machines, pumps, fans, mules, etc., etc., not a thing has been touched; and watching has cost us less than $50 per month. To my knowledge there has not been a gun on the premises, since Apr. 1 of this year. Again, during the strike of nearly six months, with over 10,000 of these foreigners, hereabout, there has not been a single violent death and very little violence of any kind whatsoever. Compare this, if you will, with newspaper files of 25 years ago, when Americans and English-speaking people predominated; and then say whether these dominant characteristics and this type of civilization cannot be easily assimilated.

It is true, also, that at the recent convention of operators and miners, at Wheeling, W. Va., these foreigners showed utter disrespect for their employers, and often shook the finger of scorn over them; until, finally, the mine owners decided to withdraw from the convention and submit their propositions to the miners. In the hotel lobby, the miners' attitude was charged to "the I. W. W.," to "state politics," to "labor leaders," etc., etc., but, I would ask, are these several influences actual causes, or are they the effects of conditions that have failed to properly develop and educate this class of labor.

These turbulent, irate, hard-headed foreigners were once smiling immigrants, courteous and easy to please. We may ask, "Has the coal-mine owner made the slightest effort, in many cases, to shape this raw material; and, if not, why should he be surprised to observe an abnormal growth among them. Has the mine owner, in many cases, interested himself in the welfare and surroundings of the foreigners in his employ? Has he shown any interest in them or made any attempt to understand them?

Is it not a fact that, in many cases, the coal operator has regularly impressed *one* thing only upon his superintendent; namely, that the "cost sheet" was everything in the world worth consideration. As a result, in the large majority of cases, these men have been styled "hunks," "Dagoes;" and designated by numbers to avoid even the trouble of learning their names. Whenever the mine boss has found the brusque manner and gruff voice, the easiest way to handle this class of labor, he has prepared the ground for the radical leader to sow his seeds of dissatisfaction; and the crop has been already all that could be expected. It will, now, be a herculean task to wrest the power from these leaders; but an educational campaign and an earnest attempt to improve the surroundings at the mines, backed by the personal touch of the owner, superintendent and foreman will eventually mold sentiment and pave the way to better results.

The minimum wage, shorter hours and other questions are coming; and if the operator expects even a respectful hearing he must do his part to cultivate a better sentiment among his foreign employees. Again, competition in the coal industry will soon cause efficient engineering to replace obsolete methods; and the foreman who depends upon a brusque manner and an extensive vocabulary will

be discounted by the one trained to handle electricity, mechanics, mining methods and human nature, successfully.

While trained men and improved methods are generally forging ahead, I know mining properties in eastern Ohio and elsewhere that have made no progress during the last 15 years. On these properties, one cannot find a labor-saving device or a machine designed later than 1900. A manufacturing concern could not follow such an example and live. Many coal-mine operators have been so engrossed in their sales department and other matters, that they have given no attention to the introduction of mining machines and other improvements; but have received the suggestions of a superintendent, in this regard, very much as the average farmer receives the proposals of a lightning-rod agent.

J. D. Jones, Supt.,
Glen's Run Coal Co.

Dillonvale, Ohio.

Letter No. 7—I have been deeply moved and profoundly impressed with the generous expressions that have marked nearly all of the letters of our mine foremen and superintendents, in respect to the attitude they advise and which they themselves are striving to maintain toward the ever-growing numbers of foreigners seeking and finding employment in the coal mines of this country. Nothing presents a more hopeful aspect, and more certainly promises the ultimate triumph of successful mine management, over the present baneful influence of most so called "labor leaders," who are, in fact, widely recognized as "agitators"—trouble makers instead of peace makers.

No one denies the right, the legal and moral right, and the peculiar advantage to be gained by organization. Labor has the same right to organize as is accorded to employers of labor. Organization properly conducted and controlled is the foundation of successful industry. It must be recognized, however, by all members of organizations, that the free and unrestricted voice and will of the members is the guiding hand in every transaction. A so called leader is, in most cases, a disturbing element. Let men act on their own best judgment and give them freedom of expression; and the *get-together* spirit will eventually prevail and harmony take the place of discord.

To this end, let every mine superintendent and mine foreman "bubble over with the milk of human kindness" and lose the "brusque manner and extensive vocabulary" so often employed in dealing with the foreigner.

J. T. Beard.

New York City.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

Action of a Reciprocating Pump—The piston or plunger of a reciprocating pump, by its movement to and fro in the pump cylinder or barrel, alternately fills and empties the same with water. By means of suitably arranged valves, the water that enters the cylinder by one port is entrapped by the closing of the valve over that port, and is then forced out through another port into the discharge pipe.

Piston Displacement, Theoretical Capacity—The space through which the piston moves represents the volume of water pumped, making no allowance for leakage or **"slippage."** This volume is called the "piston displacement," and is reckoned in cubic feet per stroke, or per minute.

The piston displacement is the theoretical discharge of the pump or its "theoretical capacity," usually estimated in gallons per minute. The actual discharge is always less than the theoretical, owing to leakage of valves and packing, and the slip of water past the piston.

Efficiency of Pumps—In respect to the capacity of a pump to deliver water, its efficiency is the ratio of the actual discharge of the pump to its theoretical capacity. In all pumps driven by a motor or engine, this is called the efficiency of the **"water-end."** In good pumps, the water-end efficiency ranges from 80 to 85 per cent.

PUMPING CALCULATIONS

Let d = diameter of cylinder or plunger (in.);
l = length of stroke (in.);
n = number of strokes per minute;
S = piston speed (ft. per min.);
G = water pumped (gal. per min.).

Piston speed, $$S = \frac{n\,l}{12}$$ *(ft. per min.)*

Piston displacement, $$\frac{0.7854\,d^2 l}{1728}$$ *(cu.ft. per stroke)*

Piston displacement, $$\frac{0.7854\,d^2 S}{144}$$ *(cu.ft. per min.)*

Theoretical capacity, $$\frac{0.7854\,d^2 n l}{231}$$ *(gal. per min.)*

Effective Head in Pumping—As previously mentioned, when a pump is in operation, the total effective head (h_1) is equal to the sum of the gravity head or vertical lift (h), the friction head (h_f) and the velocity head (h_v). Hence, adding these expressions (see Flow of Water in Pipes) and simplifying, we have as follows:

Effective head, $$h_1 = h + \frac{G^2}{800\,d^4}\left(\frac{h}{d} + 2.08\right)$$

Whenever the diameter (d) of the column pipe, in inches, does not exceed its length in hundreds of feet, the velocity head can be ignored with slight error, which is less than 2 per cent. of the friction head; and the formula becomes:

Effective head, $$h_1 = h + \frac{G^2 h}{800\,d^5}$$

The Coal Age Pocket Book

Pressure Required in Pumping—In a direct-acting steam pump, the total pressure in the steam cylinder must equal the total pressure in the water cylinder.

Assuming, first, that the diameter of the steam cylinder is equal to that of the water cylinder or plunger, the pressure per square inch in the steam-end (p_s) must equal that in the water-end (p_w), the latter being calculated from the effective head (h_1). Hence,

$$p_s = p_w = 0.434\,h_1$$

In order to avoid excessive steam pressures required for high lifts, it is necessary to increase the diameter of the steam cylinder so that its area will bear the same ratio to the area of the water cylinder or plunger, as the water pressure does to the desired steam pressure, which gives the following

Rule—The area ratio or the square of the diameter ratio is equal to the inverse pressure ratio. Or the diameter ratio is equal to the square root of the inverse pressure ratio.

Or, expressed as a formula, calling the diameters of the steam and water ends of a pump d_s and d_w, respectively, and the corresponding pressures p_s and p_w,

$$\frac{p_s}{p_w} = \left(\frac{d_w}{d_s}\right)^2; \quad \text{or} \quad \frac{d_s}{d_w} = \sqrt{\frac{p_w}{p_s}}$$

Horsepower Required in Pumping—The power required in pumping is estimated from the weight of water to be lifted a given height, in a given time, which gives the work to be performed, in foot-pounds per minute. A common rule is to assume that this effective work per minute is 60 per cent. of the required power of the pump. This rule is, however, only approximate.

The only safe method of calculating the power required to pump any number of gallons (G) of water per minute, to a given height (h), in feet, is to first calculate the effective head (h_1), and multiply this by the weight of water to be pumped per minute. The product obtained will be the foot-pounds of effective work required. To find the required horsepower of the pump, it is necessary to know the efficiency of the steam-end.

The efficiency of a pump, in respect to work, is the ratio of the work performed per unit of time to the power consumed. In other words, it is the ratio of output to input for any given period of time, or the mechanical efficiency of the system taken as a whole. The efficiency of the steam-end of a well designed direct-acting pump will range from 75 to 80 per cent.

Then, assuming an efficiency of, say 75 per cent. for the steam-end, divide the effective work by 0.75 to obtain the gross work to be performed. Finally, divide this result, again, by 33,000 to find the required horsepower of the pump.

Or, expressed as a formula, the horsepower (H) required to pump a number of gallons (G) under an effective head (h_1) is

Horsepower required, $$H = \frac{62.5 \times 231\,Gh_1}{0.75 \times 1728 \times 33{,}000} = 0.00034\,Gh_1$$

Inquiries of General Interest

Cost of Opening a Drift Mine

Can you inform me as to the probable cost of opening a coal mine, or assist me in securing data, in this regard, that will be of value? The coal is bituminous and outcrops on the face of the hill. A trestle will be required to reach the railroad, where the coal is loaded into the cars. I desire to obtain information in reference to the cost of opening the mine, its equipment, and the material needed in the construction.

A discussion of this subject by readers who have had experience along this line would be helpful and interesting.

JOHN N. SHANNON.

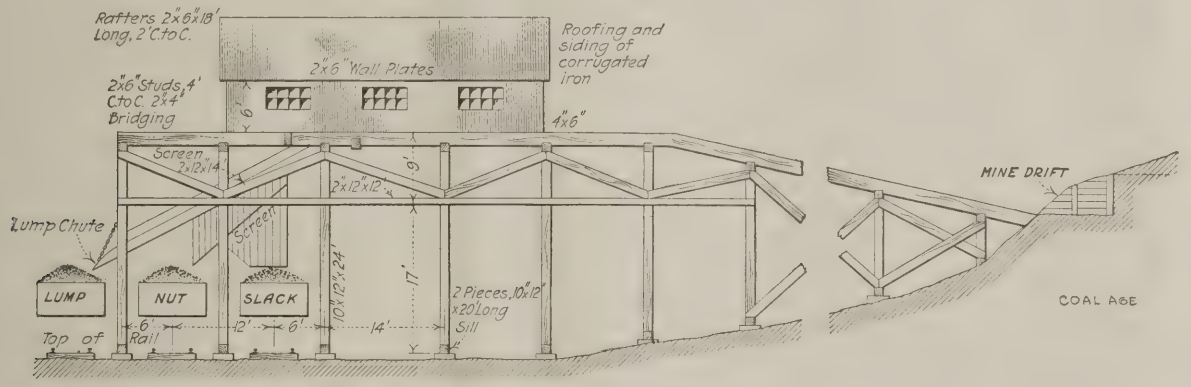
Crafton, Penn.

We agree with the writer of this inquiry that reliable data, giving the cost of material and labor required for the opening of a small mine, would be both interesting and helpful to those contemplating such work. It is readily understood that such data can be only suggestive in their application to a given case, since the cost of labor and material will vary widely in different localities; while the cost of development, in mining work, must be wholly determined by the conditions governing the proposition, in relation to geological features, the size and importance of the undertaking, desired output of coal and other requirements. Notwithstanding these differences, however, such data always have a relative value that makes them an important guide in the estimate of new work; and we hope that such estimates of cost will be forthcoming from readers of COAL AGE who can supply them.

As a suggestion along this line, we present the accompanying diagram, showing a few of the details of construction of a tipple and dumphouse for a drift mine. Three railroad cars are shown under the screens, being loaded with lump, nut and slack. The lump-coal car stands on a platform scale and the weigh beam is in the dumphouse on the tipple. The diagram illustrates the tipple arrangement, in elevation, at an actual drift mine; and the following estimate made in that case shows the approximate cost for material and construction.

ESTIMATE OF LUMBER REQUIRED

	Pcs.	In.	Ft.	Ft. B.M.
Bents, cross-sills	8	6x16	12	768
Sills	6	12x12	20	1,440
	2	12x12	14	336
	1	12x12	16	192
Posts	22	10x12	24	5,280
Caps	1	10x12	20	200
	4	10x12	16	640
	2	10x12	12	240
	5	10x12	8	400
Stringers	2	6x16	14	224
	20	4x16	14	1,493
	20	4x16	12	1,280
	8	4x16	8	341
Tipple beam	1	12x16	8	128
Sway braces	4	2x12	16	128
	10	2x12	14	280
	6	2x12	12	144
Flooring	115	3x12	14	4,830
Chutes	6	2x 6	14	84
	20	2x10	14	467
		1x 6	12	400
House, studs	40	2x 6	12	480
bridging	10	2x 4	16	107
wall-plates	14	2x 6	16	224
rafters	28	2x 6	18	504
	30	2x 6	10	300
Total				20,910



SHOWING ELEVATION OF A TIPPLE DUMP AND WEIGH HOUSE FOR A SMALL DRIFT OR SLOPE OPENING

ESTIMATE OF COST FOR LABOR AND MATERIAL

Say 21,000 ft. b.m. at $14 per M.		$294
Framing and erecting, 21 M. at $10 per M.		210
Windows, 10, 8-lt., 10x12-in., at $2.50		25
Iron, nails, 60d., 1 kg. at	$3.50	
20d., 1 kg. at	3.50	
3d., 1 kg. at	4.00	
Boat spikes, 5x⅝-in., 1 kg. at	5.00	
Wrought-iron washers, 1 kg	5.00	21
Tipple horns, in place, 2 pr		50
Roofing, corrugated, 16 squares at $2.25, laid		40
Screens, lump, 6x10 ft., in place	$75.00	
Screens, nut, 6x6 ft., in place	25.00	100
Chute lining, ¼-in. boiler plate, laid		60
Loading apron		15
Plates, upper landing, ½-in. boiler plate, laid		125
Tracking, 20 lb. tee iron, 6 cwt., laid		10
Track scales, in place		600
Blacksmith shop, 20x24 ft.		100
Office, 20x32 ft.		150
Fan, engine and housing		1200
Mules, four at $125		500
Superintendence and incidentals		500
Mine cars		1000
Total		$5000

The above estimate is for the tipple and track scales only. It includes cost of labor and material, but does not consider the cost of opening the mine or the necessary equipment for its operation, further than providing the necessary equipment for ventilation and mule haulage in the mine.

Examination Questions

Questions Asked That Cannot Be Answered

(Selected from Different Examinations)

NOTE—The following questions have been taken at random from different state examinations and are given here as examples of the lack of technical knowledge displayed by members of examining boards, from time to time, by the questions they ask or the answers assumed by them to be correct.

QUES.—If a pump having a length of stroke of 3 ft., working 15 hr. a day for 5 days, empties a mine of water, what must be the length of stroke of another pump, working 10 hr. a day for 12 days, to perform the same work, the stroke of the former pump being performed four times as fast as the latter?

This question is incomplete, inasmuch as the diameters of the two pumps are not given. In order to answer the question, the candidate must assume that the diameter is the same in each case.

For example, making that assumption, it is observed that the first pump runs $5 \times 15 = 75$ hr., while the second pump runs $10 \times 12 = 120$ hr. in performing the same work; but the second pump makes four strokes while the first pump is making one stroke. But, to perform the same work, other conditions being equal, the length of stroke required must vary inversely as the speed of the pump, and inversely as the number of hours the pump is in operation. In other words, in this case, the ratio of the length of stroke is equal to the inverse speed ratio multiplied by the inverse ratio of the time in hours. Thus, calling the required length of stroke of the second pump x,

$$\frac{x}{3} = \frac{1}{4} \times \frac{75}{120} = \frac{5}{32}$$

$$x = \frac{3 \times 5}{32} = \frac{15}{32} ft.$$

The practical absurdity of this answer shows, at once, the incompleteness of the question asked; because, the required length of stroke of the second pump is less than 6 in., while the length of stroke of the first pump is 3 ft. These pumps, evidently, could not have the same diameter; and the question, as it reads, cannot be answered.

QUES.—If 20,000 cu.ft. of air per minute is passing through an airway with 3.15 hp., and the quantity is increased to 40,000 cu.ft. per min., what will will be the water gage?

This question is incomplete, because it admits of two answers, either of which would be correct, depending on the conditions assumed by the candidate. The examining board gives but one answer as correct. The possible solutions of the question are as follows, the first being assumed by the examining board to be the correct answer:

First Solution

Assuming the given horsepower is the power on the air, the effective work is $u = 3.15 \times 33{,}000 = 103{,}950$ ft.-lb. per min. The pressure producing the circulation is,

$$p = \frac{u}{q} = \frac{103{,}950}{20{,}000} = \textit{say } 5.2 \textit{ lb. per sq.ft.}$$

This pressure corresponds to a 1-in. water gage. Then, since the pressure varies as the square of the quantity of air in circulation, the pressure required to double the air volume in this mine, or to pass 40,000 cu.ft. of air per minute, will be $2^2 = 4$ times the pressure required to pass 20,000 cu.ft. per min. Therefore, the required water gage, in this case, is $4 \times 1 = 4$ inch.

Second Solution

On the other hand, suppose the increase of air from 20,000 to 40,000 cu.ft. per min. is due to splitting the air current, the power producing the circulation remaining unchanged. In this case, the power being constant, and the quantity being doubled, the pressure produced by the circulation is one-half of the original pressure; because when the power remains unchanged the pressure varies inversely as the quantity of air in circulation. Therefore, assuming the circulation is doubled by splitting the air current, the water gage required to circulate 40,000 cu.ft. of air per minute would be ½ in. instead of 4 in., as in the previous case.

To make the question complete, it should have stated, "the power remaining unchanged"; or else have mentioned the cause of the increase in circulation.

QUES.—What power is required to lift 15 tons with three screw jacks with ½-in. pitch, one lever to each jack 4 ft. long?

Since the use of the word *power* always implies the element of time and no time is mentioned in this case, the question cannot be answered as it stands. It must be assumed that the question intends to ask, What *force* must be exerted at the end of a 4-ft. lever, to raise a weight of $15 \div 3 = 5$ tons, with a screw jack having a ½-in. pitch.

No data being given by which the frictional resistance of the screw can be calculated, it is possible, only, to calculate the theoretical force required to lift the given weight. This is found by equating the inch-pounds of work performed in lifting a weight of 5 tons through a vertical height of ½ in., with the work performed by a force x exerted through the circumference of a circle whose radius is 4 ft., or 48 in. The circumference of this circle is $2\pi r = 2 \times 3.1416 \times 48 = 150.8$ in., nearly. Then,

$$150.8\,x = 5 \times 2000 \times ½ = 5000$$

$$x = \frac{5000}{150.8} = 33.15 \textit{ lb.}$$

[Attention is not drawn to these questions in the spirit of idle or aimless criticism; or for the purpose of holding up to ridicule the honest efforts of our mine-examining boards, the members of which, for the most part, work under difficulties that can be appreciated only by those who have served in similar capacities; but rather to emphasize the need of more study and care in the preparation of questions to be submitted to candidates in examination. —ED.]

Coal and Coke News

Washington, D. C.

The action of the Senate on Oct. 10, in sending back to the conference committee for further consideration the Alaska coal land leasing bill creates, in the opinion of not a few persons, a situation that will prevent final action on the coal bill at this session, particularly if adjournment is taken within a week or ten days, as it is now hoped by many will be the case.

The Alaska coal bill has proved to be a serious bone of contention ever since the conferees began their attempt to harmonize the House and Senate drafts, and the conference with the subsequent debate has proved to be a renewal of the old Alaska conservation of coal lands squabble that raged so violently during the Ballinger-Pinchot controversy some years ago. The criticism upon the final work of the conferees is based upon what is considered to be the limitation of government power over the coal lands, and was voiced by Senator Lane in remarks on the conference report, as follows:

The Secretary of the Interior is forbidden from having anything to do either with the operation of the mines or the working of them. . . . The lessee can operate his mines under the most onerous conditions . . . relating to the employment of labor. He can bring about a condition which is identical with that which has existed in other coal-mining districts in this country, of which we have heard so much of evil in the recent past. He can have gun men on his lands; he can do anything which he pleases with his employees. He can fail to ventilate the mine; he can operate it under conditions which are absolutely dangerous, for the reason that this clause, in my opinion, controls every other provision in the bill preceding it. It is the keystone which will control the operation of those mines under this law.

I would like to have the Senate know exactly what they are doing, or at least what I think they are doing, if they pass this provision. The lessee can hold his coal for the highest price; he can keep it out of the market; he can sell it to the warships of a power at war with this country if he wants to do so.

The government agent is forbidden to have a word to say about it, and when you forbid him, you forbid this nation. There is not only a bar forever upon the government taking proceedings against the lessee, if it does not act in 90 days after it gives notice, but there is also a bar upon the government from doing anything else. Unless it was carefully designed for the purpose of compelling the government and the people of this country to keep their hands off and to allow the private owner to run the mine in any manner he wants to run it, I do not see why it was put in. It has that effect.

If I were the lessee of a coal mine in Alaska and wanted to operate it at my own sweet will and make the most out of it, gut it and rob the labor and do anything else I wanted to, without interference or supervision, I would like to have this provision remain in the bill. If, on the other hand, I was representing the government and wanted the mine operated properly and the products from it handled in a manner which would be beneficial to the community and to the people at large as well, and at the same time do justice to the owner thereof, it is the identical kind of a provision that I would keep out of the bill if I could. Here is the government tied to leases of its own land under a law which forbids it from taking any action for the relief of conditions which may be against the interests of the people of this country. It compels the government to give 90 days' notice, but if it does not go into court within 90 days and make good, the government and the people are forever debarred from further action. On the other hand, the lessee of the mine has unlimited time granted him. The short end of the rope is given to the government and the people of this country who own the land, and one of whose resources it is.

Under another section of the bill, any man may take up as much as 5000 acres under a lease. The Senator from Nevada (Mr. Pittman) informed us a few days ago, when the bill was before the Senate, that in one of those fields, I think it was the Matanuska, there are not over 15,000 acres of good coal land. Two lessees could go out under this act, under another provision, however, and secure all the land except what is reserved by the government. You may depend upon it, the government will not get the best of the coal land. If anyone thinks the government is going to get the best of the coal lands when it comes to locating it, I think he will find he is mistaken. That land is pretty well known now. It has been prospected and looked over with careful eyes by experts, and the best of it will be leased. They are allowed to take as much as 5000 acres, and two or three men can cover, we will say, a field of 10,000 acres and control the coal situation in Alaska.

These leases will not be for the benefit of the people of Alaska if this provision is left in the bill. They must depend on the Secretary of the Interior as the agent of this government, and he is not allowed to have anything to do with it or to say about it. You give him 90 days if he wants to file a notice in which to begin a court proceeding. I have seen a notice improperly written where a man rode one day and night in order to "stake" it on a claim, and for the reason that he did not have it properly worded he lost his claim. It is very easy to make a mistake in a notice. Many good attorneys do not know how to write them properly. Anyone who has had experience in a mining country knows that. The government is forever barred from rectifying any mistake which its agents may make forever and ever, whereas the person who owns the lease has time without end in his favor to hold and operate it under conditions which the Secretary of the Interior and the government of the United States are forbidden to question or even ascertain. He is forbidden to interfere in any way. If he goes around to look into the conditions, that is interference. If he takes the time of the employees to ride him up and down the shaft or enters a drift to examine the mine, he is in the way, and he is interfering with the operation of the mine, and they can oust him under this clause.

Possibilities of South American Market

An increasing interest is expressed in government circles with respect to the possibilities of the sale of American coal in the South American market. The following statement, which has been prepared by a private concern, gives the facts in a way that is believed by government authorities who have been making a study of the situation to be correct:

It is not now seen definitely what form the enterprise of our coal companies in developing the South American market will take. Some of them have become actively interetsed. Will they wait for demand, and fill orders, or will they go down and establish distribution? At the present, excepting for one or two important exhibitions of enterprise, the coal interests seem to be waiting for orders.

Ultimately, it should be possible to sell coal from the United States in Brazil or in Argentina cheaper than to sell Cardiff coal there. Good quality fuel, such as is purchased by South America, has recently sold at about $3 per ton f.o.b. both at New York and at Cardiff. The cost of shipping to Rio de Janeiro has been $3.65 per ton from our Atlantic ports. Cardiff has in the past had an advantage in rates because ships sent down there are always able to get return cargoes, but the differences are becoming less and less. There are port costs at Rio aggregating $1.24 per ton, including "dispatching," customs, statistical charges and lierage. Altogether, "soft" coal has cost about $8 a ton at Rio. The shipping costs are much the same to Buenos Aires, the advantage of better return cargoes offsetting the difference in distances.

Argentine railways figure the cost of their locomotive coals on the tenders at $10 per ton. The most important adverse element in the economies of coal shipment to South America under present conditions is, however, the lack of dockage facilities for coal from the United States in the South American ports. A few weeks ago it was estimated that the costs of a speculative shipment of 10,000 tons of coal to Buenos Aires would be $85,000 in round figures, with insurance and freight upon a chartered vessel counted in, and unless arrangements had been made for discharging the cargo within a limited number of days after arrival, an additional cost at the rate of $600 a day would have to be counted upon.

All South American coal docks are owned either by European interests, by the steamship companies or by a single concern with European business affiliations in almost every port. All this explains why coal merchants in the United States are not sending off coal to sell for what it will bring in South America.

To make profitable on a continuing basis the sale of our coal in South America's east coast cities, it will be necessary for the business to be permanently organized. Coal docks ought to be purchased, mechanical unloading devices should be installed and special ships should be chartered. The latter is not so very important, as ordinary ships may be unloaded mechanically without enough loss of time to count considerably.

Certain of our coal companies are studying the situation with some such permanent organization in view. But the movement of coal southward now is apparently on direct order.

In the coal trade, it is said that Chile is making inquiries and will next month probably ask for bids for 300,000 tons of coal per year for three years. The Argentine Navy is also said to be inquiring. It is explained that the South American demand has already affected the domestic market for coal, and that quotations on a contingent basis extending over the first of next year have been refused because of the probability of a rise in the price.

HARRISBURG, PENN.

The anthracite coal regions are suffering from the exceptionally severe drought. There has been but one rain since the last week in August, and that was hardly sufficient to moisten the ground. Prior to Aug. 30, a dry spell prevailed, so that there has practically been a period of water famine for 11 weeks, unprecedented for this time of the year.

The drought has added to the operating expenses of many of the coal companies, some of which have been obliged to put special water-hauling trains in service. Others have been forced to extend mains and get their supply from new sources, farther away from the mines.

Despite the drought the output of the collieries has not been reduced. Last month, the output was 370,000 tons more than in any September in the anthracite industry. The total production was 6,256,192 tons, an increase of 673,913 tons over the same month last year. The September output exceeded even that of September 1912, which heretofore held the record with 5,876,496 tons.

The effects of the drought are felt more in the Schuylkill region than through the Lackawanna, Wyoming and Lehigh regions, where the big companies, profiting by previous experiences, have in recent years been carefully conserving their watersheds and sinking artesian wells, which seem to afford a sure relief against the periodical dry spells that hit this part of the country.

The Lehigh field has been the least affected, principally because the Lehigh Valley Coal Co., the chief producer here, years ago bought up the water rights in and around Hazleton, and thus has an abundant supply under the most unfavorable conditions. The company is making further provisions against drought by the construction of large reservoirs at Drecks Run, at the mouth of Never Failing Springs four miles from Hazleton, where the water trains run from the Schuylkill region to fill their tanks. But for this supply some of the mines would have to close down.

Through the Schuylkill region, however, the worst drought in 50 years is being experienced. All the feed streams to the reservoirs and the springs have long since dried up, and the region is depending at the present time solely on what water is stored and on tank trains. For drinking and domestic use the people are in some cases carrying water for miles.

The Philadelphia & Reading Coal & Iron Co. has adopted drastic measures to secure a sufficient water supply to keep up steam in the boilers. Should the trains, which are now being run carrying water to places where it is most needed, fail of their purpose, it will mean a colliery suspension. At Lakeside, East Mahanoy Junction, there is a large quantity of water stored and this is now being drawn upon by the Reading company. South of Broad Mountain, the Reading is also drawing on the Tumbling Run Dams, several miles from Pottsville.

While the stored water at points referred to holds out every effort will be made to keep the collieries working when there is the heaviest demand for coal. Aside from the water supply, which the Reading company owns, it pays considerable sums in royalties for the daily supply for several large trains.

The drought which has fallen on the western part of the state bids fair to result in the stoppage of work in several of the largest mines in the bituminous region, unless relief is soon had. Some of the largest mines in Westmoreland, Washington, Greene, Somerset, Cambria and Allegheny counties have been forced to close down within the last week or 10 days, because water for the boilers could not be obtained in sufficient quantities to operate them. Cokeburg, mines are idle owing to the drought, and Ellsworth is only running part of the time. Pigeon creek is practically dry in many places.

PENNSYLVANIA

Anthracite

Throop—The 1200 men employed at the Price-Pancoast Colliery, who were made idle some time ago on account of caving in various chambers of the mine, have resumed work, the places having been put in safe condition for operation.

Nesquehoning—Claiming that the Lehigh Coal & Navigation Co. had discriminated against four company miners when it discharged them, the 500 employees of the No. 11 colliery went out on strike on Oct. 9, throwing the colliery idle. The company insists that the men were discharged for quiting work before the regular time.

Shamokin—Oliver Eishehauser, assistant foreman at the Susquehanna Coal Co.'s Hickory Ridge Colliery, was walking across a breast on Oct. 10 when he stepped into a body of gas which rushed from an adjoining chamber. He was hurled to the bottom of the gangway and was fatally injured.

Deringer—Lehigh Valley coal and railroad company detectives in the Hazleton region, believe that another attempt was made on Oct. 10, to wreck the pay train of the Lehigh Valley Coal Co When the pay train was returning from Deringer to Hazleton, the engineer thought he saw an obstruction on the track ahead, stopped the train and started to make an investigation. He found several sticks of dynamite along the track and also discovered that one had been exploded with a fuse. The work was evidently that of a person not well acquainted with the use of dynamite.

Bituminous

Pittsburgh—The Pittsburgh Foreign Trade Commission on Oct. 10 received a request from the Government of British Guiana asking that some concern in a position to ship 5000 tons of bituminous coal per month for the next 12 months communicate with them immediately. Accompanying the request was the price the British Guiana Government officials are willing to pay for coal, with a bonus offered for prompt delivery. As the figure named is something in excess of what coal is bringing here, the order will probably be divided between two or three local concerns who are in a position to make prompt shipments.

Connellsville—The Connellsville coke business showed slight gains recently in production and shipment, but the total is still in the neighborhood of 250,000 tons per week. The furnace production receded, but merchant output increased. The drouth is a serious problem to many of the coke makers.

Mount Pleasant—The University of Pittsburgh through its new extension plan, proposes establishing a mining class at this place for the benefit of the community. The work will include advanced studies in mining, including preparation for fire boss, assistant mine foremen and mine foremen's examinations next spring. No charge will be made for the instructions except the expenses of the instructor.

Huntingdon—On Oct. 8, a boiler in the power plant of the Rockhill Coal & Iron Co., exploded, killing one man and severely injuring two others. The company's damage was $6000. The coal tipple was demolished and two other boilers injured. About 280 employees will be thrown out of work for at least a month. The cable on the incline at the McIntyre mine, Finleyville, broke the same day and two cars dropped down and crashed through the tipple to the railway tracks below. Three men were badly injured.

Charleroi—A total of 14,739,000 bushels of coal passed down the Monongahela from river mines during the month of September. This is considered a satisfactory showing in view of the fact that low water conditions in the Ohio river prevented shipments of coal to the south and that barges for loading were in limited supply at many of the river mines. In September, 1913, when conditions were more favorable, 17,699,000 bushels were shipped down the river and in August of this year, the shipments aggregated 12,648,000 bushels.

WEST VIRGINIA

Charleston—An agreement was recently reached between the Branch Coal Co., operating at Elverton, on New River, the special board of arbitration and Governor H. D. Hatfield, the referee, whereby the miners who have been on strike there since July 1, resumed work. The company, it is said, has agreed to reinstate all of its former employees, about 100 men being employed at Elverton.

Fayetteville—The sale of the large timber holdings of the Sewell Lumber Co. to the Babcock Coal & Coke Co. has been confirmed by the circuit court, the price of $230,000 being satisfactory to the creditors of the selling company. The management which has been operating the property will be retained. The property consists of approximately 10,500,000 feet of standing timber, 4,700,000 feet in logs and $100,500 worth of manufactured lumber. Mr. Babcock held a vendor's lien on the property for $50,000, and paid $180,000 in cash for it, representing the difference between the agreed price and the amount of his lien.

Macdonald—In reply to inquiries received from Charleston, Huntington and other cities which desired the company to locate there, the New River Coal Co. recently announced that it will not at present move its general offices from Macdonald, on account of the unsettled conditions existing. It is probable, however, that the contemplated move will be made as soon as conditions become more nearly normal.

KENTUCKY

Sebree—A. B. Cobb and C. M. Melton are making preparations to develop coal lands in this vicinity.

Louisville—Complaints of the Stonega Coal & Coke Co. and the Blackmore Coal & Coke Co., both with mines near Big Stone Gap. Va., against the Louisville & Nashville R.R. Co., were heard here by representatives of the Interstate Commerce Commission recently. By this action the mining companies seek to compel the Louisville & Nashville to publish through interstate rates from the complainants' mines to various points touched by the road. At present, it is set forth, the complainants are compelled to pay 10 cents extra in order to get the products of their mines to Appalachia Junction, from which point they pay regular interstate rates. The Commission's ruling is not expected for some time.

Pikeville—With general business conditions in their present state, there is little in the way of new operations in prospect in eastern Kentucky. Money is scarce and the coal market is not now in a position to encourage new ventures.

Two new operations, however, are being opened near here. One is located on the John Roberts property at Penny, on Shelby Creek, and is backed by J. G. Pierce and other Ashland capitalists, while the other, nearby, is promoted by George W. Gray, of Paintsville. Both of these operations are within the bounds of the Elkhorn coal field in Pike county.

OHIO

Athens—The rumor persists in coal circles that the Lorain Coal and Dock Co. will reopen its old Eclipse mine, located midway between Athens and Nelsonville in the Hocking Valley. It is said one of the large mines of the company in eastern Ohio will be dismantled and the equipment moved to the Eclipse mine. The officials are not yet ready to make a statement but the move is being considered.

St. Clairsville—The union miners' supply store at Provident near here, was destroyed by fire on Oct. 6, with a loss of $9000, the fire being the second in the building in the past few months. Local officers are investigating a report that the fire was of incendiary origin.

Bellaire—International Secretary-Treasurer William Green and State President John Moore, of the Mine Workers, have arrived in the eastern Ohio fields for the purpose of taking up the work of relieving the distress existing among the families of the 16,000 striking miners.

INDIANA

Petersburg—The S. W. Little coal mines, 7 miles south of here, at Little, employing 400 men, have closed down for a month, during which they will be overhauled and placed in condition for the winter run.

Sullivan—W. D. Hunter, of Terre Haute, has leased the Reliance mine near here and expects to have 150 men at work by the first of the year. A bonus of $1000 was raised for him by business men. The mine had been closed for months.

Indianapolis—The executive officers of the U. M. W. of A. announce that beginning with Dec. 1 the "Journal" will change from a weekly in its present form of 8 pages to magazine form of 32 pages and will be printed in English, Italian and Slavish, the three languages that it has been decided will reach the largest number of the organization's members.

ILLINOIS

Herrin—The railroads in southern Illinois are refusing to give cars to the mines on account of the unusually large number of unbilled cars on the track. One mine had 184 "no bills," which consisted of screenings and the washed sizes from No. 2 down. Many mines in this section have from 25 to 50 thousand tons of screenings dumped on the ground.

MISSOURI

Rich Hill—The Perry-Page-McMahan-Holland Coal Co., which is said to have a large area of coal land in the Carbon Center district, is alleged to have been conducting operations successfully for a month past with strip pit machinery. The coal bed, 4 to 6 ft. thick, lies 30 ft. below the surface, where the stripping equipment is now operating, two miles south of Carbon Center.

ARKANSAS

Fort Smith—A 14-ft. bed of coal of excellent quality, 50 ft. below the surface, is reported to have been discovered by Stewart N. Kenney, a coal expert, while drilling on the Campbell farm near Van Buren. Eastern operators are said to have sent men to investigate. The discovery was reported early in October.

KANSAS

Pittsburg—A district convention of mine workers on Oct. 6 arranged to support a suit for damages against those who brought charges of graft against Alexander Howat, former president of District 14.

PERSONALS

A. L. Bogt, formerly connected with the Chapman Mining Co., of Columbus, has accepted a position with the Colonial Coal & Supply Co., of Columbus.

Harry M. Taylor, of Chicago, has recently associated himself with the Central Coal & Coke Co., of Kansas City, Mo., in the capacity of vice-president.

H. Ward, Jr., with office at 619 Ferguson Building, Pittsburgh, Penn., was recently appointed a special representative in the Pittsburgh region of the Scranton Pump Co. of Scranton, Penn.

J. W. Johnson, superintendent of the Lorain Coal & Dock Co.'s mines, has received word from headquarters to ship all mine mules to Columbus for the winter. These animals will be loaded at once.

Willis E. Holloway, Pittsburgh representative of the Roberts & Schaefer Co., of Chicago, will, on and after Oct. 15, have his headquarters at the home office, namely the McCormick Building, Chicago, Ill.

C. M. Anderson, formerly of the C. M. Anderson Coal Co., Columbus, Ohio, has been appointed Western sales manager of the Elk River Coal & Lumber Co., of Clay, W. Va., and has opened up offices on the eighth floor of the Columbus Savings & Trust Building.

Charles J. Finger, general manager of the Ohio River & Columbus R.R. has been named receiver for the property by the local courts. Judson Harmon representing the stockholders applied for the receivership. The road operates between Ripley and Sardinia and connects with the Norfolk & Western.

C. M. Moderwell, of Chicago, was recently elected president of the Illinois Coal Operators Associations. F. C. Hammold was chosen secretary and treasurer, James Neeham was elected vice-president, and Edwin G. Bend was elected as the operator member of the arbitration board to settle disputes with the Miners' Union.

OBITUARY

John Forrester, president of the Forrester Coal & Coke Co., and owner of the Paradise mine, died suddenly at his home in Duquoin, Ill., on Oct. 8. Mr. Forrester was one of the best known mining men in southern Illinois, having held many important positions in connection with mining affairs in that section.

Edmund C. Donk, president of the Donk Bros. Coal & Coke Co., age 63 years, died at his home in St. Louis, 3643 Castleman Ave., on Oct. 9, after a long illness. He was born in Germany on Feb. 19, 1851, and came to this country at the age of 5, living first in Peoria, Ill., and coming to St. Louis at the age of 12 years. He engaged in business with his brother, the late August Donk. He was also president of the Merchants & Manufacturers Investment Co., vice-president of the St. Louis, Troy & Eastern R.R., and vice-president of the East St. Louis, Columbia & Waterloo R.R.

TRADE CATALOGS

The Cross Engineering Co., Carbondale, Penn. "Perforated Metal, Coal Preparing Machinery and Simplex Rivetless Chains." Forty-five pages, 6x9 in., illustrating and describing various coal screen perforations and conveyor chains.

CONSTRUCTION NEWS

Jellico, Tenn.—A company has been formed to build a railroad from this city to Capachine Creek for the purpose of opening up the coal and timber fields lying to the west of Jellico. It is believed that this will greatly add to the prosperity of both Jellico, Tenn., and Jellico, Ky.

Gallitzin, Penn.—The tipple at No. 10 mine of the Pennsylvania Coal & Coke Corporation which was recently damaged by fire, is being rebuilt. It is believed that the improvement will be completed in a short time. The operation of the mine meanwhile, is still going on.

Whitesburg, Ky.—The Kentucky-Dean Coal Co., recently organized at Viper in the Perry County coal field, is starting a coal development there, employing a considerable force of men. It expects to begin shipping coal within 90 days, it is said. The new operation is on the main line of the Lexington & Eastern R.R.

Morgantown, W. Va.—D. M. Chaplin & Co. recently closed a contract with the Monongahela Coal Co. for the building of a tipple at the coal company's mine. This contract includes the installation of all necessary machinery and the work will be undertaken at once. The plans call for a gravity chute, which is considered an improvement over the type of tipple formerly used in this section.

Blackfield, Penn.—Twenty-five more houses to accommodate the miners families of Atlantic No. 2 mine are to be erected for the miners' who wish to remove to the scene of their work. Twenty-five miners' homes have already been

built but the company found that these will be insufficient. The settlement has been christened Blackfield, in honor of Black Brothers who control the operation.

Clay City, Ky.—The Day Bros. Lumber & Coal Co. is beginning the construction of a branch line of railroad up King's Creek to reach rich coal and timber holdings. The line will be about five miles long. It is the purpose of the company to develop the rich cannel coal fields, and forests, the development work to start at once. Several hundred men will be given employment in the new development, which will be among the largest in Eastern Kentucky. The grade work is billed to be completed by Feb. 1 and by Mar. 1 the coal operations will be well under way.

Fayetteville, W. Va.—The Boone County Coal Corporation is opening up an extensive operation on Beech Creek, in Boone County, and expects to be taking out coal within two months. The construction of a railroad to connect the location with the Coal River branch of the Chesapeake & Ohio R.R. has been under way for several weeks, and is expected to be finished soon, giving the property the necessary rail outlet. The mine will produce No. 2 gas coal. The company has leased 800 acres of coal land on Beech Creek to the Michigan & West Virginia Coal Co., organized by Detroit interests, and the lessee is preparing to begin development work.

NEW INCORPORATIONS

Cleveland, Ohio—The Pluto Coal Co. has been organized for the purpose of mining with a capital of $10,000. The incorporators are M. A. Copeland, J. A. Eldon, H. H. Mosel, C. Verbesky, and M. Barge.

Penny, Ky.—The Penny Coal Co. has increased its capital stock from $50,000 to $75,000 and will make some increases in its coal mining plant on Shelby Creek, said increases to be complete by the first of the new year.

Jeff, Ky.—The Hamden Coal Co. has been organized here to make a large coal development. The incorporators are: W. H. Hall, J. M. Combs, Felix Combs and others. They propose starting the work of development by Jan. 1.

Viper, Ky.—The Viper Coal & Development Co. is being organized at Viper, to make a coal development, the work having already started. A large force of men are already at work opening mines, building miners houses, etc. The development is on the L. & E. main line.

Charleston, W. Va.—A charter has been issued to the Taylor Collieries Co., the incorporators of which are William A. Taylor, James M. Taylor, Charles P. Taylor, and Newton F. Hawkins, all of Pittsburgh. The company is capitalized at $100,000, and will have offices in Charleston. Coal mines will be worked in Harrison Township.

INDUSTRIAL NEWS

DeKovan, Ky.—The Ohio Valley Coal Co.'s tipple and the Illinois Central freight house were destroyed by fire a few days ago; the loss is not stated.

Middlesboro, Ky.—It is understood here that the Southern Ry. has placed a large contract order for coal with the mines on Stony Fork and in Wingo Hollow. This is counted on to keep the mines in this section busy for a time at least.

Knoxville, Tenn.—A conference of coal operators and officers of the United Mine Workers of America will be held at Soddy, Oct. 28, for the purpose of arranging certain matters relative to the miners' wage scale.

Washington, D. C.—An advance of 10c. per ton in the freight rates on coal purposed by the Southern railroads was recently filed with the Interstate Commerce Commission. Unless suspended by the commission the increase will become effective Dec. 1.

Charleston, W. Va.—The "Lucy Marmet," one of the largest towboats on the Kanawha River, was totally destroyed by fire recently, with a loss of about $20,000. The boat was owned by the Marmet Coal Co., and had been in commission about 11 years. It is not known how the fire started.

Philadelphia, Penn.—All records for coal handling at this port were recently broken when 5500 tons of cargo and bunker coal were dumped into the hold of the steamer. "Castle Bruce," in four hours and 30 minutes. Some years ago 4100 tons of coal were loaded into a vessel at this port in 14 hours. This was considered a remarkable feat. The present record was made possible by suitable coal handling machinery.

Buffalo, N. Y.—There is a possibility of saving the Buffalo & Susquehanna Ry. the coal and lumber line built from Buffalo to Wellsville by the Goodyear interests. The Pennsylvania R.R. is making a survey of the road and may lease it, in which case the order of discontinuation, effective on Nov. 1, will be recalled.

Louisville, Ky.—The St. Bernard Mining Co., through Julius Bierach, of the Louisville office, has closed a contract with the Kosmos Portland Cement Co. to run for five years. This contract calls for a total of 180,000 tons of coal. It will be delivered via the Illinois Central on which both the plant and the mines are located.

Ensley, Ala.—All operations at the Tennessee Coal, Iron & Railroad Co.'s properties in Ensley will be resumed shortly. While the past partial shut-down has not caused any great discouragement in this district, at the same time it will be extremely gratifying to know that the plant will be running to full capacity soon.

Washington, D. C.—West Virginia coal operators represented by the Hitchman Coal & Coke Co., will ask the Supreme Court to review the action of the Fourth United States Circuit Court of Appeals in reversing the decision of Judge Dayton to the effect that the United Mine Workers was an unlawful organization. This case has attracted widespread attention from both capital and labor.

Olympia, Wash.—The Thurston County Superior Court has issued an order suspending the recent order of the Public Service Commission for lower freight rates on coal from Roslyn to all parts of the state, and required the Northern Pacific R.R. to furnish a $25,000 bond to protect shippers and customers pending the final decision of the court.

Birmingham, Ala.—The Pratt Consolidated Coal Co. recently resumed work on the mine openings and coal barges of the Warrior River to take care of the river navigation. This company was engaged in constructing barges for transporting coal to the Gulf Ports and opening a mine for securing the fuel when the government hesitated about finishing a lock which was necessary for the success of the enterprise on the Warrior River. The government has promised to construct the lock and finish it at once; hence, the resumption of work.

Newark, Ohio—One of the most important happenings in coal mine circles in Ohio during the past week was the announcement by the Newark Natural Gas & Fuel Co. to the effect that after Nov. 30 the distribution and sale of natural gas will be discontinued. This action was taken because of a conflict over the franchise and the price to be charged for the gas. This announcement means a large market for coal and already many of the householders have laid in a supply of fuel. Manufacturing plants and business houses are also affected.

Toronto, Ont.—The Mountain Park Coal Co., the capital of which is mainly British, and which has holdings of about 6000 acres on the head waters of the McLeod River, about 200 miles southwest of Edmonton, Alta., is making preparations for a large output during the winter. It has its own railway 31 miles in length, connecting it with a branch of the Grand Trunk Pacific. The present output is 500 tons per day, but the mines are being developed to a capacity of 2500 tons per day. The coal is high grade bituminous, suitable for steam and domestic purposes.

Pittsburgh, Penn.—Permission to foreclose on a mortgage of $6,309,500, on which there is interest due of $315,475, was asked in a bill in equity recently filed in the Common Pleas Court by the Commonwealth Trust Co., Trustee against the United Coal Co., and James D. O'Neil, Robert T. Watt and William E. Johnson, receivers of the coal company by Attorneys, Watson & Freeman, and Sullivan & Cromwell. The plaintiff asked for permission to sell at public sale the coal lands of the United Coal Co., together with those of other coal companies pledged with the trustees as security on the mortgages.

Cincinnati, Ohio—It is reported that the Chesapeake & Ohio loaded in the Kentucky and West Virginia fields during the month of September, 2,110,735 tons of coal, which is an increase of 334,515 tons as compared with the same month of last year, and a decrease of 105,725 tons loaded in the previous month, August, which was the best month in the history of the road. There were two more working days in August, however, which partly accounts for the difference. This road has issued a note to operators along its lines requesting that all shipments destined to the Lakes be discontinued, as far as possible, by Oct. 15, in order to get all such shipments out of the way in anticipation of the looked-for commercial revival.

Coal Trade Reviews

General Review

Anthracite steady, but lacking the customary snap at this time. Bituminous continues to drag and the export business is scarcely above normal. All markets are much dependent on colder weather. Lake shipping is somewhat better.

The relatively high temperatures prevailing over the past few weeks have caused a slowing up in the demand for hard coal, and the trade is essentially marking time, pending the appearance of colder weather. Market observers, however, are agreed that this is but a temporary condition, and that the trade will respond quickly to a return of more seasonable weather; in fact, there are reports in some sections that the companies are even now falling behind in their shipments, so that there is some anxiety as to what the situation will be when the fall rush opens up. The demand still centers on stove coal, which commands a premium when sold by itself. Egg coal and the steam sizes are inclined to drag.

The bituminous situation at Tidewater is still generally irregular, and even more discouraging. The resumption of shipping from the Welsh ports, the difficulty American operators found in arranging satisfactory terms with prospective purchasers in the foreign countries, in addition to the tight money market and the danger of violating neutrality laws, have all been restraining influences, adverse to a more general expansion of our export business. There has as yet been no significant change in quotations, but the offshore business has materially contracted for the time being at least, and there are excessive accumulations at most of the ports. About the only constructive feature of the current situation has been some slight improvement in the bunkering demand.

There have been no developments of a favorable character in the Pittsburgh district; in fact, the operators are now looking forward to another severe slump when Lake shipping closes. The constantly recurring reports of large orders from abroad for American goods may create an expansion in general manufacturing which will do much to relieve the situation, but, as a rule, there is not much hope of an active market before the first of the year at least. The domestic market in Ohio is dull and hinging on the weather conditions. There has been some spurt in the Lake trade, while the circulars are generally well maintained, and it is expected that the domestic trade will right itself promptly when the weather becomes more seasonable.

In the Southern market, the domestic trade, which has been the only encouraging feature of the situation there, has slowed up materially under the influence of adverse weather conditions, and operations are now curtailed to fully half capacity; the general belief that any change from now on must be for the better is the only hopeful feature at the moment.

The steam market in the Middle West is still weak, while the recent strength in the domestic trade is now confined more particularly to certain restricted sizes, the others being much easier. The market has been overshipped on some grades, on which a definite recession in the demand is noted, with occasional accumulations on demurrage. No general improvement is anticipated before the first of the new year.

ATLANTIC SEABOARD

BOSTON

Hampton Roads coals quiet. Tendency of export trade is to sag, and coastwise shipments are confined to contract application. Georges Creek about normal and uneven market for Pennsylvania grades continues. Anthracite shippers falling behind on deliveries.

Bituminous—The Pocahontas and New River market is practically featureless. The amount dumped at the piers has been only fair and the volume standing in the terminal yards is still much heavier than normal. Off-shore demand is still irregular with a general tendency to sag partly because of the resumption of normal loading at the Welsh ports. Satisfactory terms of settlement continue to be difficult to arrange and together with the tight money market and the possibility of colliding with the rules of neutrality, most inquiries are subjected to close scrutiny before commitments are made.

In this territory about all of the receipts are being applied to contract business. A spot market does not exist, except for small tonnages up the line from the various distributing points. Prices show no significant change, however, and it is felt that present values will probably hold until the industrial situation shows a change for the better; $2.85 f.o.b. Hampton Roads is the prevailing quotation although it is well recognized that the buyer of spot coal can negotiate for less.

The market for the Pennsylvania grades seems rather uneven. For some coals there is a fairly steady call but for others the situation is so stagnant that several operations have been shut down for the time being. The only really active feature now is the moderate rush to get forward sufficient supplies for points like Bangor where navigation normally closes the latter part of November.

Water Freights are still at the season's minimum. There is a dearth of inquiry and rates are nominal at 65c., Hampton Roads to Boston, on fair sized vessels. Steamers are a drug on the market.

Anthracite—In some quarters the policy of suspending mining operations during the summer dullness is now beginning to show its effect. Practically every order requires a proportion of stove size and several of the shippers are able to supply it only after considerable delay. If this is an indication of the state of things now there will surely be an active market later when the cold weather appears. Dealers who were relying on regular shipments week by week find that the companies are getting behind on their orders.

Bituminous prices at wholesale are about as follows:

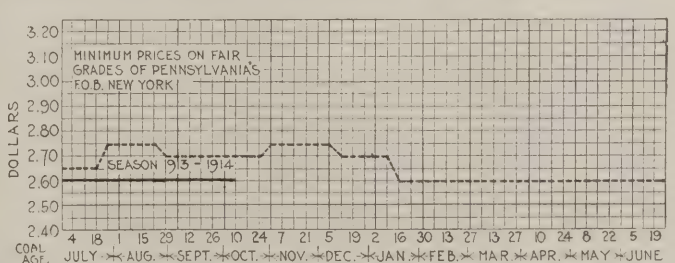
	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.90@1.50	$1.25@1.65	$1.67@1.77	
Philadelphia*	2.15@2.80	2.50@2.90	2.92@3.02	
New York*	2.40@3.10	2.80@3.20	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.80@2.85
Boston†	.....	.....	.....	3.60@3.78
Providence†	.....	.....	.....	3.63@3.73

* F.o.b. †On cars.

NEW YORK

Spot bituminous market practically dead but contract movement continues fair and there is little coal reported on demurrage. Prices are low but steady. Heavy call for anthracite stove coal continues unabated. Steam sizes still relatively weak but improving.

Bituminous—Although there is almost a complete absence of demand for spot bituminous the market continues in a healthy condition. The lack of demurrage coal is particularly noticeable. It is seldom that the higher grades are forced on to demurrage there being almost at all times a ready market for them, but the cheap fuels, that only move satisfactorily under abnormal conditions, often cause trouble in



this respect. The coal is produced cheaply, very frequently without regard to preparation, and ordinarily sells at a low price but when on demurrage it is sacrificed at rediculous figures. This has a tendency to fix a price which is not always indicative of the market conditions as a whole. Nevertheless it has an effect tending toward demoralization which is to the advantage of neither the producer nor the consumer.

The contract coal moves along in fair shape. While some plants are closed entirely and others are only taking 25 to 50%, a fair average would probably be 75 to 85% of normal; in some few instances where the war has increased the demand for particular lines, factories are working overtime and consequently taking an additional supply. The export business has fallen off to about normal.

While there is no prospect of car shortage or other reasons for inflation of prices the outlook, with winter now approaching, is good and business on its present basis should be maintained. The market is not quotably changed from last week which we continue as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—In spite of the exceptionally warm and unseasonable weather all of the anthracite prepared sizes have been moving well with the exception of egg. Stove still continues short and is selling in some quarters at a premium when moved alone.

The moment that one size begins to be a trifle short there seems to be a desire on the part of all of the trade to get shipments on this particular size; the tendency is towards placing of larger orders than necessary to cover requirements. This same condition obtained last year at this same season and reached a point where stove was almost unobtainable, when suddenly within a very few days the bottom dropped out of the market. There is a question whether this same condition will not apply this year.

It is a fact, however, that notwithstanding the tendency on the part of the operators to cut down the percentage of egg produced, the market on this size has continually become weaker from year to year. The consumer has been steadily changing from egg to stove, having found that more economical results could be had from the stove size.

Steam sizes are not active, but cold weather would also improve the condition on these sizes, especially on pea which is used extensively by the large apartment buildings throughout New York City. The demand from the West and all-rail into New England and Canada is very brisk and as soon as egg begins to move the situation on all sizes should be most satisfactory.

The New York hard coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.45@5.05
Egg	5.35	5.10@5.35	5.30	4.95@5.30
Stove	5.35	5.35@5.45	5.30	5.30@5.40
Chestnut	5.60	5.45@5.60	5.55	5.40@5.55
Pea	3.55	3.40@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.65@2.80	2.50@2.75	2.25@2.75
Rice	2.30	2.00@2.30	2.00@2.25	1.50@2.25
Barley	1.80	1.65@1.80	1.75	1.50@1.70

HAMPTON ROADS

Export shipments are slowing up. Prices still at circular. Some small shipments of nut and slack moving coastwise.

Dumpings at Tidewater ports during the week have not been heavy and there appears to have been a decided falling off in demand, both in the foreign and domestic markets. The greater part of the coal moving coastwise, so far as can be learned, seems to have been on contract although some spot sales have been made. The movement foreign has been almost at a standstill during the entire week, few cargoes having been cleared. As is usually the case the largest coastwise cargoes have gone to Boston. In addition to Pocahontas and New River mine-run there has also been some movement of nut and slack and high volatile.

Prices so far as can be ascertained have been around $2.80 to $2.85 for mine-run and about $2.60 for the other grades. There seems to be some little increase in the number of vessels calling for bunker coal but the quantity going out is still below normal.

The accumulation of coal here is somewhat in excess of usual. This is due to some extent to vessels which were expected not arriving on time and it will, no doubt reduce to a large extent during the next few days.

PHILADELPHIA

Slight easing off in demand for anthracite, owing to unseasonable weather, but mining continues in full swing. Bituminous still fails to show improvement. All seem to have ample stocks.

Anthracite—The weather thus far has been anything but conducive to the sale of anthracite coal, but notwithtsanding this condition, there is considerable coal moving, and were it not for the fact that the operators are hampered with small sizes, the situation would be entirely satisfactory. It will take cold weather, however, to put the customary snap into the market.

The production this week was somewhat curtailed, owing to the partial suspension at the mines on Monday, Columbus Day, which was generally observed particularly wherever the Italian element predominated. The demand at the present time seems to center on the household sizes, egg, stove and nut. Pea still lags, and buckwheat and rice can be purchased at considerably less than contract quotations. Just at the present time, there seems to be a slight dearth of orders for broken, but this situation will soon adjust itself.

Prices at Tidewater are as follows:

	Circular	Individual
Broken	$4.75	$4.50 @ 4.60
Egg	5.00	5.00
Stove	5.00	5.00 @ 5.10
Chestnut	5.25	4.90 @ 5.00

Bituminous—The dealers and manufacturers in this locality seem to be heavily supplied with soft coal, but there is considerable coal moving nevertheless. What the operators are really looking for is a speculative market with the consumer, instead of the operator, on the short end.

BALTIMORE

Conditions still far from normal. Domestic business generally flat, but export trade holds up well. Consolidation Co. reports a big half-year. Anthracite in but moderate call.

While considerable coal is now moving coastwise, both to New England and to the South, the figures are below normal and little new business is originating. The trade is confined to long standing contracts for the most part, and some of these have been seriously cut. To the West and Northwest there is the same story of heavy stocks and inability to place any more fuel.

Prices remain very poor. West Virginia gas three-quarter is still offering around 85 to 90c., run-of-mine at 75 to 80c., while slack has advanced somewhat under a better demand and is now commanding 40 to 45c. at the mines. Prices in Pennsylvania hold firm, low grades selling around 95c. to $1.05, medium coals at from $1.10 to $1.15 and the best grades at from $1.30 to $1.35.

The export business continues fair although the movement is not as extensive as in the middle of September. The report of the Consolidation Coal Co. for the seven months from Jan. 1 to Sept. 1, at a time when domestic business was admittedly flat, shows the effect of the heavy export trade, in which that company has played a leading role. The total output of the company for the period was 8,413,000 tons, as against 8,340,000 for the same period of last year, when home industries were demanding a record tonnage.

COAL CHARTERS

The "Journal of Commerce" reports the vessel situation as follows:

An active business was reported in steamer chartering, the major portion of which was for transatlantic voyages. Freights continue to offer steadily in several of the transatlantic trades, but as yet there is no appreciable increase in the demands of shippers in any other of the various trades. Tonnage continues to offer moderately, but not at any concessions in rates from those recently paid, and in some cases owners are demanding an advance over recent figures. For sail tonnage, there is but little inquiry in any of the various trades.

Coal charters have been reported as follows:

Vessel	Nationality	From	To	Tons	Rate
Angola	British	Norfolk	Phillipines	3179	
Isle of Jura	British	Baltimore	Havana	2485	
Kosfjord	Norwegian	Philadelphia	Sagua	961	
Agnes Manning		Philadelphia	Jacksonville	870	$1.00
Pendleton Sisters		Philadelphia	Calais	899	
Gemma	Italian	Virginia	Brindisi	1978	3.21
Ekaterini	Greek	Baltimore	Brindisi or Taranto	2414	3.24
St. Gothard	British	Baltimore	Puerto Padre and Sagua	1790	
James B. Drake		Baltimore	Galveston	991	
Dallington	British	Philadelphia	Cienfuegos	1613	
Olaf	Norwegian	Philadelphia	Mexico	1022	
Loring C. Ballard		Philadelphia	Boston	627	
Lovland	Norwegian	Baltimore	Port Limon	1463	
Santa Maria(bark)	Italian	Baltimore	Trapani	819	
Elizabeth T. Doyle		Baltimore	Robert Bay, Martinique	660	2.25

Note—Steamers are indicated by **bold face** type, all others being schooners.

COKE

CONNELLSVILLE

Market stagnant; only desultory negotiations; prices nominally unchanged. Production and shipments about 30% below top rate of year, while pig iron production generally has decreased about 20%.

The market continues stagnant, there being practically no buying of furnace coke and little of foundry. There are occasional negotiations on furnace coke, but nothing serious. One consumer has been inquiring about a 12-months' supply, but only on a sliding-scale basis, relative to pig iron. Foundry coke is a shade easier, but prices for standard grades are not quotably lower. Prompt furnace coke is nominal at $1.65@1.70, and contract at $1.75@1.85; various grades of foundry coke are available at $2 and upward, but regular standard grades cannot be had at under $2.25@2.35 for prompt, contracts being $2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 3 at 249,152 tons, an increase of 1931 tons, and shipments at 253,852 tons, an increase of 5789 tons. The movement is now about 30% less than the average for several weeks in the early spring, when the maximum of the year was reached. In the same time pig-iron production in the country at large has decreased about 20%.

BUFFALO

Still much handicapped by the dullness in Canada. Reports continue of ovens shutting down.

The continued dullness of coke is very much against any immediate revival of the iron trade. Iron ore continues to come down by Lake at a good rate, but it is understood that much of it is contracted by the U. S. Steel Corporation, on which a royalty has to be paid this year, whether it is moved or not. For all that even those vessels are beginning to lay up, so that the Lake trade is not likely to be much of a success this season. Buffalo sells coke liberally to Canada when the demand is good, but the Canadian trade is very slack now. Coke ovens have shut down more or less all summer and are still being blown out.

BIRMINGHAM

There is no change this week in the coke market, business being extremely dull.

CHICAGO

Domestic coke is moving rather slowly. Prices are: Connellsville, $4.75@4.90; Wise County, $4.75; byproduct, egg, stove and nut, $4.95; gas house, $4.35.

ST. LOUIS

The market is unusually weak on foundry coke, at $5.30 for selected Connellsville 72-hr. On domestic byproduct there is very little moving in and no demand. The demand for local gas-house is improving. Quotations are: Wholesale, $4 per net ton f.o.b. tracks; retail, $5.75.

LAKE MARKETS

BUFFALO

Warm weather makes coal sales difficult and situation is not improved. Fair demand for anthracite. No prospect of good business in bituminous in the immediate future.

Bituminous—The warm weather of late would have made the sale of coal difficult even with a liberal consumption. With the full briskness lacking it is hard to keep ahead of the mine output. Slack is only a trifle stronger, because of the moving of a big supply that has been on the market some weeks and also to the light Lake shipments from Ohio ports. So much three-quarter is shipped by Lake, to the exclusion of almost any other size, that there is always an excess of slack thrown on the market during the Lake season. There is not quite so much complaint of coal waiting on track, but there is still sufficient to keep the price down.

The state of the bituminous trade is still controlled to a certain extent by the Pittsburgh circular of last spring, though in slack times there is more and more coal sold at concessions, $2.55 for mine-run and $2.15 for slack. Allegheny Valley coal is about 25c. lower than Pittsburgh.

Anthracite—In spite of the warm weather and the brisk movement of coal early in the season there is a good demand for all sizes except egg and some shippers report an improvement in that lately. Screenings have moved rather slowly, but that is on account of the warm weather. It will take cool weather to make the local trade brisk. The Lake trade is still quiet, but anthracite is much more active than bituminous. Some of the Buffalo shipping agents would forward more anthracite if they could get it, as they report that the Western trade is good and there is a fair amount of room on the upper Lake docks. Shipments by Lake from Buffalo for the week were 104,00 tons, nearly all of the clearances being for Chicago and Duluth.

PITTSBURGH

Sale of 60,000 tons of Lake coal. Market generally stagnant, mine-run at $1 and $1.15 for steam and gas respectively. Operations at about 50% capacity.

The coal market in general continues decidedly inactive, with prices as soft as formerly. While the Lake trade in general is very quiet, a sale of 60,000 tons of screened coal for this trade has just been made by a Pittsburgh shipper, shipments to begin at once and to be completed well before the close of the navigation season. Such sales have been relatively rare in the past few weeks, the requirements of the Northwest trade being easily covered by coal under regular contracts with mines. Retail demand is no more than fair for the season, and the line demand is if anything a shade lighter than a week or two ago. Railroad consumption shows no change. The total Lake shipments will be easily 25% under last year's record. Very slack times in the coal trade are expected when Lake shipments cease.

Prices continue quite irregular. The best gas coal is held with some firmness at about $1.15 for mine run, but steam coal runs off and down to about a dollar. Slack prices are rather irregular, averaging about 50c. a ton and with little signs of the firming up that should come as the Lake shipping season draws to a close. There is no talk of new circular prices being issued. The old prices remain: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district. Mining operations are at little if any over 50% in the district, with prospects of curtailment in the near future as the Lake season closes.

TORONTO, CAN.

Domestic trade quiet but steam situation improving with the more encouraging business outlook.

The market for domestic coal continues rather quiet owing to the mild weather, and no active movement is anticipated until it becomes colder. Manufacturing conditions show some improvement as confidence returns and manufacturers in several lines are increasing their output. The call for bituminous for steam purposes is steady, with prices somewhat lower for carload lots. Quotations are as follows: Retail—anthracite egg, stove and nut, $7.75; grate, $7.50; pea, $6.50. Bituminous steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale f.o.b. cars three-quarter lump, $3.78; screenings, $2.64.

TOLEDO

Toledo market continues inactive but with a strong undertone. Lake movement good. Fine coal difficult to dispose of.

The market remained practically unchanged during the past week. The warm weather has knocked the bottom out of the domestic trade so far as demand is concerned although prices have held up well and dealers declare that it will improve as soon as weather conditions are more favorable. The steam market has been a source of some discouragement as the demand is not what had been expected and the export business has not been as great as was hoped for.

However prices have remained fairly firm except on fine coal which is a drug on the market. The Lake movement continues fairly good but the ore business is light, as has been the case throughout the summer. But dealers here, however, are far from pessimistic in spite of these adverse conditions. Money is getting easier and investments of all kinds are showing a marked improvement over what they were shortly after the announcement of the European war.

COLUMBUS

Slowness still the feature in the Ohio trade. The domestic demand hinging on the weather. Steam business slack, but Lake trade showing some activity.

The domestic market in Ohio is now entirely a weather proposition, and because of the continued high temperatures there has not been much demand for domestic sizes. This condition, however, is only temporary, and jobbers as well as operators are not discouraged over the prospects. As a result of the slack demand, there has been a number of cancellations of orders, but the circular prices are still fairly well maintained, the only cutting reported being where stocks have accumulated.

The Lake trade is still one of the active features of the market. Bottoms are apparently plentiful, and a rush of coal to the Northwest will be made before the close of navigation. Docks of the upper Lake ports are generally in good shape and the interior movement is fair.

Steam business is as bad as ever, and there is no immediate hope for improvement. Many of the manufacturing plants are buying on the open market, being loath to enter into contracts under present conditions. Railroads are taking only a fair amount of fuel and steam contracts are not expiring at this time.

Retail business is at a standstill. Dealers have sufficient stocks to last for some time, and are not selling to any extent. The bulk of the stocking business has been done and it will require colder weather to bring customers into the market. Retail prices are being upheld, notwithstanding the stagnation, and little cutting is reported. There is a distinct preference for the better grades, such as Pocahontas and West Virginia splints. Anthracite is also in good demand.

Production in Ohio fields is not very brisk. The Pomeroy Bend district reports a normal output, but that is about the only field which has held up. The Hocking Valley produced about 75 per cent. of the average, and the same percentage is reported from Jackson, Massillon and Cambridge.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Re-screened lump	$1.70	$1.75	
Inch and a quarter	1.60	1.60	$1.50
Three-quarter inch	1.45	1.45	1.45
Nut	1.15	1.40	1.15
Mine-run	1.15	1.15	1.15
Nut, pea and slack	0.30	0.35	0.30
Coarse slack	0.20	0.25	0.20

CLEVELAND

Warm weather has reduced the demand for domestic sizes, and the small grades are not being made in such large quantities. Lake shipments are about over.

Retail dealers have cancelled and postponed contract shipments the last week because of the mild fall weather. This has resulted in mines producing less coal, and the receipts of slack have fallen off proportionately. The prices of domestic sizes remain unchanged.

In the steam grades, the demand does not seem to change. There are a number of factories working 24 hours a day, but these are largely blanket and woolen mills. One or two automobile factories are working to capacity, as are some of the chemical companies, but such plants do not use a great deal of fuel.

Fairmount operators offered three-quarter as low as 80c. at the mines, and mine-run at 65c. West Virginia No. 8 is being shipped to this market on consignment. Pomeroy nut and slack carrying $1 freight has been bought at 30c. by jobbers, while Panhandle has sold at $1.35 to $1.40. Hocking nut and slack are not being brought here, because it has not been satisfactory. This weaker tendency all along the line is only temporary, and orders for shipment are being taken at the prices current a week ago.

The Lake trade is taking boats subject to two weeks' storage before being unloaded. To meet this demand, shipowners who have taken cargoes of this kind will lay their ships up for a 15-day period, which entitles them to a refund of insurance amounting to about $750. This is the principal demand for vessels just now. Docks are not shipping enough coal to make space for current receipts and shippers are about through except for what coal they may send up in boats the last week or ten days. One company that takes in a cargo a day during the season has reduced this to one cargo a week. Canadian shipments are so light that one fleet of boats that usually carries a large amount of this coal has already gone into winter quarters. Three more docks went on single shifts last week, and by the end of this week all docks will be on this basis.

Prices for current shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.75				
Lump, 6 in.			$2.45		
Egg	3.75				
Egg, 6 in.			2.10		
Lump, 1¼ in.		$2.40	2.25		
Lump, ¾ in.		2.30	2.10	$2.00	$2.05
Mine run	2.75	2.15	1.95	1.90	1.95
Slack	2.40	1.50	1.45@1.50	1.50	1.50

CINCINNATI

Domestic business is showing a slight improvement with the advance of the season. The steam market is still very dull. Lake movement has practically ceased.

The local domestic business is light, but considerably better than the steam market, which continues dull. Indications are not lacking, however, that this will not last much longer. But just now, as for several weeks, nut and slack is a drug on the market, being offered at the buyer's own price, and reports are to the effect that many operators are dumping it at the mines, without attempting shipment.

Domestic business is not what it should be at this season, conservative buying and selling serving to hold down the volume of coal handled. Dealers are not inclined to attempt to force sales, in view of the possibility of credit losses if the business depression continues, and consumers are awaiting cold weather before buying. So far there has been none, and with domestic storing below the normal, the amount of the prepared grades sold has not reached anything like its usual level.

The Lake movement has practically ceased. This is due to the disinclination of owners of boats to send their vessels up the Lakes without prospects of a return cargo. As a result, the volume of fuel to be disposed of in the rail markets is all the larger. Prices tend to show this, as might be expected, although the only substantial concessions reported are in steam coal.

SOUTHERN

BIRMINGHAM

Coal quiet. No developments in South American business.

The market for the past week or ten days has been rather quiet, especially on steam coal. Lump coal seems to be improving somewhat, due to the approaching cool weather, but steam coal is very quiet, the mines running only about 60 per cent. of full capacity. Nothing definite has yet been done regarding the South American trade, and it now seems that it is a matter of proper finance arrangements that is holding up the deal. The pig iron market is quiet.

LOUISVILLE

Domestic demand has eased off and the situation is less favorable. Mine operations further reduced.

The one bright spot in the Kentucky coal market, the demand for domestic sizes, has disappeared because of the unseasonably warm weather. As a consequence the mines in both the eastern and western parts of the state are not operating to more than half capacity. Improvement is noted to a degree in general conditions and several of the operators express confidence that things are now at their worst. Here and there coal men note that they are receiving inquiries from the South for industrial needs and are taking heart.

The Kentucky market, however, has been invaded by the Tennessee state, convict-worked mines, which are shipping by the Southern Ry. which heretofore had done very little coal carrying in this market. This coal is underselling the commercially-mined product. The local domestic market has been helped some by the low stages of the river which have prevented heavy shipments of Pittsburgh coal.

MIDDLE WESTERN

INDIANAPOLIS

Mining much below normal for October, due to the summer weather. Mines generally on only about half time.

The weather has continued warm, with the temperature between 65° and 80°, and this has lessened the demand for the domestic grades, which have been the chief factor in the trade, and caused a general weakening effect all around. Operators estimate that the mines throughout the state are not doing better than three days a week. There is no improvement in the railroad or factory demand, and the steam-coal trade is much below normal for October.

It is said that the customary advance of 10c. to 15c., Oct. 1, has been abandoned on account of the unfavorable weather and other adverse conditions. Retailers are selling at the same prices that have prevailed. It is believed by many in the trade that normal conditions will hardly return before the first of the year, unless the unexpected happens, either at home or abroad.

CHICAGO

Weather conditions have resulted in light buying. Little change in the anthracite trade. Demand for Hocking coal has slowed up. Indiana operators handling a fair tonnage of domestic business, with prices reasonably firm.

The buying of both domestic and steam coals continues light, and the anthracite trade is just holding its own. In the smokeless market, conditions have been slow, but not soft. The major operators have been holding firmly on small sales to $1.40 for mine-run, while the smaller producers and shippers of off-grade coal are accepting less prices, usually around $1.25. The demand for lump and egg is still strong, but the output is light because the production of slack is so small. There has been a decided recession in the demand for Hocking coal; some of the operators have also been overshipping this market and some of the lump coal is getting up to demurrage and being sacrificed in order to move it. The circular price is $1.60.

There has been, for the first time, some easing up in the price of splint. For a while, so much of that coal moved to

the East that Western prices remained firm, but within the last week the movement to the West has increased and quotations are lower. Springfield operators report no improvement in business. Indiana operators are having a fair run of domestic business, with prices reasonably firm.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05	$2.52	
Steam lump	2.02		1.97	
Egg		2.80		$4.30
Mine run	1.87	2.15@2.25	1.87	$3.30@3.45
Screenings	1.07@1.12	1.40@1.50	1.07@1.12	

Harrisburg quotations are: Domestic lump and egg, $2.80; steam lump, $2.20; mine-run, $2.15; screenings, $1.40@1.50; No. 1 nut, $2.80; No. 2 nut, $2.40.

Carterville prices are: Lump, $2.80; egg, $2.65@2.80; No. 1 washed, $2.80; No. 2 washed, $2.40.

ST. LOUIS

Market continues dull, though there are signs of an improvement. Warm weather adversely affects the domestic sizes.

The past week has been an unusually dull one, and it was somewhat unexpected. The steam market still continues as it has for the past two weeks, but indications are that the next week or ten days will see it considerably improved. The domestic market is still strong on lump, but the other sizes are weakening. This is due principally to the warm weather.

Anthracite still continues to move in, and is in good demand, both in the city and country. Smokeless continues a drug on the market and can be had at the purchaser's own price. While the market is in poor shape at this time, everything indicates higher prices soon.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.25	$1.10@1.15	$1.15
3-in. lump	.....	....	1.40	....	.....
6-in. lump	$1.60@1.85	....	1.50	1.25@1.35	1.40
Lump and egg	1.85@2.15	$2.25	.....	....	1.35
No. 1 nut	1.25@1.35	....	.....	0.75@0.80	.....
Screenings	0.30@0.40	....	0.80@0.85	0.10@0.15	0.20
Mine-run	1.05@1.10	....	.....	0.75@0.80	.....
No. 1 washed nut	1.55@1.65	2.25	1.50	....	.....
No. 2 washed nut	1.30@1.35	....	1.35	....	.....
No. 3 washed nut	1.10@1.15	....	.....	....	.....
No. 4 washed nut	1.00@1.05	....	.....	....	.....
No. 5 washed nut	0.15@0.20	....	.....	....	.....

KANSAS CITY

Open weather the past week permitted more liberal deliveries of coal to householders. Prices remain unchanged, but an increase seems likely soon.

Several weeks of rain, which hampered deliveries of coal, were followed last week by clear and cooler weather. Orders were stimulated, and coal moved more nearly in its seasonable volume. If the present movement continues unabated, it is predicted that the prices will be increased the coming week. Plenty of cars seem available now, and dealers are beginning to stock up against a possible shortage. Pennsylvania anthracite is moving better than any time this fall; there is said to be but little stored in this vicinity, not enough for reserve against a probable heavy demand.

Mine prices have been adjusted somewhat in the past week, after the general increase on many products three weeks ago. Lexington fancy block has gone off to $2.10, and Richmond and Camden domestic block to $2. Southern Kansas nut is $2.10, mine-run steady at $2, mill-run $1.60, and slack $1.35. Leavenworth lump, fancy lump and egg have advanced 25c. to $2.50, $2.65 and $2.50, respectively; while mine-run has gone up 10c. to $2.25 and nut 20c. to $2.35. Higginsville Old Glory is quoted at $2.10 to $2.50. Iowa coal is 10c. higher, at $2.10. Illinois fuel is holding its strong prices. Arkansas semi-anthracite has reached the top at $3 for fancy lump, $2 for mine-run and $1.40 for slack. Arkansas semi-anthracite briquetts have reached the $5 winter basis. Pennsylvania anthracite has advanced 30 to 60c.

PORTLAND, ORE.

Rumors that Great Britain has taken over a cargo of West Virginia coal. Market quiet.

From Seattle came the report this week that the American steamer "Montoso," which had just arrived there from Norfolk, Va., with a cargo of 3970 tons of coal, has been ordered to Equimault, B. C., to discharge. It is understood the coal was purchased on short notice by the British Admiralty for use at the Esquimault Navy Yard.

The local coal market is fairly active and prospects are regarded good for the winter. There has been no change in quotations in past month. Coal briquettes are gaining in popularity for domestic purposes here. They are selling at $9 per ton, delivered in one-ton lots.

Coal Contracts Pending

Contract No. 1—Columbus, Ohio—The Ruggery Building is in the market for 300 tons of West Virginia slack coal. Shipments are to be made at the rate of 25 tons per day, beginning Nov. 1, delivery to be made at Columbus, Ohio. All communications should be addressed to J. A. Shahan, 60 Ruggery Building, Columbus, Ohio.

Contract No. 2—Norfolk, Va.—The United States Government is in the market for 2000 tons of bituminous coal. All communications should be addressed to E. Eveleth Winslow, Lieutenant Colonel of Engineers, United States Engineer Office, Norfolk, Va.

FOREIGN

Chile, South America—Press reports state that Chile will probably be asking for bids for 300,000 tons of coal per annum for three years.

Argentine, South America—There are unconfirmed rumors to the effect that inquiries are being made for fuel to coal the Argentine Navy.

British Guiana, South America—The Pittsburgh foreign trade commission announces receipt of a request from the government of British Guiana, asking for bids on 5000 tons of bituminous coal, shipments to run over the next year. Unconfirmed reports state that tentative figures that accompanied the request for information, named considerably higher prices than are obtainable in the current market, in addition to which a substantial bonus is offered for prompt shipments.

Guayaquil, Ecuador, South America—La Compania de Alumdrado (Lighting Company) is in the market for 3500 tons of gas coal. Prospective bidders should state the specific gravity weight per cubic foot, and space occupied by one ton of gas coal. Give approximate analysis including moisture, fixed carbon, sulphur and ash, and a commercial analysis showing the gas per ton of coal, gas per cubic foot of coal, illuminating power of the gas in standard sperm candles, value of one cubic foot in grains of sperm, sperm value per ton of coal, coke per ton of coal (good quality), coke per cent. of coal, ash in coke, sulphur eliminated with the volatile products, sulphur in the coke, tar per ton of coal. Quotations should be c.i.f. Guayaquil. Address The Manager, Compania de Alumdrado, Guayaquil, Ecuador, South America.

COAL CONTRACTS LET

East St. Louis, Ill.—Swift & Co., recently contracted with the Rutledge & Taylor Coal Co., of St. Louis, for two cars of screenings daily until Mar. 31, 1916, and also with the Breees Trenton Mining Co. for the same tonnage under the same delivery conditions.

PRODUCTION AND TRANSPORTATION STATISTICS

VIRGINIAN RAILWAY CO.

Shipments over this road for June, July and August with details of leading operators were as follows in short tons:

Shipper	June	July	August
Knw., Glen Jean & E. R.R.	32,920	24,084	22,588
E. E. White[1]	26,073	29,424	34,884
Gulf Smokeless	21,869	22,294	26,028
Loup Creek Colliery	20,717	19,139	18,389
Slab Fork	19,811	20,544	27,523
New River Collieries	19,244	8,906	17,172
Pemberton Coal & Coke	17,253	18,212	20,242
E. E. White[2]	16,253	18,788	21,631
McAlpin	14,324	14,906	14,447
Windin Gulf Colliery	13,278	14,268	18,938
Long Branch	12,454	10,545	17,789
Bailey Wood	11,707	11,544	13,141

[1]From Glen White. [2]From Stotesbury.

Gross shipments from all mines totaled 361,906 tons as compared with 286,354 in August, 321,626 in July, and 321,181 tons for June of the current year.

I. C. C. No. 5036—Empire Coke Co. vs. Buffalo & Susquehanna R.R. Co.

1. Rates for the transportation of coal from mines in the so-called Clearfield region of Pennsylvania to Geneva, N. Y., not found to be unreasonable or unduly discriminatory.

2. The withdrawal of a rate of $1.25 per ton applicable only on coal to be coked in transit at Geneva, N. Y., held to have been justified by the carriers on the ground that it was a preferred rate to a single city and industry and was not in fact a true milling-in-transit rate. Complaint dismissed.

FOREIGN MARKETS

GREAT BRITAIN

Prices improving and export business becoming more normal. The pit-prop question still unsolved. Retriction in exports from other European states.

The London trade, especially for house coal, still continues quiet. The colder weather, however, has given a stimulus to the actual consumption, and a little more buying has been apparent. Public prices advanced 24c. per ton Sept. 26. Colliery prices are all advancing, and special quotations are now withdrawn. Many collieries still refuse to quote for standard qualities, as they have so many orders on hand. The seaborne trade is slowly mending. Manufacturing coals are firm, but slacks and small nuts are offering freely at considerable reductions.

The coal trade of the Tyne is reported to be stationary, and prices are difficult to maintain. On the other hand, a slight improvement in the household trade is again noticeable in the Lancashire market, while in Yorkshire the position is fairly firm, business having reached expectations. The Cardiff market has been quiet and irregular during the week, there having been less shipment.

Ever since the outbreak of the war, the pit-prop question has been to the fore among the many difficulties which have beset colliery managers. A commission, representing the Board of Trade, the Mining Association of Great Britain and the Timber Trade Federation, has now proceeded to Canada and Newfoundland to inquire into the possibility of opening new sources of supply in those places.

The British Engineers' Association has complained to the government regarding the inadequacy of the measure for controlling trade with the enemy. The association is of the opinion that the regulations should be more stringent.

Holland has prohibited the export of coal, coke and briquettes, and Switzerland has placed an embargo on the export of fuel of all descriptions. The Board of Trade is in receipt, through the foreign office, of telegraphic information to the effect that the Portuguese Government has authorized the exportation of pitwood from Portugal to the United Kingdom so long as there is no shortage of these articles in the home market.—"The Colliery Guardian."

Oct. 2—The market is dull and featureless. Most qualities are freely offered and concessions can be arranged where buyers are able to take prompt delivery. Quotations are approximately as follows:

Best Welsh steam	$4.08@5.28	Best Mountmouthshires	$4.08@4.20
Best seconds	4.32@4.56	Seconds	3.96@4.08
Seconds	4.20@4.32	Best Cardiff small	1.92@2.04
Best dry coals	4.32@4.56	Seconds	1.20@1.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash payment.

Freights—Chartering is fairly active and rates for the Mediterranean are firmer. For South American destinations, the market is dull and featureless. Rates are approximately as follows:

Gibraltar	$1.68	Aden	$2.22
Malta	1.68	Colombo	2.34
Marseilles	1.76	Sabang	2.34
Algiers	1.56	Singapore	2.52
Genoa, Savona	1.96	Las Palmas	1.68
Naples	1.74	St. Vincent	1.80
Venice, Ancona	2.10	Rio Janeiro	2.94
Alexandria	1.92	Monte Video	2.64
Port Said	1.86	Buenos Ayres	2.88

SWITZERLAND

Coal imports for 1912 and 1913 were as follows:

	1912	1913
Germany	1,489,039	1,590,577
Austria-Hungary	7,449	5,340
France	218,149	196,934
Belgium	152,836	130,494
Holland	17,502	15,750
Great Britain	27,095	30,358
Total	1,912,070	1,969,454

In addition 439,495 tons of coke and 968,530 tons of briquettes were imported, nearly the whole of which came from Germany. In 1912, 411,288 tons of coke and 864,402 tons of briquettes were imported.

SPANISH IMPORTS

Spanish imports of coal for the first six months of this year and last year were, in metric tons:

	1913	1914
Coal	1,466,532	1,329,095
Coke	183,298	192,085

FINANCIAL DEPARTMENT

Pond Creek Coal Co.

President Thomas B. Davis, of this company, reports, in substance, for the year ending Dec. 31, 1914:

Development and Construction—Seven mines have been operated continuously throughout the year. From these seven mines there have been produced up to the end of this year 566,965 tons, and your company is in a position now to largely increase the output. The tonnage mined during the year exceeds the estimates of the management, and it has been very generally stated by authorities that your company's production for the first year after shipments commenced, constituted a record. Actual work has been in progress about 20 months, and all of the mines did not begin to ship coal until January, 1913, or later. While the seven mines now in operation are not developed to their full capacity, they are able to produce a much larger tonnage of coal than they did last year, and the production will be increased as markets are found for the coal.

The company now has completed construction work as follows: 52 four-room houses, 41 five-room houses, 13 six-room houses, 1 seven-room house, 259 eight-room houses, 1 ten-room house, 1 twelve-room house, three stores, power plant, power, light and telephone lines, five miles of railway sidings, six substations, seven fans and fan houses, warehouse, machine shop, six mine repair shops, two Y. M. C. A. buildings, and has done much construction work in the way of building retaining walls to keep creeks in their channels, constructing and improving roads and other construction work.

The company has purchased equipment as follows: 33 mining machines, 7 fifteen-ton electric locomotives, 16 six-ton electric locomotives, 816 steel mine cars, mine pumps, repair-shop tools and machinery and other equipment.

Transportation—During the current year the Norfolk & Western Ry. Co. completed the construction of their Williamson and Pond Creek branch at an estimated cost of $1,200,000, including the cost of a bridge across Tug River and yards near Williamson. This branch represents a high-grade piece of railroad construction work, and the road is built strong enough to handle very large tonnages of coal.

The Norfolk & Western Ry. service during the past year has been all that your company could have desired. It is the more remarkable that the Norfolk & Western Ry. Co. should have been able to give practically a full supply of cars at all times, considering the difficulties under which they labored during part of the year, on account of the tremendous damage done to their properties by the abnormal floods of April, 1913.

Your company is assured by the management of the Norfolk & Western Ry. Co. that the present standard of service will be continued in the future.

Distribution of Coal—The coal of the Pond Creek Coal Co. was tested out with very satisfactory results by some of the largest users of coal in this country, and it has been amply demonstrated that the coal is not only highly appreciated as a desirable coal for byproduct coking purposes, but also for use in the production of illuminating gas and for steam and domestic purposes.

In ordinary times a coal of the character produced by your company is always in good demand, and should be marketed without much difficulty.

Financial and General—The proposed plan of financing, referred to in last year's report, was adopted by the stockholders at their annual meeting on Apr. 9, 1913. The issuance of $3,000,000 of 6% bonds, secured by mortgage and convertible into stock at $25 per share, and the increase in the authorized capital stock of the company to 350,000 shares, were approved. Bonds to the amount of $2,000,000 were issued and the money was paid into the company's treasury June 3, 1913. Your company now has the financial ability to develop its properties to a capacity of 10,000 tons per day. The actual date when this tonnage will be realized is, of course, some distance off, as development to such a capacity requires time.

BALANCE SHEET

Assets		Liabilities	
Real estate	$1,001,508	Cap. stock issued	$2,000,000
Const. and devel.	1,619,709	Share-prem. account	250,000
Equipment	430,594	Convertible bonds	2,000,000
Cash	1,018,483	Accounts payable	115,063
Accounts receivable	99,531	Other misc. items	36,497
Inventories	230,350	Funds and reserves	10,180
Deferred charges	11,563		
Total	$4,411,740	Total	$4,411,740

Note—For previous annual report of this company see "Coal Age," Vol. 3, p. 980.

COAL AGE

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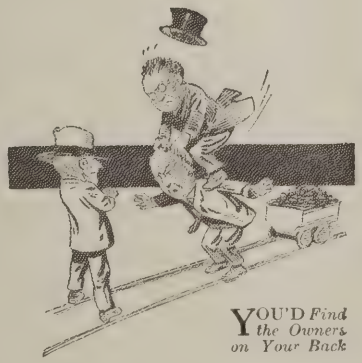
If---

By BERTON BRALEY

Written expressly for
COAL AGE



SOME *Guys would Play you for a Dupe*



YOU'D *Find the Owners on Your Back*

IF YOU was Supe of all the mine
You know just what you'd do,
You'd allus treat the miners fine
An' boost their wages, too,
YOU'D never rage around an' damn
A lazy miners' group,
YOU'D be as gentle as a lamb,
If you was Supe.

I KNOW, you'd make the old hole pay
Much better than it does,
You'd run her in a diffrunt way
You'd make her fairly buzz,
An' while you cut th' cost of coal
The wages you would whoop,
You'd be a Great an' Noble Soul,
If you was Supe!

AN' yet, I ain't exactly sure;
You MIGHT find out, you know,
That while your motives they was pure
An' clean as driven snow,
SOME guys would think yer kindness weak
An' play you for a dupe,
Or say you had a yeller streak,
If you was Supe.

YOU'D find the owners on yer back
Demandin' cent per cent,
An' labor leaders on yer track
Who'd never be content,
An' costs an' loss an' such would come
In quite a nightmare troop,
To put yer think-tank on the bum,
If you was Supe.

YOU'D find the job was pretty tough
An' full of care an' fret,
An' now an' then you'd act up rough
Like other supes you've met,
The one we have is kinda grim,
An' if you bossed the coop,
You MIGHT be just as bad as him,
If you was Supe!

Clean-Up Month

"Buy American-made Goods" is heard all over the United States. In the South, "Buy a Bale" and "Wear Cotton Goods" are popular slogans. And while the "Buy a Bale" movement will not move the cotton crop, it has a helpful value in expressing the willingness of Americans to aid one another in keeping business going. The purchase and use of American-made goods will be of tremendous value in increasing production and distribution of homemade products.

THERE has never been as much sentiment attached to the coal industry, as to the business of raising cotton. The one is an industry of hard facts and hard work, while the other has more or less of romance attached to it. When there is no market for coal the mines shut down and the workers, like the owners, simply shift the best they can until the demand comes again. People would not come forward in response to a slogan such as "Buy a Car of Coal" as they have to that of "Buy a Bale of Cotton," although coal will keep as long as cotton and more people are dependent on the industry.

But the owners and operators of coal mines, whether individuals or stockholders, are also facing serious problems. Many companies must curtail expenses, policies of retrenchment are in order, methods of strict economy must be observed; for when a mine can run but half or three-quarter time, it is a hard pull to keep ahead of fixed expenses coupled with the cost of such operations. Coal people need a slogan.

Those who run coal mines and study cost sheets know there are two great factors of expense, labor and material. The mines must be run with the least number of men essential to safe operation, and in times like these, they usually are. But wages will not be reduced until all other means are exhausted.

The second factor, that of material, can be given more vigorous treatment because here no individual or family is so vitally affected as when a man is laid off or his wages reduced. The slogan for mine operators, therefore, lies in the handling of this factor.

It is common knowledge that when times are good the censorship on orders is less rigid. There are coal-mining concerns in America—some of them among the best—who have more material in their storehouses than they dream of. These excess supplies include a large number of costly machinery spares. There is many a scrap pile that contains good material that could be used to advantage in case of necessity.

In times like these, practical things are the only things worth while. Here is a practical idea for coal-mining companies.

Discover what you have on hand and use it now instead of continuing to order new material as you always do in good times. This idea can be expressed in the term "CLEAN-UP MONTH."

It can be carried out like this—

Institute a "CLEAN-UP MONTH" when no orders will be passed except for absolute essentials such as lubricants, explosives, etc. To make this effective, the supply house and storerooms about the mine should be carefully canvassed so as to exhibit all excess and obsolete or semi-obsolete stock; in fact, to show up what is on hand in the way of material that is always passed up in good times because it is easier to order more, but which is just as good as new if the men are made to use it.

Have the so-called scrap piles gone over thoroughly for good material suitable for use in emergency repairs. Many a superintendent has instilled ideas of economy into his master mechanic and made him fit to take care of minor breakdowns without rushing to the supply house for a new part. In fact, the best test of any man is the use he makes of what is at hand, rather than what he can do if given everything to work with.

The whole idea in "CLEAN-UP MONTH" will simply be to stop for a while the practice of ordering and using new material just because one can, when there is already something on hand that will do just as well. The adoption of such a slogan by coal-mining companies will be worth as much to them as the "Buy a Bale of Cotton" movement is worth to the cotton growers.

How many will try it?

Excavating Upward

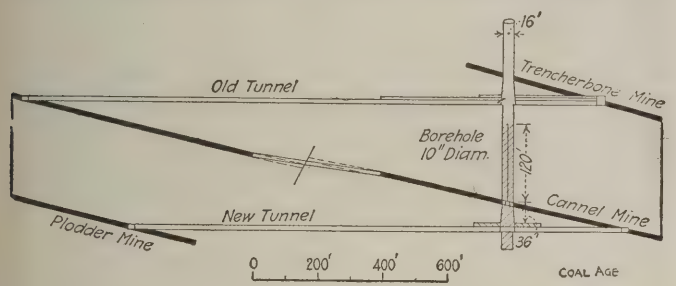
By J. F. Springer*

SYNOPSIS—In a certain English colliery it became necessary to extend an existing shaft in order to reach a lower coal measure. This work was accomplished from below, thus avoiding interference with hoisting in the original shaft.

We are so accustomed to think of shaft excavation as progressing downward, that we must regard the opposite procedure as truly novel. Not long ago, in an English coal mine, a considerable length of vertical shaft was opened from below upward.

At Newton Colliery, there are several coal seams which are sharply tilted. Two of these were, a long while back, worked from a single vertical shaft, which connected near its bottom with both seams by a horizontal tunnel. That is to say, the shaft penetrated through one seam to the strata lying between the two, but did not go down far enough to reach the lower measure. The horizontal tunnel met the coal stratum at a point a considerable distance to the north where the seam rises to a sufficiently high level.

The tunnel was used until the exhaustion of the coal easily accessible became more or less imminent. It was then desired to construct another horizontal tunnel 195



Cross-Section through the Coal Measures

ft. further down and to deepen the old vertical shaft to or below this level. The new tunnel would then afford connections with two of the tilted seams, though not precisely the same two as was the case with the upper tunnel.

If the shaft had not been in active use for nearly the entire daily period of 24 hr., when the time came to deepen the shaft, the operation would have been quite simple. What was actually done was as follows: The tunnel was driven from the proper and accessible level of one of the seams, and the deepening of the shaft was carried out, in the main, from below upward. The work on the shaft extension was in this way carried out with but little interference with the operation of the shaft itself.

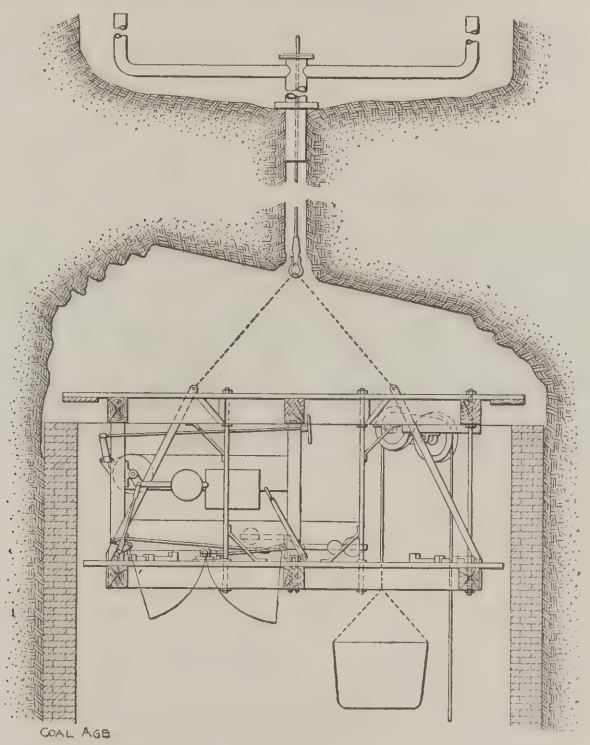
The point where work was commenced was not in the lower tunnel, but 36 ft. above it, where the lower one of the two original, tilted seams intersected the prolongation of the old shaft. The seam was now worked out in part and so there was suitable access. Between this point and the bottom of the shaft above was a vertical distance of about 120 ft. This region was now attacked by excavating upward.

*618 W. 136th St., New York City.

A bore hole was put down from the bottom of the shaft to the place of beginning the work. This served to make it possible to use a plumb line and thus fix the position with some certainty. It served also as a means of ventilating the upcoming shaft and to furnish a way of using a cable in carrying on the work.

The putting down of this bore hole was accomplished without interrupting the operation of the old shaft. The workmen were protected by means of a strong cover. The material brought up to the bottom of the shaft was so slight in amount, that it was readily removed during the few hours when the shaft was free from its ordinary use.

Let us now proceed to the upward excavating operations. A double scaffold was employed by the excavators and other workmen. This was swung from a cable through



The Arrangement for Making Excavations Upward

the bore hole whenever it was necessary to move it. When at rest, the scaffold was secured in part by means of pins or prids, which were advanced radially from the scaffold into the shaft walls. Additional support was provided by packing up from the top of the brick lining of the shaft.

There were two floors to the scaffold, both circular. The lower one was of less diameter in order to allow for the presence of a brick lining wall in the shaft. The top deck was used by the excavators, and from it they drilled the holes for blasting, the most of which were nearly vertical. The trimming of the side walls was also done from this floor.

The lower floor provided support for the bricklayers working on the lining. The space between the two floors was left open, except that on one side the upper and lower floors were connected by walls. In this way a box-

like compartment, 5x5 ft. in plan, was constructed.

Through the lower floor, opposite to the box, a hole 5x5 ft. in dimensions, was cut. The bottom of the box was a kind of trap-door, there being two leaves there installed opening downward. These leaves were normally held in place by heavy counterweights, heavy enough to prevent them from opening when only the weight of a workman was to be sustained. In addition, a strong screw brake and two trigger-catches were provided.

The men who worked on the top deck got to their positions from below by means of two openings in the sides of the box. In the space between floors, the pulleys were arranged, by means of which a bucket was raised and lowered through the 5x5-ft. opening in the lower floor.

The mode of operating was about as follows: The excavators would be hoisted in the bucket to the lower floor, whence they would pass into the box and thence to the top deck. They would get their blasts ready, and then withdraw to the bottom of the shaft. From this point or one off to one side, the explosives would be discharged.

The muck would fall onto the top floor of the scaffold or into the box. When the excavators returned to the lower floor, they either went through the openings in the walls of the box to the upper floor; or, if the way was blocked by the presence of muck in the box, by means of emergency doors. The upper deck would now be cleared by getting the material into the box. This latter was then discharged through the two-leaved door.

It should be understood that whenever drilling was begun, the upper floor of the scaffold rested on the brickwork. The men doing the excavating would use props to protect themselves from the roof overhead. It is said that the drilling went on rapidly because the drills working overhead cleared themselves automatically.

It was important that no fastenings or other necessary accessories should be out of place; so the men—especially the foreman—would make sure of everything as they started in after each blast. Thus, it was a matter of considerable importance that nothing should go wrong with the two-leaved door.

As it was desirable to use the bottom of the old shaft overhead as a sump, a pipe was put into the upper end of the bore hole and sealed on the outside with clay and concrete. It was only necessary that the upper end of the pipe should project a little above the maximum level of water in the sump. If conditions had been such as to prohibit the presence or the drilling of the bore hole, the recurrent necessity of lifting the scaffolding could have been satisfied by means of jacks.

Safeguarding the Repair Pit

By Pennsylvania Mining Engineer

The pits constructed for the purpose of cleaning and repairing mine locomotives and coke machines are among the dangers encountered in and around coal mines. Frequently these pits are from 3 to 4 ft. deep and are walled up with stone, brick or concrete. Often, too, the edges of these walls are left sharp, and a fall into the pit might easily result in a serious or fatal injury. To avoid such an occurrence, the pits are frequently covered with planking or metal sheets. In either case, however, such covers are hard to handle. Wooden covers furthermore in time become more dangerous than no cover at all, due to the rotting of the timber.

To avoid the danger of an open pit at a certain plant of which I had supervision, I, with the aid of my blacksmith and machinist, designed the folding railing shown in the accompany illustrations. When finished, in place and properly painted, this railing rather adds to than detracts from the appearance of the coke plant.

As may be seen in the photographs, such a railing was not hard to make, being built of second-hand pipe, and in the absence of fittings, 2x½-in. flat iron bands. The 8 upright pieces of pipe, located two at each corner of the pit, are allowed to project 6 in. above the upper horizontal rail. Over the end of adjacent uprights is slipped a shackle or tie, which holds the side and end sections of the railing in a proper position. Removing these shackles allows the four sections of the railing to swing outward from the pit on hinges attached to the top timbers or to the web of the rails.



The Railing in Position Protecting the Pit and Folded Down to Allow Locomotive or Coke Machine to Pass Over

I have installed similar railings at other mines, and can say from experience that after one of these railings is once placed, it gives no further trouble and answers its purpose admirably. If kept properly painted to protect it from the sulphur smoke, which attacks all iron structures around a coke plant, it will last indefinitely.

When there is a repair pit to be guarded, it is far preferable to construct a suitable railing and see that the same is properly put in place and operated, than to put the job off until a coke-machine runner or some other valued employee has walked into it and broken his neck. The expense of installing such a railing as has been above described is small and may readily be the means of saving a doctor's or an undertaker's bill, a law suit or two, and possibly an indemnity; but what is vastly more important, it may save the life of a trusted and valuable employee.

Meeting of the American Institute of Mining Engineers

SYNOPSIS—The meeting of the American Institute of Mining Engineers in Pittsburgh, Penn., Oct. 8 to 10, was an unqualified success and showed that the field of coal, petroleum, iron and steel was as fertile as any the institute has ever cultivated.

On Oct. 8, the committees of the American Institute of Mining Engineers devoted to "Coal and Coke," "Petroleum and Gas," "The Use of Electricity in Mines," "Nonmetallic Minerals," "Iron and Steel," held a joint meeting in Pittsburgh, Penn., with headquarters at the Hotel Schenley. About 200 members were present.

At 2:30 p.m., a general session was held in the Lecture Hall of the Carnegie Institute, in the rear of the Museum. L. C. Morganroth read a paper on "The Occurrence, Preparation and Use of Magnesite." This is one of the bodies which comes to us from Austria and Hungary and the discussion seemed to favor the idea that it should continue to come from that source until better deposits than those existing here are discovered. Only a temporary use of native deposits could be expected, that use ending with the war.

The paper on "The Oil Fields of Mexico," by Ezequiel Ordoñez, was left for the meeting of the petroleum section on Oct. 10. That on "The Iron Industry in Brazil," by E. C. Harder, was read by the secretary, Bradley Stoughton. Geo. S. Rice delivered his own paper in brief, entitled "Investigations of Coal-Dust Explosions."

Field Dirt for Immunizing Coal Dust

William Griffith desired to know whether field dirt had ever been used in the experiments for purposes of immunization. He said that mines did not have the crushing facilities needed for the making of stone dust and that the progress of the immunizing movement was held back by the idea, correct or incorrect, that the dust must be extremely fine which is used for that purpose. Until the Bureau makes experiments, as he showed, it is impossible to know just what are the indispensable specifications.

The paper of H. M. Chance was read only by title, as the author was absent. It was entitled "The Appraisal of Coal Lands for Taxation." R. V. Norris replied, stating his preference for a system of taxation on output. In rebuttal it was pointed out that while such a method might be reasonably equitable in the anthracite region because the companies were in general seeking to produce a maximum production, it was manifestly unjust in those portions of the country, in fact in all the bituminous-coal regions, because coal land tended to be held for a rise in value and consequently would not come into the market at all, if it were not taxed. In fact, taxation is desirable, as much for its liquidation of property as for the revenue it raises.

An Example of Freedom from Land Taxation

One of the principal untaxed offenders is the federal government, which has put a paper value on coal lands which would be swept away in a year by an indignant people if they had to pay taxes on their holdings, such as are paid by individual owners and operators.

R. V. Norris stated that the assessment of the coal in the anthracite region up to 1907 was on the basis of $10 per foot-acre. Then the various counties increased it arbitrarily in some instances up to $65 per foot-acre. They limited their assessments only by their taxation needs.

Taxation As a Veiled Robbery

In township of Hanover, Luzerne County, Penn., 97 per cent. of the taxes are obtained from the coal operators and owners, and that township recently spent $200,000 in building two miles of highway. Mr. Norris mentioned an instance where the taxes on a piece of coal land were now $2000 more per annum than the royalties which it realized. Owing to taxes being raised 163 per cent., the owner is the poorer every year by $2000, because of his ownership of the property, yet he cannot break the lease.

There has been much contest relative to the assessment in the courts of the anthracite district, and the Supreme Court has ruled that estimates based on the foot-acre are not valid. In fact, William Griffith declared that it was not safe for any expert to declare on what he based his valuation. The only appraisal which has never been successfully contested is based on the foot-acre and on a number of considerations equally invalid according to an opinion of the Supreme Court, but the basis has not been revealed and consequently no attack can be made on the validity of the results. Had the methods of valuation been exposed in the court, those methods, scientific and equitable as they were, would have been ruthlessly thrown out. The court accepted them not on the basis of reason, but on the ground of the Latin dictum "*experto crede.*"

The Income-Tax Inequities

S. A. Taylor called attention to the income-tax law for corporations. It permits, as administered, for 5 per cent. of the selling price of coal to be deducted from the profits for depletion of coal resources. This is ample in some sections of the country. On coal selling at an average of $1.20 per ton at the mine, the deduction amounts to 6c., but Pittsburgh coal can only be secured at 15 to 20c. per ton, so there is an inequity in this rule of from 9 to 14c. Whenever royalty is paid, however, the gross amount of that payment, however large, can be deducted without trouble being made by the U. S. Treasury.

In the evening, an illustrated lecture on "Ancient Methods of Manufacture of Iron in China," was read by T. T. Read, in the Lecture Hall of the Carnegie Museum. This was followed by a moving-picture lecture on "Safety Methods in Mining," by J. W. Paul, of the U. S. Bureau of Mines, who exhibited three reels, showing methods of mining at Nanticoke, Penn. Edwin Higgins, of the same Bureau, showed two reels, exhibiting the methods of iron mining of Witherbee, Sherman & Co., at Mineville, N. Y.

A few people visited the Allegheny Observatory and sighted the "double double" or Epsilon Lyrae and the

moon, through the 30-in. photographic refractor and the 13-in. refractor, respectively.

J. Taffanel's Regrettable Absence

On the second day, the party split into three parts, the "Iron and Steel," the "Coal and Coke" and the "Non-metallic" sections meeting separately. It will suffice to follow the discussion and papers of the "Coal and Coke" department. The first paper, that of J. Taffanel, on "Coal-Dust Explosion Investigations," was read by title as the author is a colonel in the French Reserves, and is needed at home. Liévin, where his experimental station is located, is at present writing on the firing line over which the Germans and French now pass back and forth in their death grapple.

H. N. Eavenson read a paper on "Coal-Mine Explosions Caused by Gas or Dust," and showed that the frequency of accidents from serious explosions, in which more than five lives are lost, is greatest in the winter months. Apparently foreign explosions do not show such a preference for cold weather. For instance, in Great Britain, while December leads in fatalities, June is second in this respect.

Increased Number of Accidents from Explosions

The author adds that "in the coal mines of the United States, the total number of accidents and of fatalities due to explosions of gas or dust has been steadily increasing; there has been a slight increase in the number of accidents and a more decided increase in the number of fatalities per million tons produced; the serious explosions, causing five or more fatalities each, having been steadily increasing in actual number and number of fatalities as well as in the number of accidents and of fatalities per million tons produced; the number of accidents per mine, both serious and total, also shows a steady increase."

Where America and Europe Differ

Geo. S. Rice called attention to the fact that the mingling of statistics of accidents from coal-dust and gas explosions had much to do with the showing which made summer conditions in some countries about as unfavorable as winter. He admitted, however, that a separation between those from one cause and another was almost impossible. He pointed out that most of the explosions in Europe were probably due to gas whereas in America, coal dust was perhaps the greatest menace.

R. D. Hall said that the very period of occurrence of winter in Europe is different from that in the United States. In fact, the last three months of the year are almost regarded as the winter in Europe whereas the first three are roughly so regarded here. One cause for the importance of coal-dust explosions in this country is the prevalence of room-and-pillar workings. The open faces in longwall leave room for release of violence in an explosion and dust explosions are not so likely to occur as they are where the blown-out shot or gas explosion originates in a restricted area, such as a heading, which resembles the bore of a cannon.

He called attention to the fact that longwall workings make ventilation difficult and consequently frequently cause gas explosions. For this, as also for other, reasons the mines of Europe are not as well furnished with air as those of the United States.

S. A. Taylor declared that it would be well to inquire into the possibility of gas being fired by the currents from wireless telegraph stations and said a recent British explosion had been ascribed to that cause.

H. A. Kuhn's paper on the "Pittsburgh Coal Field of Western Pennsylvania" was not read as he was not at the meeting to present it. The same is true of R. S. Lewis' paper on "The Book Cliffs Coal Fields, Utah," A. E. Gibson's on "An Aërial Tramway for Mining Cliff Coal," and M. B. Yung's on "Tin and Coal Deposits of the Fu Chuan District, China." Nor was there any discussion on these papers. J. P. K. Miller followed with his paper on "The Manufacture of Coke."

The Cement-Gun Work

At 12:40 p.m., the members of the "Coal and Coke" section took a special car to the Baltimore & Ohio R.R. station and the train to the experimental mine. It is perhaps unnecessary to add anything to what G. S. Rice and L. M. Jones will have to say in our next issue, relative to the demonstration at Bruceton, Penn. The cement-gun work attracted much attention and it might be well here to point out that unlike the sample work on the grounds, no reinforcement was used in its construction. The mixture of cement and sand in the proportion of one part cement to three parts sand was wetted with water at the nozzle and fired on the natural surface of the rock or old concrete which had to be covered.

This surface, though covered with soot and by no means ideal for bonding was not prepared for the reception of the gunite except that in places projections were broken off so as to make the surface less rough. It must be remembered that the gun itself sandblasts the surface. The rebound possibly moves much of such extraneous material as would interfere with bonding. This rebound of sand probably amounts to ¼ or ⅓ of that used so that the cement mixture is probably two parts sand to one of cement. The sand which rebounds can be used again as it does not bond together in any way, for it is free of cement.

Resistance to Explosion

The coating had stood a severe explosion prior to Oct. 9 when the members of the Institute saw it and it passed through the second ordeal with almost equal success. However, in the second explosion a patch about a foot square fell and this injury is supposed to have been due to putting on the coating too thick at one operation as it was two inches thick at that one point. The bonding had been made to bone coal.

Of course, the test for the cement gun is not an explosion test but one of weathering and the experimental mine is hardly the place for determining its value. There is reason to believe that the gun will prove useful for saving roofs from air-slaking. So long ago as 1911, G. S. Rice, the chief mining engineer of the Bureau, advocated a trial of its availability for such use.*

The Coal Men Were Silent

The other sections visited the McKeesport plant of the National Tube Co., the Homestead steelworks of the Carnegie Steel Co., and the Harbison-Walker brick plant. In the evening an informal subscription dinner was given at the Hotel Schenley in the Banquet Hall, S. A. Taylor

*"Some Special Uses of Concrete in Mining." Transactions of the National Association of Cement Users. Seventh convention. Vol. VII, 1911, p. 416.

presiding and B. B. Thayer, Bradley Stoughton, Charles F. Rand, Elmer Hiles, I. C. White, S. B. McCormick, George H. Neilson, Philip N. Moore, Edmund C. Pechin and E. G. Spillsbury being the speechmakers. Perhaps it would have been possible to give a little more prominence to the coal industry in the selection of speakers if only to compensate for long years of silence.

On Saturday morning, the 10th, three meetings were held, the "Petroleum and Gas" section, that of "Electricity and Miscellaneous Mining Topics" and that pertaining to "Iron and Steel." The first had two papers in which our readers will have no interest but the discussion which followed on gas and oil wells passing through coal seams has value to many coal men.

The Plea of the Gas Interests

The gas men endeavored to show that they had provided most liberally for safety. W. E. Fohl stated that investigation showed that every explosion of gas from wells which had occurred had been caused by naked lights, and he advised the use of electric lamps in mines in which an influx of gas from a well is to be anticipated. The suggestion is good but it is a folly to overlook the fact that explosions of well gas may not always be so caused, may even have already resulted from some other agency than an open light. There are several possible sources of ignition and using electric lights, though advisable, is an insufficient insurance.

"Bunching" Wells

As was stated, the gas and oil men have been placing their wells so close together as to interfere severely with mining. It might be possible to mine around a well symmetrically and let the measures fall without injury. But the frequency of the drilling makes this impossible and to leave an *adequate* pillar around such holes is an extremely expensive practice and one which spoils the mine and interferes with output.

It was alleged that the gas and oil men drilled altogether too many holes. Someone replied that no one went to the expense of drilling holes for recreation and the obvious reply was that this was not alleged. Excessive drilling is practiced because the oil or gas man desires a large output in a short time. He has, of course, just as much right to drill the earth like a sieve to hurry production as the operator has to keep him from drilling in order that he, the coal operator, can get out his coal without annoyance and danger. The rights are even. In fact, the majority of holes are by no means drilled "for fun," but for the purpose of removing the oil and gas from under the land of someone else or to remove the mineral wealth of one's own land so as to prevent it being purloined through the wells of another. As a matter of actual fact, excessive drilling has generally been considered a mistake and a source of loss to the industry as the pressure is reduced too rapidly and flooding results.

Rock Pressure Is Not a Sign of a Good Well

There is a general belief that a well of no value is always one of low rock pressure, but rock presure is a function of depth; of course it disappears in a well which is commercially valueless as soon as the gas or oil is allowed to escape but while the well is confined, pressure has little or no relation to the probable productivity of the well when the gate valve is opened. A worthless well thoroughly plugged will develop as dangerous a pressure as the most productive of oil or gas wells and protection is needed against leakage of gas from such a well as much as from any other.

How Much Rock Can a Gas Pipe Control?

The gas men believe that a little gas pipe surrounded with 2 or 3 in. of concrete will act as a pivot on which a million or more tons of rock will swing when the moment of collapse arrives. When at the Union Coal Co.'s mine, at Adamson, Okla., an area 1300x2600 ft. suddenly began to cave and 13 miners met death, what would have happened if a few gas lines with concrete facings stood in the way?

They would have snapped like the stem of a churchwarden pipe. Probably about a hundred million tons of rock fell when this Oklahoma mine let go. If only there had been a pipe with a concrete shell around it, what modification in the manner of descent of the rock would have been made by that fairy wand?

From such an atmosphere of misconception, one turns with relief to the meeting of the "Electricity and Mining Topics" Section upstairs. S. S. Rumsey and W. F. Schwedes had prepared a paper, entitled "A Test of Centrifugal Motor-Driven Mine Pumps." This was only read by title, but the discussion was animated, being led by the chairman of the committee on the "Use of Electricity in Mines," William Kelly. It was pointed out by R. V. Norris that a certain definite quantity and head for which the centrifugal pump should be designed should be provided if any efficiency was desired. Of course, by storage and interval operation the volume needed can be secured, but running the main station under varying load is uneconomical.

It was said that the reciprocating pump was also most efficient when working at a certain speed and passing a predetermined volume.

Centrifugal Pumps in Flooded Mines

Difficulty arises in the pumping of acid water. R. V. Norris declared that if it is extremely acid it cannot be handled with a centrifugal pump, but Edwin Ludlow declared that by lining the pumps with Mannheim cement, acid water and even slush could be handled. He regarded the centrifugal pump as excellent for the dewatering of flooded mines. Those over which he had charge had to handle 25 tons of water for every ton of coal mined, and as a great part of that water came in from the surface on the occasion of heavy rains, it was necessary to keep spare equipment for occasional use. The centrifugal pump being less expensive than the reciprocating unit was better suited to this purpose. His pumps had bronze parts throughout.

It was stated by one of those present that a German centrifugal pump had been ordered for shaft sinking. It was designed to lift water under any head from zero to 800 ft. The nature of the means by which this adaptability to varying heads was secured, he was unable to explain as he did not understand the construction of the pump.

Gasoline Locomotives and Health

"The second paper was on "Gasoline Locomotives in Relation to the Health of Miners," and was read by O. P. Hood, chief mechanical engineer of the Bureau of Mines.

His remarks, on the whole, seemed quite favorable to the use of such equipment. R. V. Norris urged that the locomotives be kept on the main entries and not allowed to enter chambers. He stated that carbon monoxide caused lesions of both brain and kidneys and did not have merely a temporary effect on the person who inhaled it.

G. S. Rice said that when he first saw gasoline locomotives in England, France and Belgium, he had been much pleased with their performance and had hoped for their introduction into this country. However, these foreign locomotives were of the hit-or-miss type of ignition and the power was low, only about 4 or 5 hp. They were used only on small grades. The American market demanded locomotives of more capacity and perhaps that is the cause of some ventilating difficulties.

S. A. Taylor stated that he found that the motormen were disposed to turn on too much gasoline whenever any undesirable condition increased the load and, as a result, imperfect carburetion took place. He said he had placed his gasoline locomotive in the return airway, and graded the road carefully so as to equalize conditions, but he found he got an excess of monoxide if an additional wagon or heavier loads made an unusual demand on the locomotive.

W. G. Whildin said that he had used four different types of gasoline locomotives and found them uncertain in operation. He had found little trouble from imperfect carburetion, the miners and the motormen not being affected, although one morning, on starting, all four men were overcome and needed the pulmotor.

Advocates Carburetors Used in Automobile Practice

O. P. Hood thought that the difficulties mentioned could be met by changes in design and the employment of intelligent motormen. There are dangers inherent in the gasoline locomotives as there are in all mine appliances, in powder, for instance, but they should be guarded against and similarly gasoline locomotives should be operated with judgment and should not be discarded. The carburetors in the past have been built on a rugged type with simplicity as the watchword rather than efficient carburetion, and he advised that, in future, carburetors such as were used in automobiles should take the place of those now in mining use.

The third paper was on "Short Firing in Coal Mining by Electric Circuit from the Surface," by G. S. Rice and H. H. Clark. In the discussion, T. H. O'Brien, of the Stag Cañon Fuel Co., declared that the company was removing the electric switches placed at the mouth of every room, as they were not thought necessary now that the men do not charge their own holes. There is now no risk during the working hours, so the room switches are not necessary. Before, if a switch had been thrown on the heading, only the existence of the room switches would have prevented a general discharge of the holes, and a premature discharge from some other cause was always possible. To prevent this was the purpose of the room switch.

Misfires Are Due to Defective Wires

He said that misfires were almost always due to defective wires. Only two defective detonators had been found in several months. When misfires occur, the men are not allowed to return to work till the shots have been fired on the succeeding night.

A general discussion then followed on the Use of Electricity in Mines. In the afternoon trips were made to the U. S. Bureau of Mines and the oil and gas district of Oakdale, Penn. The Bureau of Mines display was varied and interesting. Mr. McElroy, with a team of students in first-aid, described to the guests in an extremely competent way just how the first-aid work his team was doing should be performed and why.

Once Again

There was a convincing thoroughness in both execution and description. Yet one matter roused question. Here was a patient with such a severe shock that to revive him the Shaefer method is adopted. He is recovered from death by the heroic efforts of the first-aid men and they then *sit* him up and begin to bandage his fingers and his head with picric-acid gauze.

There may be nothing wrong about that sitting up. We do not pretend to know. But we have learned that men are being demerited for it at American Mine-Safety Association and Red Cross meets. Why does the A. M. S. A. and the R. C. demerit if the Bureau of Mines persists in teaching that it is right. Or, *vice versa,* why does the Bureau teach it if it is wrong? And lastly, why do we so frequently have to mention this variation between the teaching of the Bureau and the action of the national associations? Surely some action should speedily be taken.

Coal Mining Institute of America

The winter meeting of the Coal Mining Institute of America will be held Dec. 8 and 9, 1914, at the Fort Pitt Hotel, Pittsburgh, Penn.

On Tuesday, Dec. 8, the morning will be devoted to the business session, the election of officers and the president's address; the afternoon will be filled by the question box discussion conducted by W. E. Fohl. The following questions are proposed: Is the longwall system applicable to the Pittsburgh seam of coal? What is a safe voltage for use in coal mines? Do compensation laws increase or decrease accidents in coal mines? What are the advantages and disadvantages in the use of portable electric lamps?

Following the Institute dinner, at 6:30 p.m. ($1.50 per plate), T. L. Lewis, of Columbus, Ohio, and H. H. Stoek, of Urbana, Ill., will deliver addresses on "Government Control with Relation to the Coal-Mining Industry."

On Wednesday, Dec. 9, the following papers will be read: "Foreign Coal Trade of the United States," by Dr. E. W. Parker, Washington, D. C.; "Last Stand of the Mine Roof," by R. D. Hall, New York City, N. Y.; "Personal Observations in Alaska," by Dr. W. R. Crane, State College, Penn.; and "Coal-Dust Experiments at Experimental Mine, Bruceton, Penn.," by L. M. Jones, U. S. Bureau of Mines. Charles L. Fay, secretary-treasurer.

Fourth Annual Banquet at Nanticoke

On the evening of Oct. 10 in the Broadway Armory at Nanticoke, Penn., was held the fourth annual banquet of the Nanticoke District Mining Institute. No less than 798 persons attended this banquet, and even then

not all who came could be accommodated. This was the greatest number of people ever banqueted in the building at one sitting, and there was consequently but scant room for the members of the Ladies Aid Society of the Methodist Episcopal Church, who served the diners, to move about. In spite of this handicap, however, both menu and service were excellent.

After the supper, John E. Kelley, president of the institute, reviewed the work of the organization during the past year. Mr. Kelley introduced the Hon. Peter A. O'Boyle as toastmaster, who spoke for several minutes, praising the work of the institute and encouraging its members.

J. G. Brecht, secretary of the State Board of Education, was next introduced. To him as well as to many others, the number of men present was a great surprise. Mr. Brecht's theme was the practical value of industrial education.

Franklin H. Ball, of Pittsburgh, and Superintendents Diffendofer and Dixon, the latter of Newport Township schools, each spoke briefly on the subject of the evening. Gen. C. B. Dougherty also spoke briefly but with good effect.

The idea of industrial education is by no means new, vocational night schools having been established in the anthracite region for some time. This movement is, however, constantly growing in popularity, and each succeeding year sees a larger number of men enrolled, a larger number that complete the work, and what is vastly more important, a larger number that are able to successfully apply the knowledge they have acquired through their studies.

A Chemical Fuse Lighter

By Barry Scobee*

For many years it has been recognized that there is grave danger in the blasting of coal, in mines generating gas and in dusty mines where the coal is highly inflammable. In order to avoid the wholesale destruction of life, in mines where the use of powder for blasting appeared to be an essential feature in the mining of the coal, the suggestion has been adopted of employing shotlighters to fire the shots after the miners have left the mine.

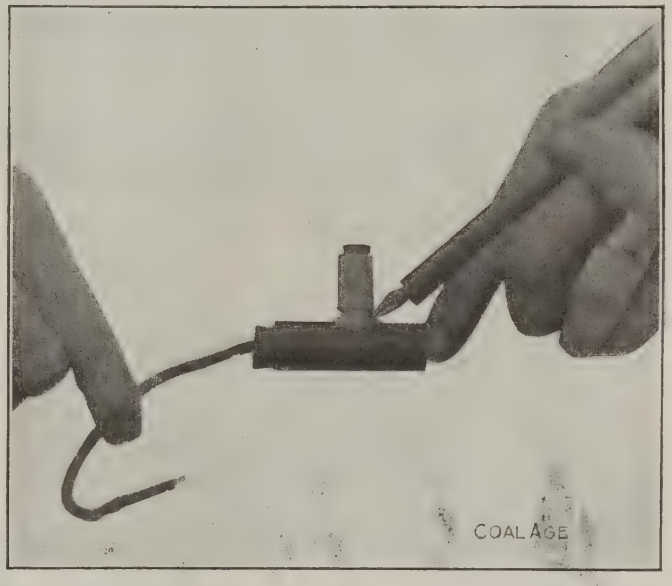
While the employment of shotfirers has greatly reduced the death list, in those mines, the sad fact remains that, in many states, particularly in Oklahoma and in Kansas, many shotfirers have sacrificed their lives in the performance of their duties. That the work of shotfiring is dangerous, under the best conditions and that this danger cannot be wholly eliminated under conditions that are less favorable is freely admitted. For this reason, any device or method for avoiding the danger incident to shotfiring is worthy of careful consideration.

Now, comes the suggestion of a chemical fuse lighter, for which the chief advantage claimed is the fact that by its use the fuse is ignited from 2 to 3 hr. after the necessary connection is made. The suggestion comes from John Dowd, a former druggist of Radley, Kan.

It is stated that this contrivance was used by the shotfirers, in shaft No. 8 of the Hamilton Coal Co., at Radley, for 13 nights in succession. The test was made on 25 shots each night, with varying results, during the first nine nights, most of the shots, however, being successfully fired each night. The last four nights every shot was fired except two; but the failure of these two shots to explode was found to be caused by other trouble and not due to any defect in the lighter. This showed that 98 out of 100 shots were successfully fired by the lighter, in the last four nights of the test.

Attention is drawn, in connection with this method of firing shots, to the danger of the powder becoming damp in the hole, before the fuse is ignited. This is particularly true where the drillhole is rough and jagged, and the paper wrappings of the charge are broken, thus permitting the dampness to reach the powder more readily. An important necessity, in employing this method, therefore, is the use of a drill that will bore a comparatively smooth hole.

The chemical fuse lighter is shown in the accompanying figure. It consists of a paper tube 2½ in. long,



Showing Construction of the Chemical Fuse Lighter

about the size of one's finger. One end of the tube is sealed with paraffin, while the other is closed with a common cork. Extending from one side of this tube, and at right angles to it, is a smaller celluloid tube having a cork in the top, like a bottle. At the junction of this small tube with the larger tube, as indicated by the pen point in the figure, is a thin diaphragm of celluloid, which closes the connection between the two tubes.

In the use of this device, the shotfirer pours about half a teaspoonful of sulphuric acid into the upright celluloid tube. It requires from 2 to 3 hr. for the acid to eat its way through the thin diaphragm and reach the combustible matter in the larger tube. This is fired by the action of the acid and in turn sets fire to the fuse that has been inserted through the cork in the end of the larger tube.

The device has not been manufactured, as yet, for the market; but it is claimed that it could be produced at a cost of from 2 to 3c. for each lighter. The idea is offered as a suggestion; and may lead to improvements that would reduce the cost of manufacture and make the device of greater utility in coal mining.

[This suggestion furnishes good material for discussion. Is the idea practicable?—Ed.]

*Pittsburg, Kan.

Snapshots In Coal Mining



Empties Being Hauled by an Air-Locomotive at Kellerman, Ala.



1.—Incline at Lefay, Bell County, Ky. 2.—Tipple and Hoist of the De Soto Coal Co., Morris, Ala. 3.—Consolidated Coal Co.'s Mines and Central Power Station at Jenners, Penn. The Power Plant Serves Mines Having an Output of 8000 Tons Daily

The Purchase of Coal on Specifications--IV

By F. R. Wadleigh*

SYNOPSIS—The fourth and concluding article of this series. This section is confined to abstracts from typical specifications for the purchase of coal. There is a wide range of selection including both domestic and foreign contracts.

At an informal meeting of the committee appointed by the American Society for Testing Materials, held in New York in May, 1914, a proposed form of "Specification and Contract for the Purchase of Coal for Use in Steam Power Plants" was submitted for discussion, a copy having been previously sent to each member for written comments. Below are given in detail:

1. Extracts from the minutes of the meeting, showing the consensus of opinion regarding such contracts and what they should include in the way of specifications.

2. Those parts of this contract referring especially to sampling and analysis.

It is thought that this information may be somewhat of a guide to those interested in the buying and selling of coal, since it gives the ideas of those who have had much practical experience in handling specification contracts, from every standpoint. It may also give a better understanding of the subject and result in the weeding out of unfair and impractical specifications.

It was decided to make no formal report this year, as the purchase of coal under specifications is in a development stage, and it was thought that the time had not yet arrived for the actual setting forth of a standard. To show that this method is still developing, the following questions were discussed:

1. Ash content and B.t.u. value have been and are widely used as factors for establishing the quality of coal bought under specifications, but the general conclusion has been reached that regular B.t.u. determinations on every sample are unnecessary, where all the coal comes from the same region and bed. In such case the B.t.u. value varies proportionately with the ash content, which, therefore, becomes a measure of heating value. When coal comes from different beds or regions, then B.t.u. values and analysis are of value.

2. Very few specifications in use make any mention of the clinkering qualities of coal, although this matter is of great importance and should be covered in all specifications. The fusing temperature of ash is used to measure this, but its method of determination should be further investigated, before definite recommendations can be made.

3. Moisture specification were also discussed. Neither the "as received" nor the "dry" basis have proved altogether satisfactory. Moisture in coal is variable; its exact determination in any shipment is difficult, because of uncontrollable losses, and its amount is largely accidental. To use the "dry-coal" basis may give inaccurate values when coals of different nature are compared. In fact a satisfactory way of handling the moisture question has not yet been evolved.

4. Alternate methods of analysis are not desirable; a standard specification should always specify one standard method. The question of weights was also discussed, but no conclusions arrived at.

EXTRACTS FROM PROPOSED SPECIFICATIONS AND CONTRACT FOR THE PURCHASE OF COAL FOR USE IN STEAM POWER PLANTS

VII—SAMPLING

11. **Company Privileged to Be Present.** The company shall have the privilege of having a representative present to witness the collection and preparation of the samples to be forwarded to the laboratory.

12. **Method.** The samples shall be collected and prepared in accordance with the method given in the appendix attached hereto as a part of these specifications and contract.

Note—As payment for coal delivered under this contract is to be based upon the quality as shown by analyses of representative samples, it is imperative that every sample be collected and prepared carefully and conscientiously and in strict accordance with the method agreed upon herein, for if the sampling is improperly done, a determined price, based on the analysis, would be in error, and it may be impossible or impracticable to take another sample; but if an analysis is in error, if desired, another analysis can easily be made of the original sample by a laboratory mutually satisfactory.

Gross samples of the quantities designated in the appendix must be taken whether the delivery consists of a few tons or several hundred tons, because of the following cardinal principle in sampling coal, which must be recognized and understood. The effect of the chance inclusion or exclusion of too many or too few pieces of slate or other impurities in what, or from what, would otherwise have been a representative sample, will cause the analysis to be in error accordingly, regardless of the tonnage sampled. For example, the chance inclusion or exclusion of, say, 10 lb. too much or too little of impurities in or from an otherwise representative sample of 100 lb., would cause the analysis to show an error in ash content and in heat units of approximately 10 per cent., whereas for a 1000-lb. sample, the effect would be approximately only 1 per cent. the effect being the same whether the sample was collected from, say, a one-ton delivery or from a delivery of several hundred tons.

VIII—ANALYSES

13. **Laboratory and Method.** The samples shall be immediately forwarded to the ..... laboratory, and they shall be analyzed and tested in accordance with the method recommended by the American Chemical Society and by the use of a bomb calorimeter. The expense of such analyses and tests shall be borne by the consumer. The results, together with the corrected price per ton, shall be reported promptly to the company.

14. **Settlement of Disputed Results.** Should the company question the reported results—except the moisture results, which are to be considered as final—the consumer shall, if requested by the company within five days after its receipt of such report, send the third sealed part or parts of the sample or samples held by the consumer, as provided for in paragraph 6 of the appendix, to the following laboratory, mutually agreed upon: .....

If the results in question represent the average of the analyses of two or more different samples, then the laboratory agreed upon shall analyze each sample separately and average the analyses, giving each analysis a weight proportionate to the tonnage that it represents. The results obtained by the laboratory agreed upon shall be considered as final. In case reports reported by the laboratory agreed upon shall be within 150 B.t.u., or 1 per cent. ash, or 2 per cent. volatile matter, or 0.25 per cent. sulphur of the questioned factor or factors, then the charge of the said laboratory shall be borne by the company, but if the disputed factor or factors shall be found to vary by more than these margins, then the charge shall be borne by the consumer.

IX—DESCRIPTION OF COAL DESIRED BY THE CONSUMER

15. **Kind and Quality.** The coal must be a good (coking, noncoking) coal, free from excessive dust, and must approxi-

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mate in quality the following proximate analysis and heating value:

Moisture in "delivered coal" ..... per cent.
Volatile matter in "dry coal" ..... per cent.
Ash in "dry coal" ..... per cent.
Sulphur in "dry coal" ..... per cent.
British thermal units in "dry coal" .....

16. **Size of Coal.** .....

X—DESCRIPTION OF COAL OFFERED BY THE COMPANY

17. **Price Per Ton.** The company hereby agrees to furnish coal of the character and quality specified in paragraphs 18 and 19 below, and from the mine or mines specified in paragraph 20 below, in accordance with all of the conditions and requirements of this contract, at $.... per ton of 2240 (or 2000) lb.

18. **Size.** Coal will be furnished of the size specified in paragraph 16, under Sect. IX, "Description of Coal Desired by the Consumer."

19. **Analysis Guaranteed.** The coal herein specified shall show the following analysis:

Moisture in the coal "as received" ..... per cent.
Volatile matter in "dry coal" ..... per cent.
Ash in "dry coal" ..... per cent.
Sulphur in "dry coal" ..... per cent.
British thermal units per pound in "dry coal"

20. **Source.** The source of the coal herein specified shall be as outlined below:

Name of mine or mines .....
.....
Location of mine or mines (town, county and state)
.....
Name or other designation of coal bed .....
.....
Name of operator of mine or mines .....
.....
Commercial name of coal .....
Railroad on which mine or mines are located .....

Note—Bids not supplying the foregoing information may be considered informal and may be rejected.

Coal of the description and analysis above specified is herein known as coal of the contract grade. Bidders are cautioned against specifying higher standards than can be maintained, for to do so will result in deductions in price and may result in the rejection of delivered coal or the cancellation of the contract. In this connection, it should be recognized that the small "mine samples" usually indicate a coal of higher economic value than that actually delivered in carload lots, because of the care taken to separate extraneous matter from the coal in the "mine samples."

VIII—PRICE AND PAYMENT

28. **Determination of Price.** The consumer hereby agrees to pay the company, during the calendar month following delivery, for each ton of 2240 (or 2200) lb. of coal delivered and accepted in accordance with all the terms of this contract, the price per ton determined by taking the analyses of the samples, or the average of the analyses, if more than one, upon the basis of the price herein named in paragraph 17 above, adjusted as follows for variations in heating value, ash content and moisture content from the standard guaranteed herein, in paragraph 19 above, by the company:

(a) **Heat Unit Adjustment.** When the coal is considered on a "dry coal" basis, no adjustment in price shall be made for variations of 2 per cent. or less in the number of British thermal units from the guaranteed standard. When the variation in heat units exceeds 2 per cent. of the guaranteed standard, the adjustment shall be proportional and shall be determined by the following formula:

$$\frac{\text{B.t.u. delivered coal ("dry coal" basis)}}{\text{B.t.u. ("dry coal" basis) specified in contract}} \times \text{bid price} = \text{price resulting for B.t.u. variation from the standard.}$$

The adjusted price shall be figured to the nearest tenth of a cent.

As an example, for coal delivered on a contract guaranteeing 14,000 B.t.u. on a "dry coal" basis at a bid price of $3 per ton that shows, by calorific test, results varying between 13,720 and 14,280 B.t.u., there would be no price adjustment. If, however, by way of further example, the delivered coal should show by calorific test 14,300 B.t.u. on a "dry coal" basis, the price for this variation from the contract guaranty would be, by substitution in the formula.

$$\frac{14{,}300}{14{,}000} \times \$3 = \$3.064$$

(b) **Ash Adjustment.** No adjustment in price shall be made for variations of 2 per cent. or less below or above the guaranteed percentage of ash on the "dry coal" basis. When the variation exceeds 2 per cent., the adjustment in price shall be determined as follows:

The difference between the ash content by analysis and the ash content guaranteed shall be divided by 2, and the quotient shall be multiplied by the bid price, and the result shall be added to, or deducted from, the price adjusted for British thermal units, or the bid price if there is no adjustment for British thermal units, according to whether the ash content by analysis is below or above the percentage guaranteed. The adjustment for ash content shall be figured to the nearest tenth of a cent.

As an example of the method of determining the adjustment in cents per ton for coal containing ash varying by more than 2 per cent. from the standard, a coal may be considered that has been delivered under a contract guaranteeing 10 per cent. ash at a bid price of $3 per ton. If the coal shows by analysis an ash content of 13.26 per cent., the adjustment in price would be determined as follows:

The difference between 10 and 13.26, which is 3.26, would be divided by 2, and the quotient of 1.63 multiplied by $3, resulting in an adjustment of 4.9c. per ton, which in this case would be a deduction.

(c) **Moisture Adjustment.** The price shall be further adjusted for moisture content in excess of the amount guaranteed by the contractor, the adjustment being determined by multiplying the price bid by the percentage of moisture in excess of the amount guaranteed. The adjustment, which is a deduction, shall be figured to the nearest tenth of a cent.

As an example, a coal may be considered that has been delivered under a contract guaranteeing a moisture content of 3 per cent., the price bid being $3 per ton. If, on analysis, the coal shows 4.58 per cent. moisture, the bid price should be multiplied by 1.58 (representing excess moisture), giving 4.7c. as the deduction per ton.

APPENDIX

METHOD OF SAMPLING COAL DELIVERIES

To be attached to and to become a part of the Specifications and Contract issued by ..... for the purchase of coal for the period commencing ..... and ending .....

1. **During Unloading.** The coal shall be sampled when it is being unloaded from railroad cars, ships, barges or wagons, or when discharged from the company's supply bins, or from industrial railway cars, or grab buckets, or from the coal-conveying equipment at the power plant, as the case may be and as may be mutually agreed upon.

2. **Size of Increments.** To collect samples, a shovel or specially designed tool or mechanical means shall be used for taking portions of increasements of 10 to 30 lb. of coal. For slack or small sizes of anthracite, increasements as small as 5 to 10 lb. may be taken. The size of the increasement shall depend on the size and weight of the largest pieces of coal and impurities.

3. **Collection of Gross Sample.** The increments shall be regularly and systematically collected, so that the entire delivery will be represented proportionately in the gross sample. The frequency of collecting the increments shall be regulated so that a gross sample of not less than 1000 lb. shall be collected. If the coal contains an abnormal amount of impurities, such as slate, and if the pieces of such impurities are very large, gross samples of 1500 lb. or more, as may be mutually agreed upon, shall be collected. For slack coal, and for small sizes of anthracite, if the impurities do not exist in abnormal quantities or in pieces larger than three-quarters of an inch, a gross sample of approximately 500 lb. shall be considered sufficient. The gross sample shall contain the same proportion of lump coal, fine coal and impurities as is contained in the coal delivered. As the increments are collected, they shall be deposited in a waterproof receptacle having a tight-fitting lid and provided with a lock.

4. **Quantity Represented.** A gross sample of the size specified above shall be taken for each 500 tons or less.

5. **Preparation.** After the gross sample shall have been collected, it shall be systematically crushed, mixed and reduced in quantity to convenient size for transmittal to the laboratory. The crushing shall be done by a mechanical crusher or by hand with a tamper on a smooth and solid floor, or, in the absence of a smooth, tight floor, the crushing shall be done on a heavy canvas, to prevent the accidental admixture of any foreign matter. The mixing and reduction shall be done by hand with a shovel, or mechanically by means of riffles or sampling machines.

6. **Hand Preparation.** When prepared by hand, the pieces of coal and impurities shall be crushed to the approximate size indicated in the table below before each reduction:

Weight of sample to be divided	Size to which coal and impurities should be broken before each division.
1000 lb. or more	1 in.
500 lb.	¾ in.
250 lb.	½ in.
125 lb.	⅜ in.
60 lb.	¼ in.

The 60-lb. sample shall then be reduced by quartering, or by the use of riffles or sampling machines, to about 15 lb. This 15-lb. part shall be thoroughly mixed and divided into three equal parts. Each part shall be placed in an air-tight glass jar or metal can which shall bear an unbroken seal. One of the samples shall be forwarded to the ..... laboratory, named in paragraph 15 of the contract proper, one shall be turned over to the company, and the third shall be held by the consumer. Should the analysis be questioned by the company, the third sample shall be forwarded to the laboratory mutually agreed upon and named in paragraph 14 of the contract proper.

7. **Mixing and Reduction by "Alternate Shovelfuls."** After each crushing, the sample, if prepared by hand, shall be thoroughly mixed before reduction in quantity, the procedure being as follows:

The crushed coal shall be shoveled into a conical pile. A new long pile shall then be formed, the shoveler taking a shovelful at a time and spreading the coal out in a straight line (8 to 10 ft. long for a shovel holding about 15 lb.). Each new shovelful shall be spread over the top of the preceding one, the shoveler beginning at one end of the pile for the first shovelful and at the other end for the succeeding shovelful, and so on, the pile being occasionally flattened with the flat side of the shovel, until all the coal has been formed into one long pile. The shoveler, by walking around the long pile, advancing a distance equal to the width of the shovel, and systematically taking shovelfuls, and shoveling the coal to one side, alternate shovelfuls being discarded, shall cause the sample to be halved in quantity.

8. **Mixing and Reduction by "Quartering."** The above "long-pile" and "alternate-shovel" method of mixing and reducing the sample shall be followed with samples of 125 to 250 lb. or more. Samples smaller shall be mixed on a canvas about 8 ft. square by raising first one end of the canvas and then the other, the sample being thereby rolled back and forth. After the sample shall have been thoroughly mixed in this manner, the four corners of the canvas shall be gathered up, and the sample shall be formed in a conical pile and reduced in quantity by quartering, as follows:

The cone shall be flattened, its apex being pressed down with the back side of the shovel, or with a board, so that each quarter contains the material originally in it. The flattened mass, which shall be of uniform thickness and diameter, shall then be marked into quarters, with a board held edgewise, or with a piece of sheet iron, along two lines that intersect at right angles directly under the apex of the original cone. The diagonally opposite quarters shall then be shoveled away and discarded and the space that they occupied brushed clean. The coal remaining shall be successively crushed, mixed, coned and quartered on the canvas until two opposite quarters shall equal the quantity (approximately 15 lb.) required to fill the three containers mentioned in paragraph 5 above.

9. **Progressive Crushing of Increments.** Whenever the different increments of samples are collected throughout some considerable period of time, each increment, or an accumulation of a number of increments, may be crushed as soon as taken and the pieces of coal and impurities may be broken sufficiently small to permit two or three, or more, reductions of the total accumulated sample before further crushing shall be necessary.

10. **Extended Deliveries.** If deliveries extend over any considerable period, what would otherwise be a gross sample may be worked down in successive stages to samples of a size suitable for transmittal to the laboratory, and these samples, which shall be approximately equal in quantity, and shall represent the several equal parts of a delivery, may be analyzed and the several analyses averaged, or the several samples may later be mixed at the delivery point or in the laboratory and reduced to one sample, one analysis being made.

11. **Special Moisture Sample.** In the reduction of the gross sample to the sample for transmittal to the laboratory, the gross sample will unavoidably lose moisture. To determine the moisture content in the coal delivered, a separate special moisture sample must be taken.

12. **Collection of Moisture Sample.** The special moisture sample shall contain approximately 100 lb., and shall be accumulated by placing in a waterproof receptacle, with a tight-fitting and waterproof lid, small parts of the freshly taken increments of the gross sample, or they may be collected separately and independently of the gross sample. The accumulated moisture sample shall be immediately crushed and reduced mechanically or by hand to about a 5-lb. quantity, which shall be immediately placed in a container and sealed air tight and forwarded to the laboratory. If prepared by hand, it shall be rapidly crushed so that no piece of coal or impurities are larger than one-half inch, and it shall be rapidly reduced by the "quartering" method on a canvas to the 5-lb. quantity.

13. **Moisture Samples Discretionary.** The collection of special moisture samples shall be discretionary with the consumer.

14. **Moisture Samples May Represent Any Part of Delivery.**

15. **Sampling of 50 Tons or Less Discretionary.** When orders are issued for 50 tons or less, sampling shall be discretionary with the consumer, and if samples are not taken, the bid price per ton shall be paid, but all coal so delivered may be rejected if it shall give unsatisfactory results because of excessive clinkering, or excessive ash-pit refuse, or a prohibitive amount of smoke, or any other cause that makes it an undesirable fuel.

There are many other forms of specifications in use in this country. Probably the one on which most of the coal has been bought is that used by the U. S. Government, prepared by the Bureau of Mines under which, for the fiscal year of 1913, 1,374,000 tons of coal were bought. These specifications are given in full in Bulletin 63, by George S. Pope, engineer in charge of the Inspection of Government Coal Purchases. Another type of specifications originally prepared by the Fuel Engineering Co., of Chicago, is much used, while nearly all of the large electric-light and power companies and state and municipal power plants have their own forms. As the various types are now quite well known and have been much discussed in different publications, they will not be given here; none of them are entirely satisfactory to the sellers of coal and some are absolutely unfair.

Some of the technical features of specifications used abroad are of interest, and may show different viewpoints of the whole matter, from which we may get new ideas. Extracts are therefore given below from some typical foreign specifications.

ASSOCIATED MUNICIPAL ENGINEERS, LONDON
(Extracts From Specifications)

Tenderers are requested to tender for coal to be supplied in accordance with either or both of the following alternative specifications: Specification (A) For coal of a particular description, hereinafter described as "Named Coal;" Specification (B) For coal guaranteed to have definite physical qualities as a fuel for steam-raising purposes, hereinafter described as "Guaranteed Coal." In the specification of "Named Coal," the tenderer is required to set out in the tenderer's details: (1) The name of the pit from which the coal will be delivered; (2) The description applied to the particular class of coal from the colliery: (3) Size as specified by the colliery. In the specification of "Guaranteed Coal," the tenderer is required to set out in his details the classes of coal for which he is tendering, corresponding with the classes referred to in the table of standards.

TESTING

A. A representative sample shall be taken on delivery from each or any consignment and shall be divided and sealed in three air-tight vessels; the contractor shall be at liberty to be represented when the sample is taken and shall be entitled to one portion thereof. The contractor shall have no opportunity at a later date of objecting to the manner in which the coal has been sampled.

B. Samples taken in the manner herein defined shall be taken from each consignment and tested by the purchaser, or in the event of dispute, by a competent expert, who shall be approved from time to time by the purchaser, and whose fees shall be paid by the contractor if the purchaser's test is confirmed. The tenderer is invited to set out in the tenderer's details the names of three experts either of whom he is agreeable shall be employed.

BONUS AND PENALTY

No variation of the contract price shall be made for any variation from the standard not exceeding one-twentieth, up or down of the figures given in the table of standards.

A. If the calorific value exceeds the standard value in British thermal units per pound, the price per ton shall be increased in the same percentage ratio as the increase in the calorific value.

B. If the calorific value be less than the standard value in thermal units per pound, the price per ton shall be de-

creased in the same percentage ratio as the decrease in calorific value, provided always that the purchaser shall have the right to reject the whole consignment if the calorific value be more than 7½ per cent. below the standard.

C. If the moisture be less than the standard percentage by weight, the weight of coal to be paid for shall be increased beyond the quantity actually weighed out by a percentage equal to the percentage decrease of moisture.

D. If the moisture exceeds the standard percentage by weight, the weight of coal to be paid for shall be decreased below the quantity actually weighed out by a percentage equal to the percentage increase of moisture. Provided always, that the purchasers shall have the right to reject the whole consignment if the total moisture exceeds one and a half times the moisture given in the table of standards.

E. If the percentage of small coal be less than the standard percentage by weight, the weight of the coal to be paid for shall be increased beyond the quantity weighed out by a percentage equal to one-quarter of the percentage decrease of small coal, percentages to be taken on the bulk and not on the standard.

F. If the percentage of small coal exceeds the standard percentage by weight, the weight of the coal to be paid for shall be decreased below the quantity actually weighed out by a percentage equal to one-quarter of the percentage increase of small coal, provided always that the purchasers shall have the right to reject the whole of the consignment if the proportion of small coal exceeds 25 per cent. by weight, percentages to be taken on the bulk and not on the standard.

TABLE OF STANDARDS TO BE APPLIED IN CONNECTION WITH GUARANTEED COALS

	B.t.u.	Moisture Per Cent.	Small Coal—Through Inch Square Mesh	Small Coal—Per Cent.
A. Bituminous Durham and Yorkshire.				
1. Washed double nuts	13,250	8	½	15
2. Washed single nuts	13,000	9	⅜	17½
3. Washed peas	12,750	10	¼	20
B. Bituminous Scotch Washed Coals.				
1. Washed double nuts	12,750	10	½	15
2. Washed single nuts	12,500	11	⅜	20
3. Washed peas	12,000	13	5/16	20
C. Semi-Bituminous and Pseudo-Anthracite. Welsh Washed Coals.				
1. Washed large nuts	14,300	5	½	15
2. Washed small nuts	13,900	6	⅜	20
3. Washed peas	13,350	6	5/16	20
D. Bituminous Durham and Yorkshire Dry Screened Coals.				
1. Double nuts	12,750	5	½	17½
2. Single nuts	12,500	6	⅜	25
3. Peas	12,250	6	¼	25
E. Bituminous Derbyshire and Nottinghamshire Dry Screened Coals.				
1. Double nuts	12,250	9	½	15
2. Double screened small nuts	12,000	9	⅜	20
3. Pea nuts	11,500	10	5/16	20
F. Bituminous Leicester-Warwick and South Staffordshire Dry Screened Coals.				
1. Double nuts	12,000	10	½	15
2. Double screened small nuts	11,750	10	⅜	20
3. Pea nuts	11,250	12	5/16	20

British thermal units shall be ascertained on coal dried at 220 deg. F. for an hour by means of a Mahler bomb calorimeter.

Moisture shall be represented by the total loss in weight of the coal as delivered after air drying and exposing to a temperature of 220 deg. F. for one hour.

The percentage of sulphur shall be based on the analysis of the coal "as received," and must not exceed 2 per cent.

The sieves used for determining the percentage of "small" shall be of square mesh, with openings in the clear to the sizes given.

It will be noticed that the table gives no figures for ash, this factor being sufficiently covered, it is considered, by the calorific value. This is entirely contrary to the practice here, and is not, we consider, in the right direction; it would be better to use the ash basis and leave out the B.t.u. value.

It is true that increase or decrease in the B.t.u. value generally means lower or higher ash percentage, when applied to the same kind of coal, but there are other points in which ash is a factor besides the mere heating value.

ITALIAN STATE RAILWAYS
(Extracts From Specifications)

Origin of Coal—The coal to be obtained from good seams in the district of .....

The origin of the coal must be guaranteed during the whole contract by certificates from the mines and other documents that the railroad administration requires.

The administration reserves the right to ascertain the origin at the mine by its own agent, to whom the shipper must give all the proofs necessary.

Quality of Coal—Large coal should be divided from the slate or other foreign materials, and should be of such a quality suitable for special use in locomotives.

In order to ascertain this, the coal will be tried on the locomotives and should be capable of producing abundant steam. After combustion, the ash should not obstruct or cling to the grate bars.

In case it should be found that the coal does not correspond exactly to the foregoing conditions, the administration of the railroads will have the right to cancel further shipment from the mine supplying such unapproved coal.

The large coal should not contain more than 20 per cent. of small when unloading it in the harbor of the purchaser. The administration, in order to ascertain the percentage, will screen the coal when unloading from the ship. The percentage of small will be ascertained on the ground while passing the coal slowly and in small quantities over a screen of the dimensions of 2 by 1 m. with the bars 12 mm. apart and placed in an inclined position of 45 deg.

The test by screening will take a quantity of the coal corresponding to about 2 per cent. of the unloading. Should the consignment be unloaded in different ways, namely, directly from the ship to cars on the wharf, or into barges, the quantity used for the screening test will be taken proportionately from each of the different ways of discharging.

For the coal that is directly taken from the ship to the cars, one sample for test will be taken from one carload per day. For the coal that is taken directly from the ship to the wharf, there will be taken at the time of unloading, a number of baskets of coal, and this coal will form a small heap which will be screened and the percentage obtained. For the coal that is loaded into barges, a certain number of baskets will be taken as above.

Finally, upon the unloading of the steamer, there will be determined the mean percentage of smalls contained in the whole shipment. This report will be made from the coal directly unloaded from the ship. The quantity of smalls exceeding their allowances as above will be considered as small and paid $1.44 per ton less than the price agreed upon.

The railroad company reserves the right to change the full consignments of the coal whenever the coal should show excessive friability.

Heat Units—The mean heat power of the large coal will be 7750 calories and will be determined by the Thompson calorimeter. In case of decrease of calories, there will be for every English ton a penalty of 0.1c. ($^5/_{1000}$th) for every missing calorie.

Ashes—The mean ash from large coal should not exceed 5 per cent.; in case of an excess, the penalty of 8c. ($^{10}/_{100}$ths) will be charged for each English ton, and for the hundredth unit, the fraction of the unit will be considered proportionately.

Sulphur—The quantity of sulphur should not exceed 1.10 per cent.; in case of excess, the company will have the right of changing the origin of the coal.

Volatile Matter—The volatile matter will range between the minimum limit of 14 per cent. to the maximum of 25 per cent., deducting the humidity.

Humidity—Coal should not contain more than 0.9 per cent. of water of composition. The administration will have the right to carry out the conditions of this clause pertaining to the samples. In each taking, they will choose a sample from one or more baskets taken from each pile, in equal quantities from the small and large, and these should weigh about 20 kilos. This coal will be passed into receptacles of thin metal, and after mixing, a sample will be taken therefrom and passed into a glass receptacle with a stopper polished and paraffined, with the date of taking, and will be forwarded to the chemical laboratory of the administration and tested at a temperature of 100 deg. C.

The means of the results obtained from the samples taken every day will give the humidity, and if this should be greater than 0.9 per cent., the difference will be applied to the quantity of the unloaded coal on the day to which the test refers, allowing for the smaller weight.

Determination of Calories, Ash, Sulphur and Volatile Matter—For the determination of the requirements mentioned in Article 4, there will be taken from every vessel at the port of unloading, 10 samples of coal 10 kilos in weight, each to be taken at an equal interval during the unloading.

Each of these samples will be taken from the barges or from the wharf, according to the manner of unloading, and

should be taken from the small coal. Every sample will be placed in a bag, with the seal of the administration, and have a tag indicating the number of the contract, the name of the boat, date of delivery and the firm of the agents of the shippers. The sample will remain in the custody of the administration.

After the verification of the seals at the laboratory, the 10 samples will be opened and the coal contained in them will be collected together and ground well and mixed in such a manner as to form a homogeneous mass. From this will be taken 1.50 kilos of coal, which, after having been ground again and mixed, will be divided into three equal parts in such a manner as to form three samples of ½ kilo each. These samples will be sealed and labeled and two will be retained by the chemical laboratory of the administration, and one will be remitted to the shipper. Of the two samples remaining in the chemical laboratory of the administration, one will serve for test and for chemical analysis and the other will be held in reserve subject to the demand of the shipper. Second analysis will only be called for in case of confirmation being required.

The consignor should assist at the making of the analysis. The results of the analysis will in no case be protested.

Penalty—The analysis will be made separately for the loading of each ship, and the following penalties will be made unless the shipment is in accordance with Article 4: (a) As regards the determination of ashes and calories; (b) As regards the humidity. To complete the shipment it will be necessary to obtain the mean results of percentage of ash and amount of calories for all samples, and this mean will be decided as regards the payment and the acceptance of the shipment.

The penalty of excess of percentage of ash and deficiency in calories will never be applied simultaneously, but only the greater of the two will be used.

STOCKHOLM ELECTRICITY WORKS, SWEDEN
(Extracts From Specification)

Coal supplied under this proposal must be suitable for automatic chain-grate stokers with natural draught (Babcock & Wilcox type). The percentage of volatile matter should amount to between 28 to 35 per cent., and the percentage of ash not exceed 18 to 20 per cent. All percentages figured on the basis of dry coal.

Coal furnished under this proposal should preferably be suitable for direct use without crushing, such as rough smalls, peas or pearls, nuts or beans, etc., but proposals made on the basis of large coals will also be considered.

The proposal should contain the following data: (a) The name by which the coal offered is generally known in the market. (b) The name of the coal field and the colliery or collieries where the coals are mined. (c) The size and kind of screen over which and through which the coal has passed when screened. (d) Approximate percentage of dust and fine coal (all coal which will pass through a ⅛-in. hole). (e) The percentage of volatile matters in the dry coal (complete analysis should if possible be submitted). (f) Character of the clinkers formed by the combustion of the coals. (g) Approximate weight of the coal per cubic centimeter.

If the actual heating value of the coal delivered should differ from the established standard, the price per ton will be altered in direct proportion to the difference in heating value. For all coal which, by analysis, contains less ash than the standard established in the tender, a premium of halfpenny per ton for each whole percentage less ash will be paid. An increase in the ash content of 2 per cent. over the standard established by the contractor will be tolerated without exacting a penalty. When such excess exceeds 2 per cent. above the standard, deductions will be made from the price paid per ton in accordance with the following table.

(Note—This ash table is the same as used by the U. S. Bureau of Mines.)

If the percentage of moisture should differ from the standard, the price per ton is altered in inverse proportion. For example, if the coal contains 2 per cent. more or less moisture than the standard, the price will be decreased 2 per cent. accordingly.

To get a fair average of the coal delivered, samples should be taken all the time the ship is unloading in order to obtain samples from all parts of the cargo. The sample taken shall not be less than 600 lb. The gross sample will be pulverized as rapidly as possible, mixed thoroughly and divided into four equal parts. Opposite quarters will be thrown out and the remaining portions thoroughly mixed and again quartered, throwing out opposite quarters as before. This process will be continued until the final sample is reduced to such amount as to be suitable for test.

This sample will be analyzed and tested (using a bomb calorimeter) by the Kungl Tekniska Hogskolans Materialprefningsanstalt (the testing department of the Royal Technical Institute in Stockholm). A copy of the result will be mailed to the contractor on the completion thereof. On this test will be based the corrections to be made on the standard price. The right is reserved to the contractor or his representative to be present and witness the sampling and preparation of the final sample. The cost of the test to be paid by the purchaser.

LONDON COUNTY COUNCIL POWER STATION
(Extracts From Specification)

The specified standards are:

Calorific value	12,500 B.t.u.
Small (passing through ⅜-in. mesh sieve)	20% by measurement
Moisture	10% by weight

The calorific value and moisture are measured by the county council chemist on samples taken from every 100 tons brought over the pier head, the calorific value being determined by a Mahler bomb calorimeter on samples dried at 100 deg. C. Moisture is determined on a weighed portion of the sample taken from an air-tight tin.

Small coal is ascertained on the pier on a sample of about 50 lb. in weight, taken at the option of the council, either from the hold or from the quantity unloaded from the grabs.

If the quality of the coal in any cargo, as ascertained by the samples tested, be found different as regards calorific value, moisture or small from the above standards, the price paid to the contractor is varied as follows:

(a) If the calorific value exceeds 12,500 B.t.u., the price per ton is increased in the same percentage ratio as the increase in calorific value.

(b) If the calorific value is less than 12,500 B.t.u., the price is decreased in the same percentage ratio. The council, however, has the right to reject the whole of the cargo if the calorific value be less than 10,500 B.t.u.

(c) If the moisture is less than 10 per cent. by weight, the quantity of coal to be paid for is increased beyond the quantity weighed in by a percentage equal to the percentage decrease of moisture.

(d) If the moisture exceeds 10 per cent. by weight, the weight of coal to be paid for is decreased below the quantity weighed in by a percentage equal to the percentage increase in moisture. The council, however, has the right to reject the whole cargo if the moisture exceeds 13 per cent.

(e) If the proportion of small be less than 20 per cent. by weight, the weight of coal to be paid for is increased beyond the quantity actually weighed in by a percentage equal to a quarter of the percentage decrease of small coal.

(f) If the proportion of small coal exceeds 20 per cent. by weight, the weight of coal to be paid for is decreased below the quantity actually weighed in by a percentage equal to a quarter of the percentage increase of small coal. The council, however, has the right to reject the whole cargo if the proportion of small coal exceeds 25 per cent. by weight.

As a general conclusion, it is believed by many chemists, engineers and others, that after the buyer of steam coal has decided on the description of coal he desires and what is best adapted to his use, there are only two items necessary, as regards analysis, in making up specifications, that is, the percentage of ash and the fusing temperature of the ash.

A standard percentage of ash of a given kind of coal (field or seam) insures a standard B.t.u. value; any change in ash percentage makes a corresponding change in B.t.u. value. The right ash-fusing temperature means no clinkers and good combustion results, if the coal is handled properly.

Where smoke laws are to be observed, it may be necessary to specify also a maximum volatile content of the coal, although even here it would generally be advisable and economical in the end to alter furnace and boiler conditions, so that higher volatile, cheaper (usually) coals could be used.

Simplicity, equity and practicability, should be the characteristics of all specifications for the purchase of coals.

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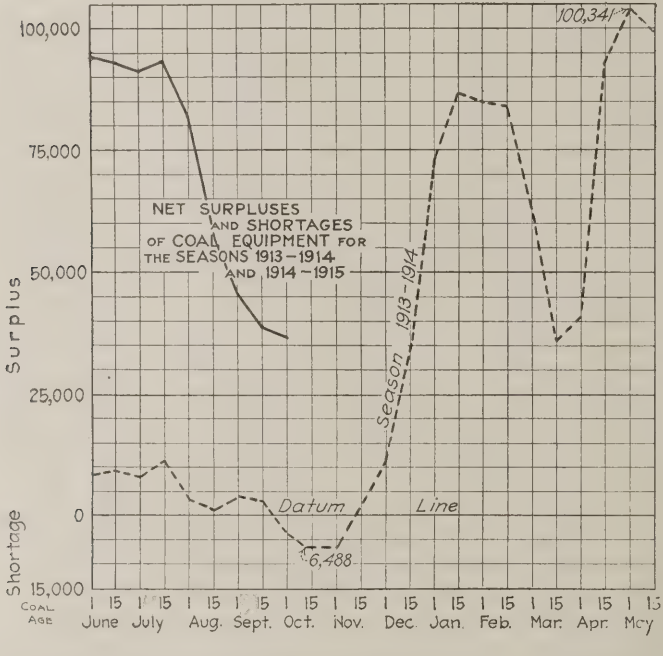
Never neglect for a moment the early signs of a fire in the underground workings of a mine. Either deal with it yourself immediately, or report it straight away to your superior.

An Analysis of the Coal-Car Situation

Compiled by A. T. Shurick

SYNOPSIS—In conformance with our past custom we present herewith a brief summary of the car-supply outlook for the coming winter. With the kind assistance and hearty coöperation of many of the leading railroad officials we are fortunate in being able to give an accurate and concise review of the actual physical condition of the leading coal roads. The current outlook is notably more favorable than usual but still replete with grave latent possibilities, due to the generally weakened financial condition of the transportation companies.

There has probably been less anxiety expressed over the possibilities of a car shortage the coming fall and winter than for a number of years. Ordinarily this season of the year occasions a great deal of concern to the operating companies. It is at this time that the consumers are reminded by occasional cold snaps, of the necessity



Curves Show Fluctuations in the Car Supply

of laying in their winter stocks, while at the same time, the resources of the railroads are being strained to the limit handling the crops; in addition, the situation is often further aggravated by more or less inclement weather which seriously interrupts the running schedules.

Because of the generally depressed conditions throughout the country, the freight movement on the railroads has seldom been lighter, and the different systems are expressing every confidence in their ability to handle the situation this year without any trouble whatever. On the other hand, all must agree that there are still certain unknown factors in the problem, viz., the extent of the demand and the weather. If the current market conditions may be taken as any criterion of the outlook for the winter, it is manifest that the demand for coal is not liable to be of sufficient proportions to seriously burden the railroads, but on the other hand those familiar with the idiosyncrasies of the coal market are well aware of its liability to experience a direct reversal of form almost over night. As to the weather conditions, even with a comparatively restricted movement, it is possible for the situation to be so adverse in this respect as to prove a serious factor.

There is also this further consideration, the great importance of which must be conceded by all, and that is, the exceedingly weakened financial condition of the railroads. While the publicity campaign conducted by the railroads, in their attempt to secure a general horizontal advance in freight rates, no doubt somewhat exaggerated conditions in this respect, it is obvious, from a perusal of their various financial statements that new construction, repairs and maintenance have all been curtailed to an irreducible minimum. It is inevitable, therefore, that the actual physical condition of the railroad systems of the country is considerably below normal, and careful students of the situation are agreed that the combination of any abnormally severe weather, together with a heavy freight movement, would be accompanied with grave possibilities of a severe collapse in our transportation facilities.

The Kanawha & Michigan Ry.

(By President F. B. Sheldon.)

Since the close of the year this company has added to its motive power seven heavy consolidation freight locomotives received in July, and 1160 steel coal cars of 50 tons capacity, received in July and August, the latter adding 30 per cent. to the capacity of its coal-car equipment, which now amounts to 6000 cars.

During the past year alignment and grades were changed for a distance of one mile on the Ohio Division, excessive curvature being reduced to three degrees or less, and grades in both directions entirely eliminated. Terminal yards were increased during the year by the addition of three and one-half miles of sidings, while 17 passing tracks on the West Virginia Division, involving three additional miles of track, were lengthened to the standard of 4000 ft. to accommodate longer freight trains. Some 19 miles of main track were relaid with 90-lb. steel rail, and the entire length of the main track between the northern terminus at Corning, Ohio, and the southern terminus at Gauley Bridge, W. Va., is now laid with rails of that weight. The road and its equipment are in excellent condition for the winter, and the recent large increase in its coal-carrying equipment assures a good car supply.

The Hocking Valley Ry.

(By Vice-President M. J. Caples.)

During the past summer the Hocking Valley Ry. has completed and put into use a modern coal-handling plant on the east side of the Maumee River at Toledo, Ohio. This plant is capable of loading aboard vessels at least 160,000 tons of coal per day of 24 hr., when worked to full capacity.

During the summer just past, the road has received 1000 additional 57½-ton coal cars. Our coal-car capac-

ity at the present time is 516,450 tons, compared with 417,020 tons at this time last year. The tractive power of locomotives now is 4,938,920 lb. as compared with 4,574,120 lb. last year.

The Hocking Valley, with its present trackage facilities, can handle 50 per cent. more business south of Columbus than it handled last year and 25 per cent. more business north of Columbus. There is no probability but that we will not be able to supply all of the coal cars required and handle all of the business offered us promptly.

The Chesapeake & Ohio Ry.

(By E. P. Goodwin, Superintendent Transportation.)

The consensus of opinion, as far as I have been able to learn, is equally balanced as to prospective increase or decrease of coal loading, under the conditions brought about by the European war. The C. & O. Ry. has just gone through four months of the heaviest loading in its history, and I personally feel that the demand for coal will be good, and anticipate that our car supply will be adequate to meet it.

The road has increased its coal-car equipment 15.34 per cent. in the past year, and has greatly added to its freight power by the acquisition of new Mallet and Mikado engines; it has also improved transportation facilities generally, especially by the completion of the most modern uptodate electric coal docks at tidewater. These improvements will permit of an increased "miles per car per day" that would, under pressure, equal another 15 per cent. increase in car equipment.

Norfolk & Western Ry. Co.

(By D. E. Spangler, Superintendent Transportation.)

In a statistical way there is little that could be added to the statement we furnished you, 1913, other than to bring those figures up to date, which I do as follows: Number freight engines, 970; tractive power, 40,200,000 lb.; number of coal cars, 34,253; total carrying capacity, 1,733,958 tons. We have also added 46 miles of second track and 79 miles of passing tracks.

While future needs of the trade are entirely problematical, this company is confident of its ability to promptly meet the demands of all mines on its lines during the coming winter. Our facilities, both as to equipment and track, have been increased and improved. Other improvements, such as second track, are still in progress and we should be in position to handle expeditiously, as far as our own rails are concerned, all traffic that may be offered in the near future. However, as much of the coal mined on the Norfolk & Western Ry. is disposed of to markets far beyond this line, we are dependent to a considerable extent upon the prompt release of equipment at destination and the prompt and proper handling of both the loaded and empty cars by our connecting lines.

The Western Maryland Ry.

(By S. Ennes, General Superintendent.)

In March and April of the current year, the Western Maryland received and added to their motive power equipment 20 of the largest type of consolidation freight engines. These are giving us the very best of service, handling during the good weather of July and August 6500 train-tons against a 0.3 per cent. grade line from Cumberland to Hagerstown.

When the new management took hold in March of this year, they immediately sent 40 locomotives to the American Locomotive Works for overhauling. At the present time, with our business equal to that of last year, we have 25 heavy freight locomotives white-leaded, and available for service at any time.

We also took advantage of the dull season to put our cars in first-class shape, and are prepared to handle an increase of 25 per cent. in our coal business with ease. The bridges between Hagerstown and Lurgan and Cumberland and Thomas have been strengthened, so that heavier power can be run in that territory. The track is being put in good shape and as stated, with business approximately the same as last year, we are handling it with ease.

New York Central & Hudson River R.R.

(By Vice-President A. T. Hardin.)

This company has maintained its quota of last year's equipment, which was more than abundant, since all orders were promptly filled. We also have 150 excellent freight engines in reserve for emergencies, and not now being used. We are not, therefore, anticipating any difficulty in the coal-car supply on our lines.

Baltimore & Ohio R.R.

(By J. Hampton Baumgartner.)

Although there was a substantial increase of 475,000 tons in our coal traffic during the last year, this was handled with greater dispatch than ever before and without any material extension of terminal or traffic facilities; this is due to the fact that the road for the first time derived the full benefit of the enlarged facilities provided during recent years at a cost in excess of $100,000,000. The recent inactivity in the building of new facilities was due to financial circumstances, which made it inadvisable to extend facilities beyond the point of urgent necessity.

During the past year this road has added 50 locomotives of the freight type, 3000 new coal cars and 3000 rebuilt cars to its equipment quota, so that at the present time the road has ample coal-car equipment to take care of its traffic requirements.

Included in the plan of extending facilities to increase the number of tracks, was a double-track stretch of line between Orleans Road and Little Cacapon, W. Va., a distance of 11 miles, known as the Magnolia cutoff, which will facilitate the movement on the east end of the Cumberland division. The improvement, which will cost about $6,000,000 and is well under way, will carry toward completion the plan to build a four-track line from Cumberland

THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Oct. 1, as follows:

	Surplus	Shortage	Net*
New England Lines	1,007	216	**791**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	4,102	0	**4,102**
Ohio; Indiana; Michigan; Western Pennsylvania	17,009	0	**17,009**
West Virginia, Virginia, North & South Carolina	4,534	185	**4,349**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	3,763	0	**3,763**
Iowa, Illinois, Wis., Minn.; North & South Dakota	3,257	30	**3,227**
Montana, Wyoming, Nebraska	564	0	**564**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,544	260	**1,284**
Texas, Louisiana, New Mexico	212	5	**207**
Oregon, Idaho, California, Arizona	2,004	76	**1,928**
Canadian Lines	0	0	**0**
Total	37,996	772	**37,224**

	June 1	June 15	July 1	July 15	Aug. 1	Aug. 15	Sept. 1	Sept. 15
Surplus	94,770	93,520	91,280	93,509	82,284	56,560	46,141	39,558
Shortage	7	49	430	292	110	496	66	191
Net*	**99,351**	**94,763**	**90,850**	**93,217**	**82,174**	**56,064**	**46,075**	**39,367**

***Bold face** type indicates a surplus.

to Brunswick, Md., a distance of 105 miles, and then with the completion of four tracks to Washington Junction there will be a four-track line throughout to the seaboard at Baltimore.

The Magnolia cutoff is in every sense an economic improvement. Besides shortening the distance between these two points via the present line by 5.8 miles, it will effect an elimination of 887 deg. of curvature and do away with a helper grade at Hansrote, which has required the use of an extra engine on eastbound freight trains—the direction in which coal moves—in climbing the mountains.

It is generally recognized by railroad managers of the present day that their properties are never regarded as finished plants, the necessity of adding to them to take care of changes in traffic and business conditions being ever apparent. With this particular road, however, the problem before the management today is one of intensive operation, as there is little undeveloped territory in which lines may be extended.

Illinois Central R.R.

According to the sixty-fourth annual report of this company, issued under date of June 30, the freight-car equipment was increased by 7195 cars and 4065 cars were sold, destroyed or transferred to other service. The net increase was 3130 cars. The average capacity of cars owned at the close of the year was 41.52 tons, compared with 40.24 tons last year. The total capacity of cars was 2,467,995 tons, compared with 2,266,490 tons for 1913.

At the end of the fiscal year 1914 the company had 26,285 coal cars, compared with 23,330 cars for the year previous. This shows an increase of 2955 in the coal-car equipment.

The record of the revenue coal freight for 1914, as compared with 1913, is as follows:

	1914		1913	
	Tons	P.C.	Tons	P.C.
Anthracite	68,450	0.21	90,659	0.30
Bituminous	12,145,945	37.55	10,488,614	34.45
Coke	126,028	0.39	127,680	0.42
Total	12,340,423	38.15	10,706,953	35.17

This shows a net increase of 1,633,470 tons, or 2.98 per cent.

Extracts from a Superintendent's Diary

I have long been of the opinion that the biggest problem now ahead of the men responsible for the future of the coal industry is to succeed in devising ways and means of attracting the boys born and reared in mining camps to coal mining as a life work.

In the old days when miners' sons were given little or no schooling, and were taken into the mines by their fathers as soon as they were able to be of any assistance, most of them graduated into mining from force of habit and only on rare occasions did they have any desire to make a change. But all of that is changed now. In most states, boys are not allowed to work underground until they have passed the age of 14 and in some states the limit is 16. In place of the old indifference to schools, compulsory education is now sweeping the land, and even in the most isolated camps, school bells are not only heard but are respected. Habit will have little weight in the future in shaping a boy's life work, but the decision will be largely dependent on sentiment and imagination.

It is true that when it comes to sentiment, home ties and boyhood friendships are strong invisible links holding the would-be wanderer in line, but it takes something stronger than sentiment to hold a boy back if his imagination is once fired by an outside vision.

And what's to prevent any boy from having his imagination fired by visions these days? Just let him follow the dailies awhile and he'll get all the inspiration he's looking for; furthermore, if he is a normal chap, you may be sure he'll believe he can do anything that anyone else has ever succeeded in doing, and he won't hesitate to try.

When he gets his thoughts back to earth and recalls a vision of tumbled down, unsightly, unsanitary dwellings (one of which is his own home) it doesn't take him long to make up his mind. And then, to complete the impression, if he walks down the street and overhears a conversation between a fireboss and an assistant mine foreman as to the impossibility of either one of them keeping the wolf from the door on the salary they are earning, despite the fact that they had to put in two hard years of night study to get where they are—well he's ready to leave and leave quick.

The way the wind might blow was first brought home to me when I began to take an interest in "First-aid work." After our squad had succeeded in getting a little training, a small local gas explosion gave them an opportunity to don the helmets. The next day the youngsters of the camp were all excitement; at last they had something worth while to talk about and, for the time being, they lost all interest in base ball and flying machines and talked about some sure-enough heroes who were living right there in their home town.

And if those same boys in future years, in looking backward, should always recall a pleasant home and neighbor boys, whose fathers were bosses, proud of their work and of their profession, the chances are they will be found earning their livelihood in places where helmets are still in demand on certain occasions.

Sometimes I become much vexed with my big boss when he tries to shut down too closely on my sociological tendencies, as he calls them. In fact, I feel that way toward him just now and I'm putting this justification down in black and white just to get in practice.

Permissible Explosives in Coal Mines

The figures show that in 1902 only 11,300 lb. of permissible explosives were used in coal mining, whereas in 1913 the quantity so used was 21,804,285 lb. The quantity of permissible explosives used in the United States is larger than in a number of foreign countries. In 1912 it represented about five per cent. of the total quantity of explosives produced, and in 1913 six per cent. The total amount of explosives used for the production of coal in 1913 was 209,352,938 lb., of which about ten per cent. was of the permissible class as compared with eight per cent. in 1912. The use of permissible explosives in coal mining has had gratifying results, and few, if any, serious accidents can be attributed directly to their use.

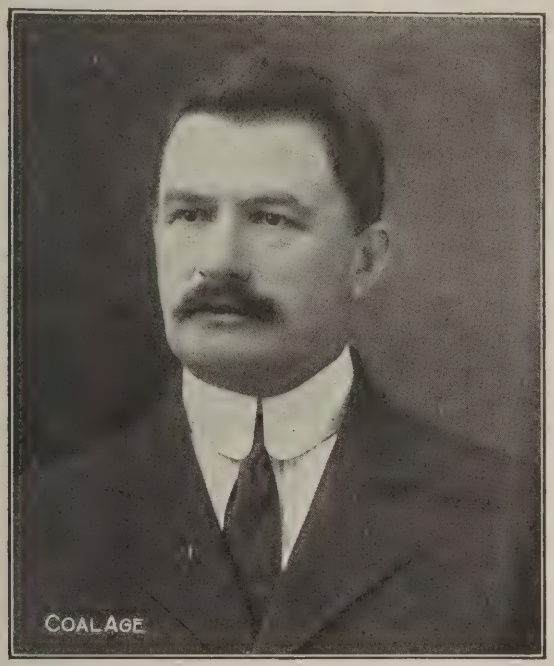
Who's Who in Coal Mining

John Francis Healy

Starting at 10 years of age, doing odd jobs on a mine-surveying corps, and working up to the position of vice-president of a large coal consolidation is the record of J. F. Healy, who is now engaged in mining in Utah.

Mr. Healy was born in Blossburg, Penn., of Irish parents. His early education was received in the common schools of Tioga County, after which he attended the preparatory school of De La Salle College and then the Toronto School of Practical Science in Toronto, Can. His final college training was received at the Pennsylvania State College, where he graduated in 1884.

As stated above, Mr. Healy first became engaged in mining work when only a lad of 10, and continued in this



JOHN F. HEALY

line of employment, off and on, until he was 18. His first serious work after concluding his college course was as engineer in the employ of the Aberdeen, Pierre and Fergus Falls Railway—now a division of the Great Northern. His next place was division engineer with the Nashville & Knoxville Ry.—now the Tennessee Central, after which he entered the employ of the C., N., O. & T. P. Ry. as assistant engineer of maintenance.

This ended his railroad experience, for he accepted a position as mining engineer with the Seattle Coal & Iron Co., Seattle, Wash. He was next identified with the Rocky Fork Coal Co., in Montana, and followed this work by accepting a position as mining engineer with the Davis Coal & Coke Co., in West Virginia. A little later, when the Davis company needed a man to fill the job of general superintendent, Mr. Healy was offered the place, which he accepted and filled to the satisfaction of all. His success with the Davis company led to his next advancement to the position of general manager of the Davis Colliery Co., one of the largest mining corporations in northern West Virginia.

Leaving the Eastern field, Mr. Healy now turned his attention to the Far West, finally locating in Utah, where he is now serving as vice-president and general manager of the Consolidated Fuel Co., Blackhawk Coal Co., Panther Coal Co., Castle Valley Coal Co., Carbon-Emery Stores Co., and Carbon Purchasing Co.

Mr. Healy is a member of the American Society of Civil Engineers, and has taken an active interest in the advancement of mining and civil engineering practice in America. His literary work has been confined to the preparation of a pamphlet entitled, "The American Language." This pamphlet, as Mr. Healy says, "is merely an effort to help Americanize America."

Relation of Observed to Calculated Pressures in Gas Explosions

Attention has often been drawn to the difference between the theoretical pressure of an explosion of gas mixed with air, as calculated from the heats of combustion of the several gases involved; and the actual pressure observed experimentally in the explosion. In this connection, a paper on "The Lost Pressure in Gaseous Explosions," by W. M. Thornton, is of great interest.

In his paper, Prof. Thornton draws attention to the fact that the theoretical or calculated pressures of gas explosions are, in all cases, about twice the pressures observed in the experimental explosion of the gas. From the results of a large number of experiments, he has ascertained the interesting fact that the mean of the ratios of the observed to the theoretical or calculated pressures of gases exploded in air is about one-half.

As is quite well known, the cause of the difference between the theoretical and the observed pressures in gaseous explosions, has been variously attributed to the lack of knowledge of the actual reactions that take place in the dissociation of the elements of the gases and of the products formed. It has, also, been assumed with reason that the specific heats of gases are much higher at the temperature of the explosion than the values determined by experiment. It has been further suggested that there is much loss of heat by radiation and conduction, which has not been accounted and cannot be estimated with any degree of accuracy. A less obvious reason has been suggested to the effect that the maximum pressure of the explosion may be developed before the combustion is complete.

Without casting any reflection on these suggested influences, any or all of which may operate to a degree to reduce the experimental value, Prof. Thornton makes the important suggestion, as drawn from his experiments, that the force of cohesion developed in the formation of the molecule may explain the absorption of a portion of the heat energy of the reaction. He ascribes the pressure and temperature developed in an explosion to what he terms, "translational energy," or the energy imparted from one molecule to another; and reaches the conclusion that the ratio of translational energy of two colliding bodies before and after collision is one-half the total energy developed. The theory, though necessarily incomplete, is suggestive and may prove helpful in the solution of the many problems relating to the explosions of gaseous mixtures.

Editorials

Safety Hints

Several of the railroads are adopting a system whereby they expect to increase the safety of passengers and employees. They supply post cards at each terminal or yard office which their men can obtain and use for the purpose of calling attention to the operating departments of any dangers they may observe in their daily work.

Each of the roads has a standing committee, of which the head officer is chairman. At each divisional headquarters there is a committee, composed of members from each department. The superintendent of the division is the local chairman and he selects the others, who are appointed for a year.

The committees meet monthly and every department is represented. Thus motive power, transportation, signaling and maintenance of way are all duly considered by employees from those several departments.

The post cards filled by the employees are all read by the assembled committee and their value duly considered. They are then printed with comment, each employee being duly credited with the suggestions made. Should, however, the recommendations of the employee be such as to need urgent action, the superintendent accepts the suggestion without delay and wires appropriate orders. For this information we are indebted to E. E. Winters, the chief railroad inspector for the West Virginia Public Service Commission.

We believe that a similar system to that just described could be put in operation at mines. Perhaps a few malicious criticisms might redden the cheeks and ruffle the temper of the superintendent, but, on the whole, it is to be expected that the suggestions would be just and valuable. Some companies, like the H. C. Frick Coke Co., have formed paid safety committees to make reports on mining conditions and are convinced that the experiment makes for safety. The post-card system gives a less limited range for suggestion and might be well worthy of trial.

Much depends on the character of the personnel at the mine as to the success of the movement. In some cases such a system of suggesting dangers to employees would be as fatal as the inquiries of a doctor are to a hypochondriac, who is no sooner asked as to his symptoms than he overwhelms his hearer with a combination of woes no single man ever yet endured.

We recall a coal-company president who took his private car down to the mines and considerately invited the Italian consul to go with him, treating him with consideration of the most distinguished sort. He impressed on the consul throughout the journey, his humanitarian interest in his Italian employees and requested the consul to ask his compatriots at the mine what could be done to increase their safety and comfort.

The consul did so, and the swarthy sons of Italy believed that the strong, omnipresent hand of *"il gran re Umberto"* was behind the consul and their demands for increased wages thereupon resulting blossomed into a strike of no small dimensions. The president lost his interest in the consul and in purposes humanitarian and never again was known to ask for suggestions from that source.

The general attitude of the employees must decide whether the post-card or the committee system will either or both be feasible. It is a piece of socialism and can only be a success when the men have the social sense strongly developed and realize that in this world of ours no finality of safety or comfort can ever be reached and that the burden of safety falls equally on the shoulders of employers and employees.

Profits or Thrift?

Speaking before the Coal Mining Institute of America at the winter meeting nearly a year ago, Harrington Emerson, the efficiency expert, declared that the steamship Mauretania cost roughly nine million dollars, and employed a thousand men. Thus an outlay of nine thousand dollars was needed to supply the wherewithal by which each man on that ship could earn his living. Of course, some operatives are not backed by such an outlay of capital to furnish them with opportunity of efficient labor. Their work would be more serviceable to mankind if they were.

But a careful consideration will lead us to the conclusion that the instance quoted by Mr. Emerson is uncommon in degree rather than in kind, for many mining plants expend more than two thousand dollars for every man they expect to employ. It is clear therefore that large amounts of capital must always be provided, and without pretending to scientific accuracy or a really adequate consideration, we might be excused in saying that the average capital back of a workingman's labor is roughly equal to his year's gross earnings.

There is no reason why the funds needed to supply the workman with tools should be owned by rich men. If the wage of the laborer is not all spent, but if some of it is preserved by thrift, he can invest it and become himself the capitalist. If, however, the workingman, like the average American, raises his scale of living as fast as his wages, the only hope for the citizens of this country is in large profits for the manufacturer and operator. If the workingman will not save, his employer must do it for him or the material for economic production will not be accumulated.

It is in fact necessary that there should be for the future of the workingman, either large profits or universal thrift. Of course, such penuriousness on the part of the workman as decreases his efficiency, by lowering his physical, mental, and even moral status is not thrift. But such economy as makes him a purchaser of only healthful, advantageous and permanent possessions will enable him to enter into the field of the capitalist with benefit to the world at large.

The amount of capital being increased, profits would be lowered and the workingman would get a larger share

of his product in wages. It is sometimes said that profits are necessary to urge capital to invest, and to encourage thrift, but it is even more true that profits or thrift are needed because without them capital could not even exist and labor would be deprived of its tools.

From what has been said, it is clear that the efficient operation of mines demands profits. A starved executive is as inefficient as a hungry laborer. The one has not the equipment for economic operation; the other has not the diet to vitalize his labor.

Let us hope, however, that the time may come here, as it has, perhaps, only come in one country, France, up to the present, where thrift may make profits less necessary to the good fortune of the commonwealth. If every man were to own his own home the result would be a liberation of capital for industry, a boom the like of which this country has never before seen. As it is now, with so much of the wages of the workingman being wastefully spent on ephemeral benefits or even in permanent self-injury, the growth of capital is slow and is most largely provided by what is termed the "greed of capital for profits." The thrift of the masses would be a far preferable basis on which to rear our economic future.

One of the great sources of Germany's rapid rise, as also of the rapid progress of the iron and steel industries in this country, has been the large profits made by reason of the tariffs in both countries and as a result of restrictive syndicates in the case of the German Empire. We cannot feel satisfied that individuals should be enriched at the expense of their employees, but at the same time that the results of large profits are not wholly undesirable is seen in the excellence of the welfare work and of the scientific experimental investigation which in Germany, America and England, have followed wherever profits have been large.

As the world progresses, it is to be hoped that the thrift of the worker will oust the profits of the employer as a source of that accumulated capital which means so much for humanity.

The Daily Press and the Colorado Situation

The presumptuous intrusion of the daily papers into the intricate technical problems of the coal industry has long been a source of distress to the mining fraternity. The editorial and space writers of the big metropolitan dailies criticize coal men whenever and wherever the opportunity is affored them.

In this day of the highly developed super-specialist, the conclusions of such versatile pen artists must be viewed with suspicion. These writers, whose knowledge of the many different issues upon which they pass is of the most superficial character, do not hesitate to pass judgment upon men who have made each of these problems a life study; men who frequently are trained scientists, and whose fathers before them often have lived and died in the service in which they are engaged.

An insidious editorial of this character appeared in the *New York Sunday Times* of Oct. 18, under the caption "Which Union for Colorado." It is written as a reply to a well meaning attempt on the part of President Welborn of the Colorado Fuel & Iron Co., to point out certain inaccuracies in a corrective plan suggested in a previous editorial on this subject in the same sheet.

A seeming justification of their original policy is worked out by a clever evasion of the point at issue, and placing unspoken words in Mr. Welborn's mouth, while an obvious lack of first-hand knowledge pertaining to actual labor conditions in the mining regions of the West, is manifest throughout.

The leading argument is based upon the unfair "inference" that the Colorado operators are opposed to organized labor in any form. It has been repeatedly pointed out that this is not the situation at all in Colorado, and it is surprising to find such a well informed paper as the *Times* playing upon the credulity of its readers in such a manner.

It further contends that the Colorado operators must accept some form of unionism, in proof of which it has much to say regarding the garment and waist makers' strike in New York. It points to the fact that when these workers were finally organized, "the I. W. W. was powerless to make inroads upon the shops," and the further statement, "President Welborn and the other operators of Colorado might do well to consider the complete unionizing of their mines on this basis, if only as a measure of denfense against invasion by organizers whose principles and methods they do not approve."

If this is the case, we would like to have the *Times* explain the complete disintegration of the Butte (Mont.) Miners' Union through the confessed machinations of the I. W. W. element. The Butte Union was the most powerful organization of its kind in the world, so much stronger than any of the Eastern sweatship unions that there was no comparison between the two; and yet almost overnight, the I. W. W. precipitated such a riot that the National guard was compelled to almost take the town by assault, planting their machine-guns in the main thoroughfares, while the National Government at Washington rushed a reserve detachment of regulars to Helena, a few miles away.

While we are not in any way opponents of organized labor, it being generally conceded by all enlightened thinkers of today that legitimate unionism possesses certain advantages for all concerned, it is yet to be proved that mining operations cannot be satisfactorily conducted in any other manner. The fallacy of such a conclusion has been conclusively disproved by a number of large concerns, notably the Berwind-White Co. The Berwind interests have developed into one of the very largest coal producers in the United States, and it is a well known fact that they will not permit unionism or organization in any form at their operations, and yet there are but few mining companies in this country where the owners have experienced less labor trouble or where the working men enjoy such unexcelled advantages of all kinds.

There is no disputing the fact that for use in the smaller types of battleships liquid fuel possesses an immense advantage: (1) In simplifying ship design; (2) in affording ability to obtain and maintain great speeds; (3) in providing a far wider range of action, and (4) in diminishing the numbers and strain upon the personnel. Another great advantage is the ease with which oil-burning ships may be refilled at sea. Oil can be fed easily from one vessel to another without returning to port, and this adds an appreciable percentage to the relative fighting strength of the navy.

Sociological Department

The Utah Annual First-Aid Meet

By OTTO HERRES, JR.*

The Utah annual first-aid contest was held at Price, Carbon County, Utah, on Saturday, Sept. 26, under the auspices of the Carbon-Emery Fair Association, with the active cooperation of the important coal-mining companies of the state. This was not only the first state-wide contest ever conducted in Utah; but it was also the first intercompany meet to be held in the state.

Thirteen teams were entered, each representing the best of their respective mines. The contesting teams represented the Consolidated Fuel Co., the Castle Valley Coal Co., the Black Hawk Coal Co., the Independent Coal & Coke Co., the Spring Canyon Coal Co., the Standard Coal Co., and the Utah Fuel Co.

Excursion trains were run from the closer districts, and notwithstanding the difficulties of mountain travel, each team had a large following. About 1500 visitors from the mining camps were in attendance during the entire time of the contests, remaining on the field or in the grandstand until the final tie had been decided. A large percentage of the leading coal-mining officials of Utah were present, and each one of them followed the various events with more than ordinary interest, on account of the general excellence of the work and closeness of results.

The field for the contests was laid out on the Price baseball diamond and race track, in a rather unique manner. Two rows of 12-ft. squares were outlined with white paint in the shape of a "V." The wide end of the "V" opened and was close to the grandstand so as to permit the spectators to view the work of every team. The ground was roped off, and the numbers of the various teams were suspended from the ropes in the rear of the square where each team worked. No one was permitted within the ropes except contestants and presiding officials. All announcements to the contestants and spectators were made through megaphones. Positions on the field were drawn by lot by the captains of the various teams.

The judgment of events was in charge of representatives of the United States Bureau of Mines, assisted by State Coal Mine Inspector J. E. Pettit and Dr. F. R. Slopanskey. No surgeon or official connected with the companies competing was

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CASTLE GATE MINE NO. 2, THE WINNING TEAM



SPRING CANYON COAL CO. TEAM WINS SECOND PRIZE



TEAM FROM STANDARD MINE WHICH TIED FOR FIRST PLACE IN THE TWO-MAN EVENT, AND SECURED SECOND PLACE IN THE THREE-MAN EVENT



TEAMS AND JUDGES WORKING ON FULL-TEAM EVENT—COMPOUND FRACTURE, LEFT HIP; DISLOCATED RIGHT HIP; SIMPLE FRACTURE, RIGHT FOREARM



TEAMS IN THE TWO-MAN EVENT. FACE, FOREHEAD AND EARS BADLY BURNED, BROKEN LEFT KNEECAP

allowed any part in the judging. The number of judges was such as to allot one to each two teams, and the judges were placed with different teams on successive events to eliminate the personal equation as much as possible. The judges were: J. C. Roberts, U. S. Bureau of Mines, chief judge; Dr. A. J. Lanza, U. S. Department of Health; J. E. Pettit, State coal-mine inspector; Dr. F. R. Slopanskey, Denver & Rio Grande R.R. surgeon at Helper, and J. L. Boardman, J. T. More and K. H. Chisholm, of the U. S. Bureau of Mines, First-Aid Department.

Other officers were: Marshall, Sheriff T. F. Kelter, Price; recorder, J. C. Snow, Castle Gate; timer, H. E. Lewis, Hiawatha; announcer, J. H. Hammond, Price.

Committee on arrangements consisted of Dr. E. M. Neher, Castle Gate; Dr. J. E. Dowd, Hiawatha, and Dr. Hal. Robinson, Storrs.

The contest was divided into one-man, two-man, three-man and full-team events. These were held in the morning from ten o'clock until noon. After a recess for dinner the scores on the morning's work were tabulated and the ties worked off during the afternoon.

Prizes were in cash and aggregated $450. The first prize of $150 was won by Castle Gate Mine No. 2 team, with a perfect score in all events. The Spring Canyon Coal Co. team won the second prize of $75.

There were ties in the one-, two- and three-man events, and it was with difficulty that these contests were decided, as the contestants were well trained and made few errors. Bandages were applied and placed with exceptional skill and neatness. After a third problem had been given to decide the tie in the two-man event, all seven judges acting together were unable to deduct from the perfect scores of the Standard team and Sunnyside Mine No. 2 team.

The prize winners were as follows:

Grand Prize—First prize, Castle Gate Mine No. 2, $150; second prize, Spring Canyon Coal Co. Mine, $75.

One-Man Event—First prize, Sunnyside Mine No. 1, $25; second prize, Sunnyside Mine No. 2, $12.50.

Two-Man Event—First prize, tie between Standard Mine and Sunnyside Mine No. 2, $50; second prize, Hiawatha No. 1, $25.

Three-Man Event—First prize, tie between Mohrland No. 1 and Mohrland No. 2, $75; second prize, tie between Kenilworth, Sunnyside No. 1 and Standard Mine, $37.50.

The following problems were given:

One-Man Event—Patient found with cut on right temple; severe bleeding. Treat and carry 50 ft.

Two-Man Event—Face, forehead and ears badly burned, broken left kneecap. Treat and carry 50 ft.

Three-Man Event—Patient is found unconscious with face downward and lying on live wire (carrying 4000 volts), with chest severely burned. Treat and carry 50 ft.; use improvised stretcher.

Full-Team Event—Compound fracture of left thigh; severe arterial bleeding; dislocated right hip; simple fracture of the right forearm. Treat and carry 50 ft.

Problems in working off the ties were:

One-Man Event—Treat patient for crushed right foot and compound fracture of nose.

Two-Man Event—Treat a man found in blackdamp under a fall of rock, unconscious, with compound fracture of left thigh and bone projecting inward.

Three-Man Event—Treat a patient for severe burns of the hands; a deep cut of the abdomen just above the umbilicus with bowels protruding.

The rules, under which the meet was held, are identical with those in force at the Utah Fuel Co.'s meet described on p. 348 of the issue of Aug. 29, 1914, with a few changes. Thus the demerits in Rule 17 of the Utah Fuel Co. meet had in this contest this important addition: For improper treatment, five points, and Rule 11 was changed providing that teams with the same score shall be required "to participate in another similar event" instead of in a contest between the full teams so tieing.



E. K. HOLLAND, SECOND-PRIZE WINNER IN ONE-MAN EVENT, WITH J. W. LITTLEJOHN, PATIENT

Rule 12 being about the challenge cup was naturally omitted, and Rule 16 about the hour of contest was also changed. Two rules of interest are added, namely: Rule 18: Members of teams participating in the one-man event, two-man event and three-man event, will be barred from all other events except that for full teams. Rule 19: Every team entering this contest must procure a certificate from its respective mine superintendent to the effect that the members are regular employees of the company, and that their entrance into the contest is approved by their superintendent.

Each event was marked on the basis of 100 points for a perfect score; then divided by 5 to give 20 points for each member of the team working; and multiplied by the number of men in the event. Thus, a perfect score for the one-man event was 20; two-man event, 40; three-man event, 60; full-team event, 100, and total score, 220 points.

The personnel and scores of the best teams follow:

Castle Gate Mine No. 2: Robert J. Henderson, captain; Jack Ramage; Jack Hreinson; Albert Wardell; James Lakin and Leonard Taylor. Score 220.

Spring Canyon Coal Co.: S. H. Short, captain; Ben Sellars; Fred Thomas; Bert Davis; John Harrison and John Haddow. Score, 216.2.

Sunnyside No. 1: Ernest Lloyd, captain; Henry Stobbs; J. W. Dunn; James Thorpe; Jack Turner; Eugene Singleton. Score, 215.2.

Sunnyside No. 2: J. W. Littlejohn, captain: M. H. Detwiler; J. T. Johnson; J. Patterson; E. K. Holland and Zeph Thomas. Score, 214.4.

The other teams made the following scores: Standardville, 213.2; Mohrland No. 2, 212; Hiawatha No. 1, 211.4; Mohrland No. 1, 210.6; Utah, 209.6; Black Hawk, 209.2; Winter Quarters, 209; Kenilworth, 202.8; Hiawatha No. 2, 190.4.

The character of work performed by the various contestants was highly commended by the judges and surgeons present at the meet. Individual efforts compared very favorably with those shown at any of the large meets of the East. Great proficiency in bandaging was displayed by several teams.

Although the safety-first movement is not new in the state and some of the mines have trained men in first-aid work for many years, the past year has shown both the miners and the various mining companies working together with greater interest than ever before, and the results seem commensurate with the greater efforts expended.

First-Aid Meet of the "Old Company"

The Lehigh Coal & Navigation Co., familiarly known as the "Old Company" in the Anthracite region, because it is the oldest in the history of mining in this country, held its annual outing at Lakeside Park, East Mahanoy Junction, Aug. 29 of this year.

As usual the meet while giving first place to first-aid, also comprised field and water sports. The problems were as follows:

1. Treat a foreign body in the left eye, and laceration of left hip. One-man event. Time, 3 min.
2. Treat a simple fracture of left collar-bone, and laceration of scalp. Two-man event. Time, 3 min.
3. Treat a simple fracture of left thigh, and a compound fracture of right upper arm. Team event. Time, 10 min.
4. Treat a fracture of left kneecap, a fracture of right thumb, and extensive lacerations over right shin bone. Team event. Time, 10 min.
5. Treat conditions of a man who has fallen on an electric wire, back down, whose clothing is burning; rescue, extinguish fire, treat patient and dress back and upper arms. Team event. Time, 10 min.

The judges were as follows: Drs. E. H. Kistler, W. H. Kastem, M. H. Neumiller, W. F. Ely, W. C. Scott and R. Kistler, of Lansford; Dr. J. E. Beale, of Coaldale; Dr. W. H. Hinkle, of Tamaqua; Dr. J. H. Behler, of Nesquehoning, and Dr. B. A. Erwin, of Mauch Chunk .

The first prize of $25 in gold and individual silver medals





The Crowd at the Annual Outing of the Lehigh

was won by the Nesquehoning Outside Team, consisting of William J. Adams, captain; Oscar Strohl, Clarence McGerry, William Strohl and Samuel Azer. The second prize of $15 in gold fell to the Electrical Department—Harold Ramsay, captain; Thomas Wildin, George Israel, Harry Wheinmeyer and Warren Holmes. The third prize of $10 was secured by Daniel J. Jones, captain; George Boyle, David Morgans, James Cunningham and Edward Minnick.

The ratings of the teams in the contest follow:

Team	Captain	Per Cent.
1—Nesquehoning Outside ..	W. J. Adams	100
2—Electrical Department ..	H. Ramsay	100
3—Lansford Shops	D. James	99⅛
4—Tamaqua Inside No. 2..	C. Erbe	98
5—Coaldale No. 9 Shaft.....	D. Moser	97
6—Lansford Outside	A. Gibson	97
7—Coaldale No. 8 Slope.....	T. J. Evans	96⅝
8— Nesquehoning Tunnel 2	P. Bouse	96⅛
8— Coaldale No. 8 Shaft ..	J. Boyle	96⅛
8— Greenwood Inside	W. Sweeney	96⅛
11—Nesquehoning Shaft No. 1	T. Hoffler	96
12—Tamaqua Inside No. 1 ...	O. Belts	95⅛
13—Nesquehoning Shaft No. 2	J. Lewis	94⅛
14— Nesquehoning Summit..	J. Forest	94⅛
14— Lansford No. 4 Slope...	A. McMuller	94⅛
14— Lansford No. 3 Shaft...	S. Hollenbach	94⅛
14— Hauto Washery.....	E. Mulhearn	94⅛
15—Nesquehoning Tunnel No. 1	C. Keeney	93⅞
19—Tamaqua Outside	C. Gould	93⅛
20— Lansford No. 4 Shaft..	H. McElmoyle	92⅜
20— Lansford No. 6 Shaft...	D. Cunning	92⅜
20— Coaldale Outside	W. Callahan	92⅜
23—Rahn Shaft	J. Filer	92⅛
24—Springdale	T. Whildin	90
25—Greenwood Outside	R. Werner	89⅜
26—Foster's Tunnel	T. Thomas	88⅛

The contest for supremacy in field sports followed. Each district had a limited number of representatives in each event.

The water sports were: 50-yd. swim with turn, 300-yd. single-oar boat race, chasing the duck, 100-yd. straightaway swim and 400-yd. double-oar boat race. The contestants representing different districts competed with each other, and a summary of points made by the contestants from each district provided a way of comparing the skill of the men thus classified. Lansford won with 16 points, Tamaqua being second with 14. Coaldale and Nesquehoning tied with 6 points, while Greenwood scored only 2 points.

The field sports were: Standing broad jump, 50-yd. dash for men over 50 years of age, 50-yd. dash for men weighing over 200 lb., running broad jump, 600-yd. two-legged race, 100-yd. dash, putting 16-lb. shot and tug-of-war. Lansford again won, with 26 points; Greenwood made 25, Tamaqua 12, Coaldale 7 and Nesquehoning 1 point. As a whole, Lansford won easily with 42 points, Greenwood having 27 and Tamaqua 26, but Coaldale made only 13 and Nesquehoning 1 point only.

A baseball game was played between teams from Carbon and Schuylkill Counties, the winning team receiving $25. A dinner was served in the grove.





Coal and Navigation Co. in Lakeside Park, Aug. 29, 1914

Legal Department

Duty of Operator Concerning Safety of Mine

By A. L. H. Street*

In reversing a judgment which was awarded against defendant for death of a miner, caused by fall of a mine roof, the Washington Supreme Court decided these points in the recent case of Lindquist vs. Pacific Coast Co., 142 Pacific Reporter: The legal principle that where an employee's place of work is constantly changing, as in the case of mining, he is presumed to assume risks of injury arising from the performance of his work, did not apply in this case, it appearing that the accident occurred in a room which was being operated on the pillar system. The foreman had inspected the place in the roof where a squeeze appeared, pronounced it to be safe, and directed the deceased employee to work there. The latter remained at work under such direction until the middle of the day, when the roof fell.

A workman who follows the assurance and judgment of his employer's representative, will not be charged with assumption of risk or contributory negligence, as a matter of law. The assurance is not that one blow may be struck or one shovelful of earth turned in safety, but that the place is safe long enough to accomplish the thing to be done, which, in this case, was to remove the coal from that part of the pillar where the squeeze occurred. But, if defendant company furnished a sufficient supply of timbers at the entrance of the working place, it could not be held responsible for the accident, merely because it did not provide for cribbing instead of posts and caps, and did not keep the chutes open on both sides of the section which was being worked, so that the coal might be removed from either side.

The requirement under the Washington laws that coal-mine operators shall deliver timbers for supports "at the entrance to the working place," is not shown to have been violated by reason of the fact that the timbers in this case were placed about 250 ft. from the place where they were to be used. It was a question for the jury to determine whether it was proper mining in this case to remove the coal from one side of the section to another, and whether the fact that the chutes on one side had caved in would charge the miner with assumption of the risk or contributory negligence.

Recent Judicial Decisions

Validity of Virginia Wage Law—The Virginia statute which prohibits coal operators and manufacturers from issuing orders in payment of wages, unless such orders are redeemable in cash, is valid. (United States Supreme Court, Keokee Consolidated Coke Co. vs. Taylor, 34 Supreme Court Reporter 856.)

Proof of Negligence in Fatal Injury Cases.—Mother's Right to Recover Damages.—A coal company cannot be held responsible for death of an employee in an accident to which there were no eye witnesses, on mere conjecture as to the cause of the accident; there must be proof reasonably tending to show that the injury was caused by some act of negligence attributable to the company. But, in the absence of evidence to the contrary, it will be presumed that the employee was in the exercise of ordinary care for his own safety. Under the laws of Wisconsin, the mother of an illegitimate son is entitled to recover damages for his death due to negligence of a third party. In any case a mother will not be permitted to recover on account of a prospective loss of support by her son after he would have attained his majority, unless there is evidence showing such loss to a reasonable certainty, and the amount thereof. (Wisconsin Supreme Court, Andrzejewski vs. Northwestern Fuel Co., 148 Northwestern Reporter 37.)

Mechanic's Liens Against Mining Property—A lessee under an ordinary lease for mining coal on a royalty basis is not a "contractor" of the landowner in such sense as to entitle his employees to enforce a lien against the property. (Colorado Court of Appeals, Empire Coal Co. vs. Rosa, 142 Pacific Reporter 192.) In denying the right of employees of a lessee to a mechanic's lien, the court said: "The work done, as shown by the evidence, was that usual, ordinary, and necessary in the regular course of operating a coal mine, in extracting coal therefrom, although involving a small amount of 'dead work,' driving an entry (but whether in coal or not is not disclosed), and laying some track. Besides, it nowhere appears what part of the labor sued for was performed in doing anything that might be termed development, preservation, or improvement of the mine, as distinguished from the mere extraction of the coal, and if some items are lienable, the amount cannot be ascertained from the evidence so as to form the basis of a decree."

Employer's Duty Concerning Safety of Mine Roof—When a mining company's foreman undertakes to inspect the roof of a mine room to ascertain whether it is safe for a miner who is about to work under it, the company, acting through the foreman, is bound to exercise a reasonable degree of care to discover any dangerous conditions existing in the roof, even though it may ordinarily be the duty of the miner to look after the safety of his own room, the company merely providing props. Hence, if it appeared in a suit for injury to a miner, caused by rock falling on him, that, being somewhat inexperienced, he asked his foreman whether he thought any more of the roof would fall, and the foreman tested the roof with a pick and assured plaintiff that it was safe, the jury were warranted in finding that the injury was due to negligence attributable to the company, if the foreman's failure to make a proper inspection resulted in his overlooking the dangerous condition which caused the injury, and if plaintiff was induced to continue his work, in reliance upon the foreman's assurance. (Missouri Supreme Court, Manufacturers Coal & Coke Co., 168 Southwestern Reporter 927.)

Width of Barrier Pillars in Pennsylvania Mines—A Pennsylvania law enacted in 1891 requires the owners of adjacent coal properties to leave a boundary pillar sufficient as a barrier for the safety of the miners in each of the adjoining mines, in case the other should be abandoned and filled with water. The width of the pillar is to be determined by the engineers of the adjoining property owners, together with the inspector of the district in which the mines are situated. This law has just been before the Pennsylvania Supreme Court again in the case of Mill Creek Coal Co. vs. Curran, 91 Atlantic Reporter 424, a suit brought to declare illegal an award fixing the width of a barrier pillar of coal between the mines of two operating companies. Summed up, the court's opinion, in effect, is that the law was a valid exercise of the legislature's power; that the power given to determine the width of a barrier between two given mines includes authority to determine whether the safety of employees in the two mines requires a pillar of any width; that a decision by the engineers and inspector fixing the width of a pillar will be presumed to have been reached after considering the necessity for any pillar at all; and that a valid decision may be reached by a majority of the members of the board created by the law.

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Discussion By Readers

Gasoline Mine Locomotives

I read with much interest the letter of E. W. Hamilton, COAL AGE, Sept. 12, p. 440, drawing attention to the particular advantages to be derived in the use of gasoline locomotives, in mine haulage.

In this connection, I wish to refer briefly to some very important facts brought out in a recent paper read at the Pittsburgh meeting of the American Institute of Mining Engineers, October, 1914, by O. P. Hood, Chief Mechanical Engineer of the Federal Bureau of Mines. In his paper, Mr. Hood has enumerated some of the results of the extensive experiments made by the bureau to determine, as nearly as possible, to what extent the use of gasoline motors is dangerous to life or injurious to the health of miners, under the worst possible conditions that may exist in the operation of coal mines.

After speaking of the "great flexibility, ease of control and economy of operation" of electric haulage and the "serious menace" of the trolley-wire system of distribution, Mr. Hood gives equal emphasis to the "greater flexibility of application" secured by the use of gasoline locomotives in mines, without a similar dangerous distributing system. He contrasts the danger of death by electric shock with the injury to health and possible death by the corruption of the mine air with the exhaust gases of the engine. He states that these gases consist of "nitrogen, a little free oxygen, hydrocarbons, hydrogen, carbon monoxide and carbon dioxide."

The exhaustive study made of mine air and gases, by the engineers of the bureau, to which Mr. Hood refers, (Technical Paper No. 62, U. S. Bureau of Mines) leads him to conclude that the determining factor, in respect to the danger arising from the use of gasoline motors in mines, is the presence of carbon monoxide in the exhaust gases of the engine. He adds that the percentage of this gas in the mine air will depend upon the amount of the gas present in the exhaust, as compared with the quantity of air passing on the haulage road; but he considers that it will be necessary to provide ventilation for the worst condition that can result.

It is stated that while, under normal running conditions, this gas rarely exceeds 6 per cent. of the total exhaust, the quantity may, owing to a bad adjustment of the carburetor, be increased to 13.5 per cent. It is clear that since such a wide variation in the percentage of this dangerous gas is possible, this fact coupled with the possibility of a slack ventilation on roads or in places where the locomotive may be working, makes it necessary to observe great caution in the use of these machines.

Mr. Hood gives a table showing the percentages of carbon monoxide and carbon dioxide gases that may be produced by the different sizes of engines in common mining use, number of cylinders, speed (r.p.m.) and piston displacement, together with the quantity of air required to dilute the carbon monoxide to 0.1 per cent. He draws attention to the possibility of the locomotive running in the same direction in which the air current is traveling and perhaps with the same speed or velocity, in which case the gas would reach a dangerous percentage in the air to which the engine runner would be exposed. He mentions also the danger of permitting a gasoline locomotive to stand idle for any length of time, except in an ample ventilating current, and advises the use of a self-starter on all gasoline locomotives.

MINING ENGINEER.

Pittsburgh, Penn.

Waste under the Ohio Mine-Run Law

All familiar with the systems and methods of mining coal now employed, in eastern Ohio, know that not more than 65 per cent. of the coal is recovered or mined as marketable coal. As slack is being sold today, in the Cleveland market, for 15c. a ton, one cannot but feel that there is considerable reason in the resistance that is being made, by the coal operators in the No. 8 Ohio field, to the mine-run law that a short-sighted government has forced upon an already superlegislated industry.

Under the operation of this law, the miners are not concerned in the amount of slack and fine coal that they load into the cars. It is passing strange that legislators charged with the duty of enacting such laws as will prove a benefit to the state, its industries and the workers, alike, should continue to whittle down the small margin by which the coal industry lives. That the state of Ohio is losing hundreds of thousands of tons of coal, in the No. 8 field, is a fact known to all miners, operators and inspectors alike. In my opinion, time will undoubtedly fix the responsibility for this waste and loss, not upon the industry but upon the law-making body, for the enactment of laws that serve no other purpose than to waste the resources of the state by compelling a profligate system of mining.

There is, in the recently enacted mine-run law in Ohio, an innocent and harmless looking item, which the miners' union forced upon the operators of the No. 8 field, to the effect that "rooms shall be 24 ft. wide, with the track in the middle of the room." This practically lays down the law in regard to the system of mining to be adopted; and compels the operator to consent to a heavy loss both to himself and to the state. The method of laying the track in the middle of a room, as all mining men know, precludes the drawing of pillars, under most conditions in coal mining; because the drawslate and other refuse is gobbed against the pillars and must be removed before the work of drawing back the pillars can be commenced. The cost of removing this waste would be prohibitive, and the pillar coal would be often abandoned.

In the Pittsburgh district, the same union, inspired with a greater sense of justice, agreed that the track in the rooms should be laid close to one rib, which enables the pillars to be drawn back with little expense. All mining men know how important it is to obtain the largest possible percentage of coal from the rooms, to offset the

expense of driving narrow-work. On this account, it frequently happens that mining in the rooms is allowed to encroach upon the entries; and, under the conditions, one can hardly blame companies for this practice; although if it is carried too far, a squeeze is the almost inevitable result.

Besides the great waste it entails, there is no doubt in my mind that this system is responsible for a large percentage of the fatal accidents occurring daily in that field from falls of roof. If this be true, it is a matter that should concern the chief inspector and the safety commission. In respect to the unwarrantable waste of natural resources, this condition should interest every citizen, whatever his calling or standing.

Were it not for the prescribing of the system of working, by the union, in the manner to which I have referred, operators would be in a position to reduce the present waste in mining to a minimum, by adopting a system better suited to the conditions and which would guarantee the extraction of the largest possible percentage of the coal. While the union conceded this privilege to the operators in the Pittsburgh district, it was withheld from those in the No. 8 field, which was manifestly an unfair discrimination.

We may ask, Why is this system permitted, which entails so large a waste and great financial loss, and is a constant menace to life and causes an increased demand for compensation for injuries, besides other losses to the operators? Is it not evident that such laws are adding to the heavy burdens already borne by coal operators in this field? Is it possible that law-makers do not realize that while such laws may be a benefit to a few, they impose unjust burdens on the large majority? If such be true, they are betraying the trust placed in them.

One is forced to the conclusion, however, that under the working of the spoils system and the desire for long terms of office, the influence of the miners' union is allowed to control the better judgment of men who have it in their power to adjust these matters. It is to be regretted that, under this influence, the coal operator is rapidly becoming known as a common enemy, instead of the mainstay and support of a large and necessary industry. Such a situation is as deplorable as the strikes, that result, are expressive.

The demands on the coal operators of the No. 8 field are greater than those in any other district, as far as my knowledge goes. One great source of trouble is that, under existing conditions, each mine is a law unto itself, there being no general agreement. For example, one mine will be thrown idle if eight men are out of coal; another, if 10; and still another if 12 men so elect. The penalty for loading dirty coal differs in almost every mine. The occurrence of morning meetings in the mines, after all the daymen have entered, causes frequent stoppage of the work and a loss of two or more hours, which is a serious matter in the successful operation of a mine.

As a practical example of the interference of the union, in the operation of the mine, one local even essayed to prevent the superintendent of the mine from picking chunks of slate, sulphur, etc., off the top of the loaded mine cars, claiming that every car must first be weighed and its weight credited to the miner, who should be docked the necessary amount, after the coal is dumped. In this case, after a six days' strike, the men became more reasonable.

In closing, permit me to say that, until the coal operators, in the No. 8 field, are permitted to adopt their own system of mining, and until there is a greater desire on the part of the men in that district to live and let live, there can be neither success, satisfaction nor peace.

Charlton Dixon, Gen. Mgr.,
Franklin Coal Co.

Pittsburgh, Penn.

The Mine Foreman

Letter No. 11—I have often wondered why we do not hear more frequently, by way of discussion and the writing of practical articles, from the mine foremen of this country. There is not a man engaged in the coal industry who comes into closer contact with the practical side of mining than the mine foreman. As a class, they are busy men and often have little to say; but it is not because they have nothing to write about. If these men were so disposed, many of them could produce articles that would be of great interest to their fellows.

There is no occupation in which men are engaged that presents more varied conditions and experiences than the mining of coal. The mine foreman finds some fresh difficulty each day. His mind dwells constantly on the work. At home, he goes over plans for the next day, studying what will be the best and most economical way of making necessary changes or performing the daily routine work of the mine. In all his plans, the questions of safety and expense are of the first importance.

In the mine, the foreman is constantly confronted with questions that often demand an immediate answer, yes or no. In many cases, his decision will mean hundreds of dollars saved or lost to the company. It is important, therefore, that the mine foreman be a man of keen and reliable judgment. He must be able to work his men to the best advantage, and to secure the highest efficiency from their labor.

There is a great difference between considering a plan or method outlined on a map, when sitting at home or in the office, and being required to carry out the same work or execute the same plan in the mine. When a plan is handed to a foreman, he must consider how the work can be done in the quickest manner and with the least expense. He must regard the safety of his men and the requirements of the mining law, in respect to the work.

In a large mine where the mine foreman has a number of assistants who are in charge of different branches of the work, his duties require a general oversight of the mine, to see that the work is well done and the least expense incurred in the operation. Such a general oversight requires the broadest knowledge and judgment, both in respect to the men employed in different kinds of work and the manner in which that work should be accomplished.

In most mines, however, the foreman has little help and must give his entire attention to every detail of the work going on in the mine. He must be informed of every bad or dangerous rock, bad track, or a switch where cars are frequently derailed; and see that the trouble is overcome or the difficulty removed. At the same time he must keep things moving. He must see that all material required is at hand and brought into the mine and delivered promptly where it is to be used.

The mine foreman must inspect every working place while the men are at work, to ascertain that the coal is properly mined and loaded and the face suitably timbered and safe for work. He must see that each man has his needed supply of cars, timber and tracking, and that the place is well ventilated and free from gas. He must inspect the haulage roads, arrange the work of the drivers so that there will be the least delay and the coal arrive regularly and promptly at the bottom of the shaft or slope.

In these days of sharp competition, when machinery of all kinds and for all purposes is being introduced into the mines, it is essential that a mine foreman shall be familiar with the general principles of every class of machine, so that he will be able to judge of its practical adaptation to the work in the mine.

Again, the task of the mine foreman is rendered much more difficult, by reason of the fact that 95 per cent. of the men employed, in many mines, are foreigners and cannot speak the English language. The most of these men can only be made to understand by means of signs. Their instruction in regard to the safest and best method of mining coal requires much time and patience. The presence of these foreigners in the mine is a source of constant worry to the mine foreman, for fear that something will go wrong at any moment. Their ignorance of conditions or neglect of the simplest precautions may cause an accident that will cost hundreds of dollars and, perhaps, jeopardize the life of every man in the mine.

Mine foremen, as a rule, are hard-working, conscientious men. In most cases, they shoulder their own burdens and do not trouble their superintendents with many small matters, although these may be a source of continual annoyance and trouble to them. In some cases, it would be better if the foreman would take up many small matters with his superintendent, with a view to the removing of the difficulty, as it often happens that a small matter neglected will grow to much larger proportions; and the expense of removing the difficulty will be much greater than if proper attention had been given the matter earlier.

It is a great help to the mine foreman when his superintendent is not too busy to go over matters with him in detail. This sociability shows that the superintendent has the welfare of the foreman and the men at heart; and the knowledge is a satisfaction to the foreman, who is encouraged thereby to greater effort. Such encouragement is greatly needed, because of the arduous work with which he is charged.

THOMAS HOGARTH, Mine Foreman,
Penn-Mary Coal Co.
Heilwood, Penn.

Study Course in Coal Mining

By J. T. Beard

The Coal Age Pocket Book

Duty of a Pump—There are different definitions for what is termed the "duty of a pump," each giving a different estimate or value.

The duty is sometimes defined as the weight (lb.) of water raised through a vertical height of 1 ft., for each 100 lb. of coal burned; or, more simply, the theoretical work (ft.-lb.) performed, per hundredweight of coal burned under the boiler.

It is observed that this definition is faulty, because it combines furnace and boiler efficiencies with that of the pump itself, besides estimating only the theoretical work performed, thus eliminating friction, which is often a most important factor.

The true definition of **duty in pumping** is the actual work performed in a given time (ft.-lb.), per million B.t.u. delivered to the pump in the same time. Or, less frequently, the duty is estimated in foot-pounds of work performed, per thousand pounds of dry saturated steam consumed.

Steam Consumption in Pumping—The common type of direct-acting pump, so much employed in mining, is well known to be wasteful in respect to the consumption of steam. This is owing to the necessity of using steam at full pressure throughout the entire length of stroke. Only a comparatively few pumps are designed to use steam expansively and these are not adapted to the commonly high lifts in mining.

Steam consumption, in pumping, ranges from 10 or 15 lb. per i.hp. per hr., in triplex, flywheel pumps when run condensing, to an average of 150 lb. per i.hp. per hr. in direct-acting pumps. The consumption of steam, in pumps of the latter type, varies from 100 to 200 lb. per hp. per hr., depending on the speed of the pump and its condition. In this class of pumps, the consumption of steam is less as the speed is increased.

To Calculate Steam Required to Operate Pump—For a direct-acting pump in fair condition, operated at a piston speed of 100 ft. per min., assume an average steam consumption per indicated horsepower-hour of, say 150 lb. dry saturated steam, which is a so called **"water-rate"** of $150 \div 60 = 2.5$ lb. per i.hp.-min.; and multiply this water rate by the indicated horsepower of the pump, as shown by the following:

Example—Find the steam required to pump 9000 gal. of water per hour, from a shaft 450 ft. deep, using a simple direct, double-acting pump running at a speed of 100 ft. per min., and discharging through a 3-in. column pipe.

Solution—The effective head, in this case, is

$$h_1 = 450 + \left(\frac{9000}{60}\right)^2 \frac{450}{800 \times 3^5} = say\ 502\ ft.$$

The indicated horsepower of this pump will then be

$$H = 0.00034 \times 150 \times 502 = 25.6\ hp.$$

The weight of steam required to operate this pump, under the assumed conditions, will be

Steam consumption, $2.5 \times 25.6 = 64$ *lb. per min.*

The Coal Age Pocket Book

To Calculate the Duty of a Pump—First, find the horsepower required to operate the pump under the given conditions, which is the indicated horsepower of the steam cylinder and may be calculated from the work performed in the water-end of the pump, assuming for that purpose a mechanical efficiency of, say 75 per cent. Multiply this horsepower by 33,000 to reduce to foot-pounds per minute.

Now, find the heat units (B.t.u.) per pound of steam used in the cylinder each minute, and multiply this **heat value** by the **water-rate** for the class of pump employed, and that product by the indicated horsepower, which will give the total heat (B.t.u.) converted into work each minute.

Finally, since this total heat energy is to be expressed in million B.t.u when estimating the duty of a pump, multiply the foot-pounds of work performed each minute by 1,000,000 and divide the product by the total heat consumed in the same period of time. The quotient obtained will be the duty of the pump expressed in foot-pounds.

It is **important to observe** that the basis of estimating duty, in pumping practice, is purely an arbitrary one and varies greatly among engineers; so that it is necessary, in giving the duty of a pump, to state the basis of estimate employed. Otherwise, the duty given is of no value as demonstrating the efficiency of the plant.

Duty is very commonly estimated, as above, on a basis of million B.t.u.; or, as many engineers prefer, on a basis of thousand pounds of dry saturated steam consumed, per unit of time. Aside from this difference, however, the heat in the steam is sometimes taken as the total heat above 32 deg. F. and sometimes above the feed-water temperature. The latter method would seem to be preferable inasmuch as it considers the ratio of the work performed, to the heat in the steam derived from the combustion of the fuel in the furnace. It eliminates the heat imparted to the feed water by the condensation of waste steam in the feed-water heater. It may therefore be a better index to the comparative cost of pumping, without confusing the efficiencies of the pump, boiler and furnace.

Example—Referring to the last example, where it was found 25.6 hp. was required to pump 9000 gal. of water an hour, under an effective head of 502 ft., assume a feed-water temperature of 100 deg. F. and the diameter of the steam-end double that of the water-end and find the duty of the pump, on the B.t.u. basis, above feed-water temperature.

Solution—The work performed is $25.6 \times 33{,}000 = 844{,}800$ ft.-lb. per min. When the pump is in operation the pressure in the water-end is $0.434 \times 502 = 217.8$ lb. per sq.in. The diameter ratio being 2, the required steam pressure is $217.8 \div 2^2 =$ say 55 lb. per sq.in., gage or $55 + 15 = 70$ lb., abs.

From steam tables, water at 100 deg. F. contains 67.9 B.t.u. and steam at 70 lb. abs., 1179.9 B.t.u., per pound. Since this pump uses 64 lb. of steam a minute, the total heat in the cylinder is $64\ (1179.9 - 67.9) = 71{,}168$ B.t.u. per min.

Duty of pump, $\frac{844{,}800 \times 1{,}000{,}000}{71{,}168} = 11{,}870{,}500$ *ft.-lb.*

Inquiries of General Interest

An Electric Mine-Haulage Problem

I have been studying to become more familiar with the observed action of an electric mine locomotive, and am puzzled to explain to my own satisfaction the following question: Why will an electric mine locomotive pull more on series than on parallel? For example, should a motor stall on account of defective bonding when running on parallel, it will at once start and haul the trip if thrown over on series.

FRED VINTON, Mine Foreman,
Penn-Mary Coal Co.

Heilwood, Penn.

To answer this question intelligently, requires not only an intimate knowledge of the construction of the motor in use, but a thorough understanding of the principles involved in its action. The study of electricity is a difficult one, and there are many troubles continually arising that even expert electrical engineers find hard to fully explain.

The question correspondent has asked is interesting and worthy of careful study on the part of anyone in charge of an electric locomotive. In the present case, it may be assumed that the mine locomotive here referred to is equipped with two series-wound motors. These motors, on a locomotive or a trolley car, are usually arranged so that they can be operated in series when starting the motor and can then be thrown into parallel, after the motor has attained the desired speed.

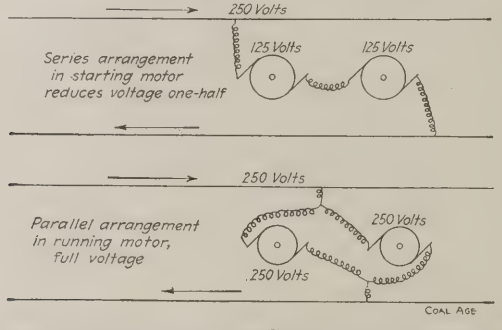


DIAGRAM SHOWING THE SERIES AND PARALLEL ARRANGEMENTS IN MINE MOTORS

Briefly stated, the object of this is to reduce the voltage one-half and thereby prevent the large rush of current that would take place in starting owing to there being, as yet, little or no electromotive force set up in the armature winding. As the speed of the motor is increased gradually, the electromotive force, which is then set up in the armature winding, opposes that produced in the motor field, with the result that the flow of current is restrained. Also, by means of the controller used in starting the motor, a gradually decreasing amount of resistance is introduced into the circuit, which likewise has the effect of regulating the current flowing through the motors.

The accompanying diagram illustrates both the series and parallel arrangements; and enables one to see more clearly how the voltage is reduced one-half, in the series arrangement; while the full voltage, disregarding the losses mentioned later, is available in the parallel arrangement. It is evident that when the total current is passing in succession through each of the motors, as in the series arrangement, each will absorb one-half of the voltage available at that point. For example, assuming the difference of potential between the trolley wire and the rail at the motor is 250 volts, each motor will be operating under one-half this pressure, or 125 volts in the series arrangement; while in the parallel arrangement each motor will be subject to the total pressure of 250 volts.

There are numerous sources of motor losses that in a direct-current, electric motor can be classified under three heads, as follows: (1) "Copper-loss" due to the resistance of the conductors on the armature and field windings, which in a well designed motor running under full load varies from 12 to 14 per cent. of the input, or less for a lesser load; (2) "Core-losses," which consist of the eddy-current losses that vary as the square of the speed of the motor, and the loss due to hysteresis that varies directly as the speed. Core-losses vary in different machines and result from the revolution of the armature laminations in a magnetic field, thereby producing eddy currents opposed to the field current of the motor. Hysteresis results from the tardiness of the magnetization in the metal, which, owing to the rapid reversal of current in the armature iron, considerably reduces the magnetic field; (3) Friction-losses in the bearings of the motor and the brushes and what is called "windage," due to the friction of the air against the revolving armature, which is slight.

Returning now to consider the power of a motor installed in a mine locomotive to pull its load, it may be stated that the tractive force or drawbar pull of the locomotive depends as much on the adhesion of the wheels to the rails as on the power exerted by the motor itself. Assuming, however, that the weight of the locomotive is such that its adhesion to the rails is sufficient for the power of the motors installed in the frame, it is only necessary to consider the torque or turning moment of the motors.

In a direct-current, series motor, this torque varies with the square of the current and is practically independent of the voltage, except as the losses to which we have referred, affect the speed of the motors, by decreasing the voltage. A lower voltage means a lesser speed, which reduces the losses but increases the available torque. By reason of this condition, motors operated in series possess a slight advantage in respect to torque, which measures the tractive effort of the locomotive. However, the chief advantage of the series arrangement in starting is the consequent reduction of the voltage one-half, which makes the expedient a valuable one in haulage.

Examination Questions

Firebosses' Examination, Held at Terre Haute, Ind., Sept. 10, 1914

(*Selected Questions*)

Ques.—If you were employed as fireboss, explain fully how you would conduct your examination of a mine for firedamp, from the time you commenced your work until you had completed it.

Ans.—I would reach the mine in time to begin work promptly, making sufficient allowance for properly inspecting and lighting my lamp and ascertaining that the ventilating apparatus was working as usual. Having descended the shaft or slope, I would proceed at once to follow the intake air from the point where it enters my district and to inspect in regular order all airways, passages and rooms, following the air current throughout the district.

When entering a room and approaching the working face I would proceed with caution to avoid walking into a body of gas, making such tests as are necessary to determine the presence or absence of gas. Every fireboss should, also, closely observe the condition of the roof and coal in each room to assure himself that the place is safe for workmen to enter. He should replace any brattice that may have been blown down by the shots discharged in that place. Having made this examination, I would mark the date on the face of the coal, as evidence of my presence at that point.

I would do the same at the face of each room and entry and then return to the shaft or slope bottom and enter in a book kept for that purpose my report of the examination, dating and signing the same. I would state in that report any particular dangers I had found. When making the examination I would place suitable danger signals and fence off any places found unsafe for men to enter. If the check system is in use at the mine I would remove from the board the checks of the men working in such places and deliver the same to the mine foreman, explaining to him the particular danger in each place. This would prevent any workman from entering a dangerous place unwarned.

Ques.—(a) What safety lamps do you know of that are in use, and which would you prefer to use in making an examination of a mine for firedamp? (b) Give reasons for your choice. (c) Explain the construction of the safety lamp of your choice.

Ans.—(a) The lamps most commonly used for testing for gas are the Davy and Wolf lamps. I prefer to use the common Davy lamp when making an examination for firedamp.

(b) The Davy lamp is simple in construction and very sensitive to the presence of gas. The lamp is convenient to handle, easy to clean and can be inspected in every part without trouble. It burns a nonexplosive oil and, when properly handled is a safe lamp to use.

(c) The Davy lamp consists of an oil vessel surmounted by a gauze chimney, which may be and usually is protected with a shield, to avoid the flame being blown through the gauze by a strong air current or heavy concussion of the air. The mesh of the gauze chimney contains 28 wires to the inch or 784 openings to the square inch. This chimney is 1½ in. in diameter and about 4½ in. high, in the fireboss Davy. The top of the chimney is further protected by a gauze cap, which is often called the "smoke gauze." The air supporting the flame enters the lamp in the lower part of the chimney and the gases produced by the combustion escape at the top.

Ques.—(a) If, on making an examination of a mine, you should find a large accumulation of firedamp at the head of a pair of entries where it had not been previously detected, to what cause or causes might this be attributed? (b) What precautions would you take to prevent an accident as the result of such an accumulation of gas?

Ans.—(a) The presence of the gas at the head of the entries might be due to the last shot fired at the face having opened a fresh feeder of gas either in the coal, the roof, or the floor. The shot may have caused a heavy fall of roof that has produced the same effect. In some cases, such a sudden accumulation of gas may result from a squeeze or creep extending over the head of the entries; but this is not possible except when the entries are in close proximity to other workings. Gas often makes its appearance suddenly when an entry strikes a fault and this may have produced the accumulation found in this case at the head of the entry.

(b) If the body of gas is large, no attempt should be made to remove it from the head of the entry, until all of the men working on the return of that current have been withdrawn. The gas should then be removed by starting a line of brattice from the outby corner of the last crosscut at the head of the entries and extending this gradually toward the face. As this brattice is extended, time should be given for the air current to sweep away the gas. Only safety lamps should be used in performing the work. While this test is being performed, every approach to the return current should be carefully guarded to prevent anyone entering the return airway with an open light or unwarned. If necessary, the air current should be increased sufficiently to enable the complete removal of the gas.

Ques.—Is it possible to increase the quantity of air circulating in a mine, without increasing the power producing the circulation; and, if so, by what means may this be accomplished?

Ans.—Yes. Without increasing the power producing the circulation, the quantity of air passing through the mine may be greatly increased by cleaning up the airways and removing every obstruction to the passage of the air current; also, by shortening the distance the air must travel; also, by splitting the air current one or more times, as this is found to be practicable. Wherever this is required, the crosscuts or breakthroughs should be enlarged to the full size of the entry, and all leaky doors, stoppings, brattices and air bridges made airtight.

Coal and Coke News

Harrisburg, Penn.

Final argument was heard recently, in the Dauphin County Court, in the mandamus proceedings brought against the chief of the Department of Mines on the issuing of certificates of eligibility to some of the men recommended by the mine foremen's examining boards, and in the injunction case brought by the United Mine Workers against the Chief of the Department of Mines from issuing certificates to certain men, who they allege never had actual experience at the face.

Involved in this suit is the question, whether the term "five years' practical experience as a miner" means five years' employment inside the mines, as was interpreted by ex-Attorney General Elkin (now Chief Justice of the Supreme Court) and by Attorney General Bell, during the early part of the year, or does it mean five years in the actual cutting of coal?

At the hearing held on Sept. 25, expert witnesses testified that the term "miner" in the anthracite region means the man who gets out the coal, but did not confine their opinion strictly to the cutting or blasting of that mineral.

Ex-Judge Shay argued that the court had no jurisdiction in the case, as it could not go behind the recommendations of the board appointed by the court, and cited the case brought by Thomas Reese against the Mine Inspectors' Examining Board of Schuylkill County, in which case the court decided it had no power to change the decision of the board. He also argued that the duties of the Chief of the Department of Mines were purely ministerial and that he had no right to hold up the certificates of the men recommended by the several boards, which is now being done until a decision is handed down in the injunction case.

Ex-Congressman Reilley, representing the United Mine Workers, argued that the word practical means a man who actually cuts the coal at the face, and that even expert witnesses testified that a man should have at least two years' experience at cutting coal at the face before becoming mine foreman. He stated that 70% of the fatal accidents in the anthracite mines occurred at the face, and that it is the man with the experience of cutting coal at the face that should become the mine foreman, so he would know how to advise and look after the man who is doing the most dangerous work, and the operator whose property he is in charge of, also to safeguard the people on the surface, who are liable to be affected by mine caves, due to an incompetent mine foreman.

Mr. Reilley also quoted as follows an article from one of the annual reports of the Chief of the Department of Mines, as to who should become mine foreman:

"One of the most important officials in the anthracite coal mines is the mine foreman. The welfare of the mining interests depends largely upon the vigilance, care and efficiency of these officials, and when they are incompetent, they are a menace to the lives of the miners and the property of the operators. The mine foreman should be qualified for his position, not only by practical experience in mining coal, but by experience in the other branches pertaining to mining operations. He should also be a man of good character and of necessity he must possess a high average of intelligence in order to pass the examination required by law—an examination that is or ought to be as stringent as a Governmental Civil Service examination. The mine foreman, it may be stated, is the only mine official of whom the law demands proof of qualification to perform the duties of his position; and in view of the responsibility that attaches to his position it is to be regretted that the examining boards are not more careful in passing upon the candidates for this office."

The attorneys for the United Mine Workers in their argument claimed that the interpretation of the law as given by the attorney general conflicts with the miner's certificate law which reads that a man must have at least two years' experience at the face before he can get a "miner's certificate" and in view of this law, that the legislature intended the word "practical" to mean the actual cutting of coal at the face. In reply to this Judge Shay stated that if that were the intention of the legislature, then the governor would have to go down into the mine and up to the face of the breast to select a chief for the Department of Mines, for the qualification of this office calls for "10 years' practical experience as a miner."

An early decision is expected in the case.

PENNSYLVANIA

Anthracite

Scranton—Headed by Rev. Roderick MacEachon, a Catholic priest who is active in the affairs of the local in which he has held membership for years, a delegation of union miners from eastern Ohio was recently in Scranton to confer with President John T. Dempsey and Secretary-Treasurer John M. Mack of the first anthracite district.

The miners of eastern Ohio have been on strike for months and appeals for aid are being made throughout the jurisdiction of the United Mine Workers of America. Miners from the Lehigh region contributed $3000.

Danville—The coal dredging season, the best in many years, is drawing to a close and already some of the dredges have ceased operating for the year. The first rise in the Susquehanna River will probably put an end to all the operations. The exceptionally fine season is due to the fact that throughout the summer there were frequent rains and as frequent rises in the river, with the result that the coal was brought down in large quantities.

Dupont—The officials of the Hillside Coal & Iron Co. have warned the property owners at the intersection of Ford and Williams Sts. that a cavein is expected. Ford St. is closed to traffic and employees of the Butler colliery erected fences at the Williams and Broad St. entrances. The residents have been warned to keep little fire in their stoves in case the settling may disturb their homes. Several weeks ago a cave occurred on Williams St. and carried down the tracks of the Scranton Traction Co. together with the brick pavement. On Oct. 13 a watchman discovered a cave in the Delaware & Hudson R.R. in Judge's Cut. It was about 40 ft. long and let down the northbound tracks several feet. Cars of ashes were rushed from Scranton, the hole filled, and traffic was resumed in a few days.

Port Bowkley—Considerable damage was done at Prospect colliery of the Lehigh Valley Coal Co., on Oct. 15, when the sheave wheel and part of the hoisting tower at the Prospect shaft were partially demolished, due to the cage being hoisted too high. The sprocket chain that runs the hoisting indicator broke and the engineer, who was hoisting a car of coal at the time, thought he could raise the car to the dumping chute in the head of the tower, without the use of the indicator. He mistook the distance and the overwind resulted. While repairs are being made to Prospect shaft all of the coal will be hoisted through the Oakwood shafts.

Shamokin—Six hundred members of the Shamokin and Mt. Carmel Mining Institute, including officials of the Mineral, Susquehanna and other coal companies, held a banquet at Maysville park on Oct. 17.

Audenried—It is feared that the first serious trouble since the signing of the agreement between the operators and men of the Lehigh & Schuylkill district may result from the action of the Lehigh & Wilkes-Barre Coal Co., in changing the powder used and raising the price at its No. 4 colliery.

Freeland—Trouble is said to be brewing between the stripping workers who belong to the United Mine Workers of America, and the steam shovel engineers' union. The latter are reported as having refused to recognize the former as union men despite the fact that they belong to the greatest union in the world. It does not sound reasonable that such a condition should exist when it is a positive fact that the stripping workers are now working for better wages and under better conditions than ever prevailed before they became affiliated with the U. M. W. of A.

Hazleton—By the breaking of a rope attached to the first car being hoisted over an inside plane in the shaft colliery of the Lehigh Valley Coal Co., the car ran away on the plane, dashed to the bottom and injured five men, before they could get out of the way. One of these men, Andrew McKelvey, of Hazleton, died soon after in Hazleton State Hospital from his injuries.

Tamaqua—When the Lehigh Coal & Navigation Co. agreed to reinstate four men discharged at the No. 11 Colliery pending a settlement of the grievances, 500 employees who went on strike recently returned to work.

Wilkes-Barre—The slate pickers of the Nottingham Colliery of the Lehigh & Wilkes-Barre Coal Co. recently went on strike for a longer work day, tying up the operations of the colliery. The breaker has been working on an eight-hour schedule, and the boys complain that their pay was too small.

Exchange—It is reported that a coal bed has been discovered on the farms of T. C. Dennis and William C. Houghton. This measure was discovered during well digging operations. It lies at a depth of between 70 and 80 ft. and ranges between 3 and 4 ft. in thickness. Preliminary tests go to show that it is a fair grade of anthracite.

Bituminous

Indiana—Austin Swartz recently transferred to the Operators' Coal Mining Co., of Johnstown, something over 135 acres in Wheatfield Township. This is a part of the coalfield that is now being developed by the Conemaugh Smokeless Coal Co., near Seward.

Connellsville—The coke trade has reached the lowest point of the year with shipments of 244,000 tons per week. Each coke seller is anxious to retain such trade as he has, and any extra coke that may be required is readily arranged for without a general inquiry being made. The coke market is, however, in apparently no worse condition than the local pig iron market which is entirely stagnant.

WEST VIRGINIA

Charleston—The Hitchman Coal & Coke Co. has announced its intention of making a special effort to have the Supreme Court of the United States review the action of the Circuit Court of Appeals in reversing the holding of the district court to the effect that the United Mine Workers is an unlawful organization. Judge Dayton, of the Federal district court of West Virginia, enjoined W. B. Wilson, now Secretary of Labor, and other officials of the United Mine Workers, from attempting to unionize the mines of the company named, on the ground that the organization was intended for an unlawful purpose. This holding was reversed on appeal, and while the coal company has no right of appeal, under the circumstances of the case, it believes the matter is sufficiently important to be passed upon by the Supreme Court, which may, in its discretion, review the case if it so desires.

The list of fatalities in the coal mines of West Virginia during the month of September shows that 30 miners lost their lives during the month, this being a decrease of 2 from the previous month. Falls of coal and slate were responsible for 16 deaths, nine were due to mine cars, three to motors, one to electrocution, and one man was killed by a railroad car at the tipple. Many of these accidents were caused by the carelessness of the men themselves, a lack of discipline on the part of the employees being responsible. Mine foremen are especially urged in the letter accompanying the report from the chief of the Department of Mines to give more attention to conditions at the working face and insist upon proper timbering.

The eyesight of all foremen and fire bosses in West Virginia is being tested so that they will be fully qualified to detect gas in any place in the mine which they may examine. An order to this effect was recently issued by Earle A. Henry, chief of the mining department, after a conference with coal operators throughout the state. The operators fully approve of Mr. Henry's ideas and advised him to issue the order, they promising their hearty coöperation.

Huntington—According to records of the Chesapeake & Ohio R.R., West Virginia and Kentucky coalfields for the first 13 days of October loaded 50,000 tons in excess of the amount loaded during the same period of last month. A total of 904,010 tons of coal was loaded from Oct. 1 to 13, inclusive, an increase of 50,165 compared with 853,845 tons loaded during the same period of last month. It is believed that should no unforseen contingency arise, the coal loading record will be broken this month.

Wellsburg—One of the largest coal deals ever consummated in Brook County was completed recently when Joseph and James Guida, operating under the name of Guida Brothers, sold their interests outright to Stephen Ertle of Pennsylvania and Leonard Wolfe of Brilliant, Ohio. The purchasers will continue to operate the mine. The coal property involved brought $100 per acre.

Bluefield—Judge H. C. McDowell in the Federal District Court in Lynchburg, recently entered a decree in accord with the recent mandate of the United States Circuit Court of Appeals at Richmond, awarding Mrs. Ollie H. Browning the sum of $61,875 in unpaid royalties and $96,816.75 unpaid purchase money for Tazewell County, Va., coal properties which have been in litigation in the Federal District Courts for several years. The decree was entered in the suits of Thomas Boswell against the Big Vein Pocahontas Coal Co. and the Colonial Trust Co., of Baltimore, against the same defendant.

KENTUCKY

Middlesboro—E. P. Nicholson and F. D. Hart, Jr., have announced that they have taken over the Low Ash Coal Co.'s property located near Excelsior, Ky. This is a shaft mine, one of two in this district, and opens into the Bonner seam, which yields a fine grade of coal. They are experienced operators and expect to begin shipping in a few days.

Central City—Some 600 miners in the employ of the Central Coal & Iron Co., in the mines both here and in Ohio County, were out of work for some time recently as a result of a disagreement between the union miners and officers of the company. The Central City mine previously was closed down for three months while a new tipple was in course of construction and other improvements under way at a cost of $50,000 and resumed work for only a short time before the disagreement developed. The Central company is not a member of the Western Kentucky Coal Operators Association and it therefore was not in position to arbitrate the differences with the Mine Workers. Work was resumed pending settlement.

OHIO

Warnock—The Youghiogheny & Ohio Coal Co.'s store at Warnock was recently robbed by two foreigners who are said to be miners. The robbery was not discovered until the store was opened in the morning, when it was immediately closed until bloodhounds could be brought from St. Clairsville. The dogs had but little trouble in finding a trail and soon took the sheriff to a house where the loot from the store was found, together with the two foreigners.

Glouster—A call has been been issued for a meeting of the miners of the Sunday Creek Coal Co. and the Pittsburgh Coal Co., to take place on Saturday, Oct. 31, for the purpose of agreeing upon some uniform system of weighing which will be in accordance with the provisions of the Ohio screen law. A straight run-of-mine system is desired, as at some mines a double draft system is used and at others a percentage is added to the screened lump. The miners assert that they agreed temporarily to permit the use of a weighing system other than that prescribed by the Green law, but that the operators have had time to comply with the law by this time.

ILLINOIS

Sparta—George and John Wilson, formerly connected with the Eden mine here, have leased the mine of the Boyd Coal & Coke Co. from the estate of W. R. Borders, who formerly operated it, but who lost his life in the Athletic Club fire in St. Louis the early part of the present year. The mine is being pumped out, and arrangements made for operation within the next 30 days.

Willisville—As a result of a feud between American and Italian miners at this place, which came to a head on the street here a week ago, two Americans and two Italians were killed. Feeling runs high, but the authorities contend that they can maintain peace.

Edwardsville—The Home Trade Co. of Edwardsville is the first coal mine in the United States to announce that Eagle trading stamps will be given with coal purchased at the mine. George D. Worden, superintendent of the mine, is determined to give this scheme a thorough tryout.

Livingston—Madison County has one of the largest and perhaps the greatest producing mine in Illinois. This is the mine of the New Staunton Coal Co. at Livingston, of which Thomas Hevenstreit is superintendent. During last year the mine worked 192 days and 7 hr. and averaged 4196 tons daily. The first two weeks of September this year showed an average of 4481 tons per day, and the last two weeks 4582 tons.

De Camp—The De Camp coal mine was recently sold by the master in chancery, Thomas T. Brewster of St. Louis, general manager of the Mt. Olive & Staunton Coal Co., bidding in the property. The latter would not disclose the identity of the purchaser for whom he was acting. Besides the actual coal mine equipment and coal rights to between 250 and 300 acres of land, the purchaser is also to receive 8 four-room cottages, and a two-story building suitable for use as a hotel or a boarding house.

MICHIGAN

Owosso—The Findley Coal Co., of Bay City, has secured control of the mines in New Haven Township, six miles north of Owosso, and is pumping out the shafts preparatory to resuming operations. These mines have not been operated successfully for 15 years. The Ann Arbor R.R. recently constructed a spur to them.

COLORADO

Denver—President Wilson is considering the advisability of withdrawing Federal troops from the Colorado coal fields as the result of the deadlock with the operators who refused to give approval to the President's plan for settlement of the strike. Governor Ammons is believed to be reorganizing the Colorado National Guard in order to make the presence of the Federal troops unnecessary.

WYOMING

Buffalo—The Owl Creek coal mine, which has not been worked recently, is on fire. Considerable volumes of smoke are issuing from the slope and the heat can be felt on the surface. This mine is valued at $300,000 and it is feared that it may be a total loss. Spontaneous combustion is supposed to be responsible for the fire.

PERSONALS

W. H. Blaney, of Cannelsville, Ohio, recently purchased a controlling interest in the Corning Mining Co.

John Turnbach has tendered his resignation as superintendent of the C. M. Dodson & Co. collieries at Bever Brook and Morea.

Joseph Tumkolkski, who was recently buried under a fall of coal in the Ebervale mine of the G. B. Markle Co., was rescued alive after six hours of entombment.

A. S. Tingley, a traveler with the Chapman Mining Co., has been made Ohio representative of the Commercial Coal Co. of Detroit. His headquarters will be in Columbus.

R. V. Norris, a consulting engineer of Wilkes-Barre, Penn., recently read a paper entitled the "Conservation of Anthracite Coal," before the engineering society of Wilkes-Barre, at the club room.

J. W. Reed, formerly mine inspector for the Consolidation Coal Co. in the Elkhorn District, has taken up his duties as Assistant State Mine Inspector. He was recently given the appointment by Governor McCreary.

Secretary B. F. Nigh, of the Michigan-Ohio-Indiana Coal Association, in his report for the month of September shows that in all 19 cases of freight collections were settled for the members of the association, which is the best month in the history of the organization.

A. Watts, one of the pioneer mine workers of Franklin County, Illinois, and who helped sink the Zeigler mine as well as those at Christopher, has resigned his position as manager of the Christopher mine, after several years of work, in which time he made this property the model mine in southern Illinois.

Effective Nov. 1. F. B. Lockhart of Cleveland, Ohio, president and general manager of the Baltimore & Ohio Coal Co., will be associated with J. H. Hillman & Sons Co., Oliver Bldg., Pittsburgh, Penn. Until other arrangements can be made by the Baltimore & Ohio Coal Co., Mr. Lockhart will continue to act for it as heretofore.

Charles H. Thompson, of Darbyville, Va., vice-president and general manager of the Darby Coal Mining Co. and the Old Virginia Coal Co., and W. J. von Borries, a mining engineer of Louisville, Ky., have leased from the Haly Coal Co. a tract of over 2000 acres of valuable coal land on First Creek of the North Fork of the Kentucky River, in Perry County, Ky., three miles from the Lexington & Eastern Branch of the Louisville & Nashville R.R., and are organizing a company to open and operate two large mines. A railroad will be built to the lease from the Louisville & Nashville.

OBITUARY

John Gallagher, a well known coal man in eastern Ohio and an official of the Ohio and Pennsylvania Coal Co., was killed by a fall of slate recently while cleaning up a mine at Yorkville.

Richard J. Hughes, a former auditor for the Pennsylvania R.R. Co. in Philadelphia, died at his home in Altoona on Oct. 16. He was born in Ebensburg, Cambria County. Mr. Hughes was extensively engaged in the coal business, and was 80 years old.

F. M. Beyea, aged 55 years, of Monroe Ave., Dunmore, Penn., land agent for the Pennsylvania Coal Co., died at his home on Oct. 13, following a stroke of apoplexy, sustained several hours before while riding in a trolley car. His father died in the same manner on an Erie train several years ago.

Charles Sutton, aged 47, a prominent resident of Homer City, Penn., and an official of the Buffalo, Rochester & Pittsburgh Coal & Iron Co., at Luzerne, was fatally injured Oct. 18, when the automobile which he was driving collided with a street car. The glare from the car's headlight apparently blinded Mr. Sutton, and he drove his machine directly into the approaching trolley. He died from the effects of his injuries early on Oct. 19.

PUBLICATIONS RECEIVED

The Canadian Mining Institute Monthly Bulletin No. 29, September 1914. Seventy-one pages, 6x9 in. illustrated.

Department of the Interior, Bureau of Mines, Miner's Circular 16. "Hints on Coal Mine Ventilation," by J. J. Rutledge. Twenty-two pages, 6x9 in., illustrated.

Department of the Interior, Bureau of Mines, Bulletin 76. "United States Coals Available for Export Trade," by Van. H. Manning. Fifteen pages, 6x9 in., with one map.

Department of the Interior, Bureau of Mines, Technical Paper 65. "A Study of the Oxidation of Coal," by Horace B. Porter and O. T. Ralston. Thirty pages, 6x9 in., with numerous curves, drawings and diagrams.

Department of the Interior, Bureau of Mines, Bulletin 83. "The Humidity of Mine Air with Special Reference to Coal Mines in Illinois," by R. Y. Williams. Sixty-nine pages, 6x9 in., with numerous tables, curves, and illustrations.

West Virginia Geological Survey, County Report for 1914, "Preston County." Cloth-bound volume of 566 pages, containing many halftones and tables. This volume is accompanied with a case of three maps showing the region in question.

The University of Illinois, Engineering Experiment Station, Bulletin No. 75. "Thermal Properties of Steam," by G. A. Goodenough, 69 pages, 6x9 in., with numerous curves. In this bulletin is described the development of a general theory of the properties of superheated and saturated steam. The equations employed are true throughout a range from 32° to 600° F., or a far wider limit than is at present employed in engineering practice.

TRADE CATALOGS

Morgan Gardner Electric Co., Chicago, Ill., Catalog 57, "Mining Locomotives." Forty pages, 10x7 in. illustrated.

Morgan Gardner Electric Co., Chicago, Ill., Catalog 55. "Continuous Coal Cutters." Thirty-two pages, 10x7 in., illustrated.

The Goodyear Tire & Rubber Co., Akron, Ohio. "Mine Equipment, Belting, Packing, Hose, Valves." Twenty-eight pages, 3½x6¼ in.; illustrated.

The Walter A. Zelnicker Supply Co., St. Louis, Mo. Bulletin No. 159, September, 1914. "Opportunities in Used Equipment." Eighty pages, 3¾x8¼ in.; illustrated.

Manistee Iron Works Co., Manistee, Mich., "Centrifugal Water Pumps, Rotary Jet Condensers and Air Pumps." Seventy-two pages, 8x10½ in. illustrated.

Link Belt Co., Philadelphia, Chicago, Indianapolis. "Link Belt Locomotive Cranes." Thirty-eight pages, 8½x11 in., illustrating the adaptation of the locomotive crane to the handling of various materials.

RECENT COAL AND COKE PATENTS

Smoke Precipitator. C. W. Lent, Byron, Calif., 1,103,304. July 14, 1914. Filed May 26, 1913. Serial No. 769,836.

Locomotive Stoker. N. E. Gee, Altoona, Penn., 1,103,406. July 14, 1914. Filed Oct. 15, 1912. Serial No. 725,960.

Furnace Grate. F. L. O. Wadsworth, Sewickley, Penn., 1,103,232. July 14, 1914. Filed Sept. 30, 1912. Serial No. 723,075.

Furnace for Boilers. R. F. Sturrock, Dundee, Scotland, 1,103,098. July 14, 1914. Filed Mar. 12, 1912. Serial No. 683,353.

Water-tube Boiler. W. D. Hoxie, assignor to Babcock & Wilcox, Bayonne, N. J., 1,102,407. July 7, 1914. Filed Jan. 12, 1912. Serial No. 670,750.

Boiler Arch Construction. E. P. Stevens assignor to Locomotive Arch Brick Co., Chicago, Ill., 1,103,447. July 14, 1914. Filed June 28, 1913. Serial No. 776,234.

Safety Apparatus for Mining Cages. S. W. Richardson and W. Stavely, Hokitika, New Zealand, 1,103,841. July 14, 1914. Filed May 7, 1913. Serial No. 766,180.

Process and Apparatus for the Treatment of Coal and Shale in Vertical Retorts. A. Waddell, Dunfermline, Scotland. 1,103,112. July 14, 1914. Filed Sept. 11, 1913. Serial No. 789,306.

CONSTRUCTION NEWS

Indiana, Penn.—Work has recently been started on the survey on the Calderwood farm for a new coal opening.

Bakerstown, Penn.—The Sterling Coal Co. is putting into service two 12-ton barsteel locomotives recently ordered from the Westinghouse Electric & Mfg. Co.

Raven Run, Penn.—The Girard Mammoth Coal Co. recently ordered another 12-ton Baldwin-Westinghouse locomotive in order to handle its haulage problem more efficiently.

Charleston, S. C.—Work has been begun on the half million dollar coal plant which the Southern Ry. is erecting on the Cooper River, in the rear of Magnolia Cemetery.

Barnesboro, Penn.—The new tipple at the Marion mine of the Madeira-Hill Coal Mining Co. has recently been completed, and coal is now being shipped from the new structure.

Wilkes-Barre, Penn.—The Mill-Creek Coal Co. has awarded to C. K. Schupp of Wilkes-Barre, a contract for a large stripping operation, which will uncover thousands of tons of coal.

Johnstown, Penn.—H. E. Northens, of Johnstown, has purchased, with others, 63 acres of coal land at Bull Creek, near Tarentum. A modern tipple is to be erected at the mine which will be opened soon.

Mt. Carmel, Penn.—The Westinghouse Electric & Mfg. Co. recently received an order for four 10-ton barsteel locomotives from the Philadelphia & Reading Coal & Iron Co., to be placed in service at the latter's Alaska colliery.

Athens, Ohio—The Hocking Power Co. is busy on the construction of the pole line which will carry its distributing system from the Floodwood power station to the various mines and towns which will take current therefrom. The machinery is all in place, and it is expected shortly that the latter will be put in operation.

Lansford, Penn.—The Lehigh Coal & Navigation Co. is installing at Nesquehoning and Seek, Penn., two 250-hp. Westinghouse synchronous motors direct connected to air compressors which replace steam driven units. The current for these installations comes from the Hauto plant of the Lehigh Navigation Electric Co.

East Liverpool, Ohio—The Sugar Camp Coal & Clay Co., headed by J. J. Smith, who has for many years been connected with the Pittsburgh Coal Co., has taken leases on 500 acres of land extending from the eastern corporate limits of Chester up the river to Mill Creek. A corp of mining engineers was recently started at the work of testing out and proving the coal deposits.

NEW INCORPORATIONS

Hartford, Ark.—The Blackburn Coal Co. has been incorporated here, with Lillie Blackburn, president, W. A. Blackburn, vice-president, and C. M. Blackburn, secretary and treasurer.

Chicago, Ill.—The East Kentucky Coal Co. has been organized to develop 2500 acres of coal land near Richardson, Ky. The daily output of the mine will be 2000 tons.

Tacoma, Wash.—The Cassidy Coal Mine Co. has been organized at Tacoma with a capital stock of $1,000,000, by J. L. McMurray and R. L. Sherrill. W. D. C. Spike is attorney.

Bramwell, W. Va.—The Cooper-Pocahontas Coal Co. has been organized with a capital stock of $70,000 for the purpose of operating coal mines in southeastern West Virginia. The incorporators are W. B. Honaher, of Matoaka, E. Cooper, C. H. Thomas, and W. A. Thomas, of Bramwell, and J. G. Thomas, of Mullins.

INDUSTRIAL NEWS

Penowa, Penn.—The Waverly Coal & Coke Co. has opened a new mine at Penowa, which, when developed, will give employment to several hundred men. William Fleming, of Virginville, W. Va., is superintendent of the new operation.

Moundsville W. Va.—An important coal deal was recently consummated at Moundsville, eastern Ohio operators securing a controlling interest in the Parrs Run mine. This mine is in operation, and will be continued so, the coal going to the markets formerly supplied by the territory across the river.

Scranton, Penn.—An agreement has been entered into between the Northern Coal Co. and the supervisors of Fell Township, whereby the company is to build and maintain the township roads in lieu of road taxes. The company has been taking care of the roads for years, and the arrangement has always worked satisfactorily.

Columbus, Ohio—The Hocking Valley Ry. Co. has asked permission of the State Public Utilities Commisison to issue $4,000,000 of one year 6 per cent. gold notes, the proceeds to be used in refunding a similar quantity of outstanding notes due Nov. 1. The company stated that it was unable to indicate what price it would be able to get for the issue, on account of the financial situation.

Toledo, Ohio—The receivers for the Cincinnati, Hamilton & Dayton R.R. Co. have filed a petition in the United States District Court to secure authority to transfer a portion of the holdings of the company in the Toledo Terminal R.R. Co., of Toledo, to the Hocking Valley Ry. Co. and the Toledo & Ohio Central R.R. Co. The object is to equalize the holdings of the railroads entering Toledo in the terminal belt line.

Washington, D. C.—The Alaska coal land leasing bill, revised at the instance of the President and Secretary Lane as part of the Administration's program for this session, awaits only the President's signature to become law. This bill is designed to open by a system of leases under competitive bidding the immense coal resources of Alaska, tied up for the last 8 years. Pending claims will be adjusted within 12 months.

Columbus, Ohio—Clarence D. Laylin, assistant to Attorney General Hogan of Ohio, has filed a petition in the United States Supreme Court asking for the dismissal of the application now pending for a restraining order against the operation of the Ohio anti-screen law. The case was brought to the attention of the court at the last term when an application for the interlocutory injunction, filed in the U. S. District Court in northern Ohio was denied.

Scranton, Penn.—An order was recently issued for a parade of the mine workers to take place on Mitchell Day, Oct. 29, in the city of Scranton. The parade will begin at 1:30 o'clock and there will be a mass meeting immediately after in the baseball park. Addresses will be delivered by former president, John Mitchell; Stephen MacDonald, John P. Dempsey, Joseph Yaunis, and Alex. Kupstas. This will be the 14th anniversary of Mitchell Day.

Cairo, Ill.—The tow boat "Joseph B. Williams" was recently destroyed by fire at this point. When this vessel was built she was the largest craft of the kind in the world, and remained so until the steel-hulled tow boat "Sprague" was built for use on the Mississippi River. The "Joseph B. Williams" held the record of being the biggest wooden-hulled tow boat in existence until her destruction. She was built at Freedom, Penn., in 1876. She was 252 ft. in length, with a beam of 52 ft., and belonged to the Monongahela River Coal & Coke Co.

Columbus, Ohio—That Columbus is expected to become a great coal and ore center is suggested by the vast constructural program being pushed by the Hocking Valley and the Chesapeake & Ohio railroads. The city will be the terminus of a new line being built by the latter road as an outlet for the coal fields of West Virginia, Kentucky and Ohio. It will also be the transfer point in a scheme for the distribution of these fuels, and also the ores from the Northwest. The new road will connect with the Hocking Valley, which latter will double-track its line northward to the Lakes.

Coal Trade Reviews

General Review

Anthracite trade slowing up, due to the warm weather, and concessions on the circular are freely offered. Further restrictions and cancellations are the features of the bituminous market. Practically no spot demand.

The anticipated active business, succeeding the cold spell of early September, has failed to materialize because of the return of higher temperatures. The slowing up applies more particularly to the retail end, the wholesale business still being in a healthy condition; in fact, were it not for the mild season there would already be considerable anxiety about getting cargoes forward. The individuals are offering concessions down to as low as the May circular on some grades, while occasional cancellations are noted, and a continuance of the summer-like weather may necessitate a curtailment in mining operations. The heavy pressure for stove coal has entirely disappeared and straight cargoes of any reasonable amount are now readily available at the circular.

Further recessions are noted in the bituminous market in spite of the fact that it has been repeatedly felt that the bottom had been reached. Restrictions and cancellations on contracts are noted, while demurrage coal is beginning to appear, and there is a complete absence of any spot demand. The export business has been particularly disappointing. There are still some inquiries for foreign shipments, but the movement over the piers is light and confined almost entirely to contracts; exports are practically nothing insofar as any relief from the prevailing depression is concerned. Accumulations at the large distributing centers are reaching larger proportions, and the only thing that prevents a heavy slashing of prices is the general conviction that even this would not stimulate any buying.

The Pittsburgh situation continues in a distressing condition and there is no change in sight, with the exception of the coming close of navigation on the Lakes. Canadian business still remains abnormally flat, and the difficulty in moving slack continues one of the most serious problems for the time being. A more favorable movement in the Lake trade of Ohio has helped the situation there, especially as it was expected there would not be enough business to finish up the season. But in other lines, the outlook is most discouraging. The warm weather and curtailed steam consumption, due to the general heaviness in all lines of business, have reduced the demand to practically nothing.

The Southern market is under heavy pressure and the outlook is regarded as most discouraging; the market is even worse, if anything, and operations are heavily restricted. In the Middle West, a slight improvement is noted in spots, due to an occasional cool day creating a mild rush for coal. But on the whole, the October weather has been distinctly adverse to a good coal consumption, and the steam fuels are not being taken so well. One encouraging feature is that the producers were successful in resisting a determined effort on the part of the buyers to break the screenings market.

ATLANTIC SEABOARD

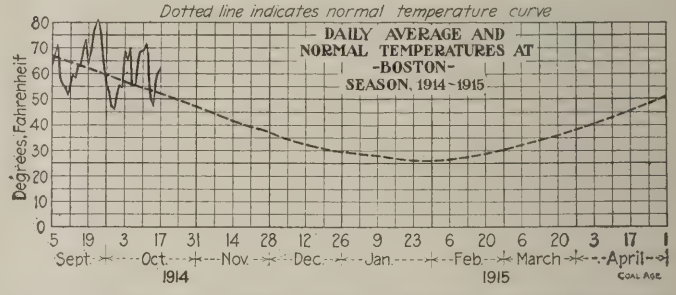
BOSTON

Pocahontas and New River situation critical. No spot market anywhere; contractors backward in taking coal. Slight improvement in demand for Pennsylvania grades. Georges Creek dull.

Bituminous—The export market having dwindled to small proportions, the Pocahontas and New River shippers are facing a rather critical time. Contractors are not taking anything like their normal requirements for October and there is no spot market anywhere. Cargoes here on the market meet with no response at all and there are several that have been awaiting disposal for ten days or a fortnight. Meanwhile, the volume on hand at the Hampton Roads loading ports continues to increase rather than diminish. If it were not for the conviction on the part of selling agents that even a radical cut in prices would not bring results, the $2.85 figure would have been seriously slashed. Efforts have been made looking to a general curtailment at the mines but it is too soon to expect any results.

Trade is somewhat improved for the better grades from Pennsylvania, especially in the all-rail sections. From Philadelphia there is a fairly steady movement in conjunction with anthracite shipments but the tonnages are small. Prices are fairly steady on all the coals that are favorably known.

Georges Creek is beginning to share the situation of Pocahontas and New River, so far as seeking orders is concerned, but f.o.b. prices remain firm at the contract figure.



Anthracite—The warm weather has had a depressing effect on retail trade and new business is rather slow coming in. The wholesale trade, however, is in a healthier state and with most of the shippers there is a little delay in getting cargoes cleared. Stove size is still in short supply, which is the reason for most of the slow dispatch.

Retail prices in Boston on bituminous were advanced Oct. 19, from $4.65 to $4.90 net ton, delivered. Anthracite screenings are quoted at $3.25.

Bituminous prices at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.90@1.50	$1.25@1.65	$1.67@1.77	
Philadelphia*.....	2.15@2.80	2.50@2.90	2.92@3.02	
New York*.....	2.40@3.10	2.80@3.20	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.....	.....	.....	.....	$2.80@2.85
Boston†.....	.....	.....	.....	3.60@3.78
Providence†.....	.....	.....	.....	3.63@3.73

* F.o.b. †On cars.

NEW YORK

More cancellations of bituminous orders and a further general contraction. Mining operations heavily curtailed. Anthracite under pressure due to the mild temperatures. Stove coal now plentiful.

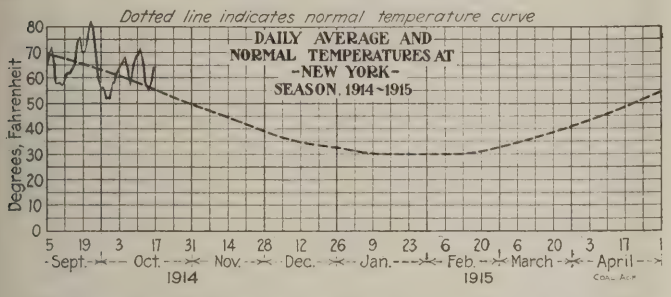
Bituminous—Even the most cheerful optimists are discouraged over the current situation in soft coal. Though not hopeful of any immediate improvement, it has been felt for some time that the situation would not contract any further, but the trade has experienced a severe disappointment in this respect. The past week has witnessed heavy cancellations, domestic consumers apparently restricting orders still further, while the general manufacturing and steam demand is notably reduced. There is practically no spot demand whatever, and the movement on contract is only fair. The necessity on the part of sellers to exert some pressure as regards credits is further aggravating the situation.

Operations in the mining regions are down to half capacity, and it is now agreed on all hands that the current situation could scarcely be worse. The only features of a constructive nature are the comparative absence of demurrage coal and the excellent manner in which prices are being maintained. Operators are rigidly curtailing production, so that accumulations are relatively insignificant considering conditions, while prices continue at a profitable figure, probably more because it is fully realized that concessions would not be productive of any results.

Occasional sales are reported at off figures, but the nominal market is not quotably changed from the prevailing level of the past few weeks, which we quote as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—A continued absence of the customary cool fall weather has exerted a depressing influence upon the

hard coal market. The effects of this are being felt particularly in the line trade, and this has resulted in diverting an excessive tonnage of the individual prepared grades to Tidewater. Egg coal is suffering particularly, it being almost impossible to move it even when offered down to the full May circular. The heavy pressure for stove coal has also eased up notably, straight cargoes being readily obtainable at the circular. Nut coal is about normal.



Pea coal is moving rather freely, but the smaller sizes are heavy and difficult to dispose of. All the local dealers are complaining of the adverse weather conditions, and are anxiously awaiting lower temperatures. There are considerable tonnages going to Down East points, vessels being plentiful, with rates about normal. There are persistent rumors current to the effect that a move is on foot to advance the price of stove coal to the same as chestnut. No confirmation of this can be obtained at this time.

The New York hard coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.65@5.10	$5.05	$4.60@5.05
Egg	5.35	5.10@5.35	5.30	4.85@5.30
Stove	5.35	5.35	5.30	5.30
Chestnut	5.60	5.50@5.60	5.55	5.45@5.55
Pea	3.55	3.45@3.55	3.50	3.40@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.25@2.75
Rice	2.30	2.05@2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.70@1.80	1.75	1.55@1.75

PHILADELPHIA

Anthracite inclined to lag, owing to unseasonable weather conditions. Partial suspension is expected, unless conditions change. Companies hampered with small sizes. Depression still marks bituminous situation, with little prospect of improvement.

Anthracite—The unseasonable weather has depressed the anthracite trade. It was expected that the month of October would compare favorably with the year previous, when uninterrupted operations were the rule and all sizes from broken to barley, found a ready market. Retailers who were induced to take on coal during the flurry late in September, still find themselves in possession of a good supply. The summer-like weather has restricted new business, many orders being cancelled, and the dealers are rather loth to take on additional supplies, until there is some prospect of disposing of what they have.

Outside of stove coal, the market is long on the other sizes. It is particularly hampered with the small grades which will not commence to move until the furnaces of the large apartment houses, hotels and office buildings are placed in operation. The individuals are also making things interesting for the large companies by substantial concessions on all sizes, but even at that, it is understood that the volume of business they are doing is not great. Unless conditions materially change, a curtailment in output is looked for.

Prices at Tidewater are about as follows:

	Circular	Individual
Broken	$4.75	$4.50
Egg	5.00	4.90 @ 5.00
Stove	5.00	5.10
Chestnut	5.25	4.80 @ 4.90

Bituminous—There is a depressed feeling in the trade. While considerable coal is moving on contracts, the spot business amounts to nothing at all, and the prospects for improvement are not satisfactory.

BALTIMORE

Bituminous market very flat. Industrial curtailment hits fuel business locally. Anthracite fairly satisfactory.

Anthracite is the best feature of a poor fuel situation generally. A slowly awakening demand on domestic account is being noted, and steaming coals, while in poor call, are not losing any ground and it is felt that purchasing for heating purposes can not be delayed much longer. Since Oct. 1 the trade has merely waited for cold weather.

There is little encouragement to be found in the soft-coal market. In West Virginia and Pennsylvania many mines are still on a heavily curtailed basis. Car supply is more than sufficient under the existing circumstances. Cheap fuel is noted in all directions. West Virginia steam coals are selling around 80 to 90c. and three-quarter gas is freely offered around 90c. Slack holds its own at about 40c. The best Pennsylvania coals are still commanding $1.35, but sales are relatively small. Lower grades are struggling along at from 95c. to $1.15, with numerous partial cancellations reported.

The export trade will be about a fair average for the month. From charters now contracted, November seems likely to see another increase.

HAMPTON ROADS

Coastwise shipments from Hampton Roads fair. Foreign movement light and bunkering demand less than normal.

Coastwise shipments are only fair, while the movement foreign has been light and dumpings are consequently not showing up so well. So far as can be ascertained, practically all coastwise cargoes have been on contract and the foreign shipments are cargoes which were sold some weeks back. There are some inquiries in the market from foreign buyers but no reports have been made of any large spot sales for either coastwise or foreign shipment. There has been a fair movement of bunker coal, considering the war conditions, but it is not up to usual tonnage.

Prices on all grades remain about the same as they have been and although the supply of coal in the railway yards is perhaps still above normal, there is little prospect of any cut being made.

Of the cargoes cleared during the week the schooner "E. Starr Jones" took 1350½ tons for San Juan, Porto Rico. Large cargoes seldom move from Hampton Roads to Porto Rico, the average movement being by schooner and in small parcels.

COAL CHARTERS

The "Journal of Commerce" reports the vessel situation as follows:

Full cargo steamers are in good demand for October and November loading, particularly neutral boats, and as the supply available for prompt loading is exceedingly light, rates are decidedly strong and in some trades are quotably higher. The greater part of the prevailing demand continues to come from shippers of grain, coal and other cargo to transatlantic destinations, and there is also an increased demand for boats for South American business. A considerable number of boats were closed for grain and coal to Mediterranean ports and two neutral boats for coal to the River Plate, the rates in all cases being equal or better than the last previous fixtures of the kind. The sailing vessel market continues exceedingly slow in all trades and but little was done in chartering. Rates remain unchanged and the supply of available vessels is more than sufficient for the limited needs of charterers.

Coal charters have been reported as follows:

Vessel	Nationality	From	To	Tons	Rate
Bayard Barnes	.....	Newport News	Cay Francis	954	....
George F. Scannell	.....	Philadelphia	St. Croix	475	....
Humarock	.....	Philadelphia	Galveston	399	....
Clara E. Randall	.....	Philadelphia	New Orleans	863	....
Sylvia C. Hall	.....	Philadelphia	Jacksonville	285	....
F. A. Allen	.....	Philadelphia	Eastport	462	....
Lewis H. Goward	.....	Philadelphia	Porto Rico	1954	....
Margaret Thomas	.....	Philadelphia	Porto Rico	1161	....
Greenwich	British	Baltimore	Genoa	1878	....
Alderney	Norwegian	Baltimore	Havana	1970	....
Westerdijk	Dutch	Virginia	Montevideo	1988	....
Epsilon	Dutch	Virginia	Montevideo	2015	....
Primo	Italian	Virginia	West Coast Italy	2245	....
Adda	Italian	Baltimore	West Coast Italy	2179	....
Emanuel Accame	Italian	Baltimore	Savona	2175	....
Dagland	Norwegian	Philadelphia	Sagua	684	....
Egda	Norwegian	Philadelphia	Havana	1610	....
Elisha Atkins	.....	Baltimore	Boston	1049	....

Note—Steamers are indicated by **bold face** type, all others being schooners.

LAKE MARKETS

PITTSBURGH

Market continues quiet and prices irregular, slack still at 40@50c. Operations at about 50% capacity and Lake shipments likely to decrease soon.

Demand from retail dealers has been lighter the past week, on account of warmer weather. The dealers evince no disposition whatever to stock coal, and are buying merely as they distribute. Manufacturing demand shows little change, and there is no prospect of any improvement in this direction. The steel mills are constantly reducing their output. While their production is stated to be about 50% of

capacity the coal consumption is more than 50% of full requirements since coal consumption does not decrease as rapidly as output. Lake shipments are approximately holding their own, as compared with September but there are no signs of the long expected final spurt and it is not improbable that shipments will dwindle rapidly after Nov. 1.

Coal production in the Pittsburgh district is at about 50% of capacity, though on the basis of the best rate of shipment attained, operations are perhaps between 60 and 65%, the difference in the proportions being due to the fact that at best the mines are never able to work at capacity on account of car scarcity. Prices are fully as irregular as ever, and an evidence of the market weakness is that slack has shown no tendency whatever to firm up, even though the end of the Lake shipping season is near at hand. Slack is obtainable at 40@50c., or as low as at any time in the season. Excellent grades of coal are obtainable in prompt lots at $1.15 for mine-run, and considerably below this is sometimes done. There is a little talk about circular prices being named for the new selling season, but it will likely be some time before the market definitely shapes itself and it is possible that no definite price announcement will be made. The old circular prices, purely nominal for months, were: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Bituminous dealers believe prices and demand are at the lowest point. Slack very difficult to sell. Fair movement of soft coal. Lake trade drawing to a close.

Bituminous—There is nothing in sight likely to change the condition of the bituminous market except the closing of the Lake trade. It is a little early for that as yet but the making of an excessive amount of slack will soon be at an end for this year and it will then be a question whether the increase in the output of three-quarter will offset the decrease in slack.

The trade in Canada is quite dead; furnaces and factories are largely idle and the weather has been so warm all the fall that very little coal is needed for heating. These conditions will improve somewhat but the trade does not look for anything that will materially advance the price of coal. The prices on bituminous continue at the bottom, where they have been about all the year. Quotations are $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack with slack quite often going at most any price. Allegheny Valley sizes sell at 25c. lower than Pittsburgh. Youghiogheny slack commands a slight premium over almost anything else.

Anthracite—The demand is good, considering the warm weather. Shippers have sold about as much as they commonly do without the aid of cool weather and find that there is a steady improvement in the demand. The local trade is not quite as good as the line business, but it is bound to pick up. The demand for independent anthracite is active, though no premium is obtained for it.

Shipments of anthracite by Lake from this port are in fair quantity, though not by any means what they were last season. For the week they amounted to 104,000 net tons. Reports differ as to the Western anthracite trade. The latest statements are that it is very dull, so that it would be poor policy to rush any more than an ordinary amount in that direction till there is a better movement away from the docks.

CINCINNATI

Demand lighter in all departments and there is little prospect of improvement. The industrial situation is improving very slowly.

The demand during the past week has been even less than during the week before, if possible. Several cool days brought hopes of improvement in the retail trade, but it did not get cold enough and the movement remains very sluggish. Some of the local industrial consumers seem to be again receiving orders, but so far there has been no increase in the steam demand as has been hoped for. On the contrary, there is a marked hesitancy on the part of large consumers to either accept deliveries on contracts or buy spot coal. With both branches of the market in this non-buying humor, the trade seems to be in a deep rut.

COLUMBUS

Domestic trade is quiet due to warm weather. Price list weak but not demoralized. Lake trade continues active but steam grades dull.

Cancellations have been the rule among retailers, whose stocks are generally large. Their bins are full and orders booked for October are either being canceled entirely or shipment is being held up. Demand from the rural districts is small while a larger tonnage is being sold in the cities and larger towns. Retail prices are fairly well maintained despite the weakness. Preference is still being shown for the fancy varieties such as Pocahontas and West Virginia splints. Anthracite is also moving quite freely in Columbus and vicinity.

The Lake market is still active and, on the whole, the best feature of the trade. A considerable tonnage is moving from Ohio mines to the upper Lake ports and congestion on the docks is not interfering to any great extent. Chartering of boats is still going on and there is every indication of an active Lake trade up to the closing of navigation. The Toledo docks of the Hocking Valley Ry. have loaded more than 2,000,000 tons since the opening of navigation in spite of the long suspension.

Production has fallen off because of the unfavorable weather conditions. The Hocking Valley is producing only about 65% of normal and the same is true of Crooksville and Jackson. Massillon and Cambridge is even lower. In the Pomeroy Bend district, which had held up well until recently, the output is estimated at 80% of the average.

	Hocking Valley	Pomeroy	Kanawha
Re-screened lump	$1.76	$1.75	.....
Inch and a quarter	1.60	1.60	$1.50
Three-quarter inch	1.45	1.45	1.45
Nut	1.15	1.40	1.15
Mine-run	1.15	1.15	1.15
Nut, pea and slack	0.30	0.25	0.30
Coarse slack	0.20	0.25	0.20

TOLEDO

Lake movement much heavier during the past few weeks. Warm weather has caused a depression in the domestic market.

The domestic business has been practically at a standstill owing to the extremely warm weather. There does not seem to be any demoralization as yet, it simply being a dearth of demand. The steam business is not showing much improvement due to the fact that the money scarcity has brought about slow business conditions which are felt in every department of business. It was thought that business would improve when the crops began to move but the farmers concluded to hold their products for more money. The Lake trade is the one bright spot; there has been a good movement of coal in this direction, especially at the T. & O. C. docks.

Prices quoted in Toledo are:

	Hocking Valley	Cambridge	Pomeroy	Massillon	W. Va. Splint	Pocahontas
Lump	.....	.....	.....	$2.50	.....	$2.25
Re-screened Lump	$1.70	.....	$1.75	.....	.....	....
Domestic Lump	1.60	.....	1.85	.....	$1.60	....
1½ Lump	.....	$1.40	.....	.....	.....	....
¾ Lump	.....	1.20	.....	.....	.....	....
Egg	1.25	.....	1.35	.....	1.15	2.25
4-in. Block	.....	.....	.....	.....	1.75	....
Nut	1.25	.....	1.25	.....	.....	....
Washed Nut	.....	.....	.....	2.50	.....	....

CLEVELAND

Prices stronger due to the scarcity of coal. Market cleaned up Monday night for the first time in several weeks.

Slack prices have advanced from 5 to 15c. the last few days and spot coal is moving readily at $1.60 to $1.65 with shipment quotations at the higher prices rather than the lower. Even Hocking slack, that a week ago was sold as low as 5c. a ton at the mines, was stronger and high grade nut and slack were quoted $1.55 to $1.60. In this coal the advance is fully 20c. a ton.

Smokeless coals are holding at last week's prices because of the continued warm weather and a good supply. In Ohio and Pennsylvania domestic coals, the trading is at last week's prices, but the market is firm because of the small offerings. More than 200 cars of fine coal and steam size coarse coal came into the city over Sunday. A week ago it could not have been disposed of because of the large amount left on track, but late Monday afternoon the spot coal was all sold and Tuesday receipts were looked for to take care of additional business.

The real reason for the brisk market and the higher prices is the lack of orders for domestic sizes and for Lake shipment. The Lake business is practically over and only boats that can be held two to three weeks at the docks are being loaded. This has resulted in mines curtailing production.

Prices for current shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.75	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.75	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1½ in.	.....	$2.40	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$2.00@2.05	$2.05
Mine run	2.75	2.15	1.95	1.90	1.95 65
Slack	2.40	1.60@1.65	1.60@1.65	1.55@1.65	1.60@1.

LOUISVILLE

The market is even worse, and operations are heavily curtailed. Outlook is regarded as discouraging.

The return of cool weather has had the effect of stimulating the demand for domestic coals in the Kentucky market but otherwise conditions have shown little or no change.

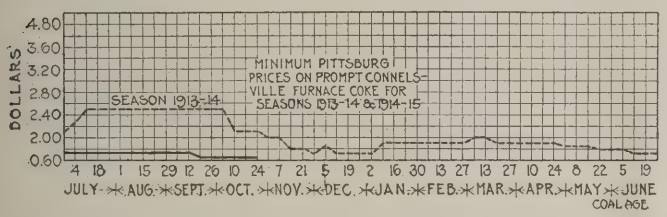
Although return of better conditions is spoken of with some optimism there is no immediate prospect of any industrial recovery that would put this market on its feet again. Some hope is expressed that the cotton will be moved and this would help the demand. Prices are not definitely quotable, whatever reasonable offer the operators can get usually being sufficient to close any deal.

COKE

CONNELLSVILLE

Coke market stagnant, with prices not seriously tested, but evidently a shade lower. Production and shipments declining.

There is no inquiry for foundry or furnace coke, and shipments on contracts are tending downward rather than upward, as consumptive requirements decrease. A little buying of November furnace coke is expected, but no inquiries are out yet. Prices are not being definitely tested, but would doubtless be found somewhat softer upon actual inquiry, and we reduce our range of quotations slightly, it being remembered that they are largely nominal: Prompt furnace, $1.65; contract furnace, $1.75; prompt foundry, $2.25; contract foundry, favorite brands, $2.35@2.50, per ton at ovens.



The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 10 at 246,110 tons, a decrease of 3042 tons, and shipments at 244,593 tons, a decrease of 9259 tons.

BUFFALO

The coke trade is about as quiet as it could well be. The demand is so light that a great many dealers in coal are paying no attention to it. The movement is at a mere routine stage, with prices on the basis of $4.25 for best Connellsville foundry and stock coke at $3.30.

CHICAGO

Because of the let-up in the demand for furnace and foundry coke, most of the ovens are making storage piles. There has been a little better demand for domestic coke. Prevailing prices in Chicago are: Connellsville, $4.75@4.90; Wise County, $4.75; byproduct egg, stove and nut, $4.95; gas house, $4.35.

MIDDLE WESTERN

INDIANAPOLIS

Slight increase in the movement of domestic coal is noted. Screenings selling very low. Operators not expecting much before first half of November.

The weather has been adverse to the coal trade, except for two days when it was wet and inclined to be chilly. This caused a better movement of domestic coal from retailers' yards and had a corresponding effect at the mines. But outside of this, the October situation has been bad and the trade is not now expecting much before November. The screenings situation is about as poor as it could be and steam coals are not moving so well. Mines are on about half-time and cars are plentiful.

Screenings are selling at 30@50c. though a much higher price is obtained on contracts. The price of lump holds up well to $1.75, although there are markets that will not take it at that figure.

CHICAGO

Conditions improving. Increase in the buying of both domestic and steam coal. Price on steam fuel advanced as a result of the curtailed production. Anthracite market stronger.

There has been a slight improvement in the Chicago market. Dealers report better buying of domestic coal and an increase in the demand for steam fuel. Steam prices have advanced as a result of a curtailed output, and the anthracite market has been improved by the raw weather. Prices are firmer, but no advances have been made. The smokeless market is active, due to a steady demand from apartment houses.

The major operators are getting $1.40 at the mines for mine-run coal, while some of the smaller shippers are quoting $1.25 as their minimum. There is a very light demand for splint coal. Carterville operators report a slight improvement in both domestic and steam trade. The Franklin County market is stronger, the domestic lump price being $2 a ton.

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05	$2.27@2.37	
Steam lump	2.02		1.97@2.02	
Egg		2.80	2.17@2.27	$4.30
Mine run	1.87	2.15@2.25		
Screenings	1.07@1.12	1.40@1.50	1.07@1.12	$3.30@3.45

Harrisburg quotations are: Domestic lump and egg, $2.80; steam lump, $2.20; mine run, $2.15; screenings, $1.40@1.50; No. 1 Nut, $2.80; No. 2 nut, $2.40.

Carterville prices are: Lump, $2.80; egg, $2.55@2.80; No. 1 washed, $2.65@2.80; No. 2 washed, $2.30@2.40.

ST. LOUIS

Market flat on both steam and domestic grades. Most prices are less than production cost.

The depression in the coal trade still continues, with the exception of prices on the high-grade lump coals. In past years, when the steam market had gone to pieces at this particular time, the lump or domestic market was in good shape, but this year not only is the steam market flat, but there is absolutely no demand for the domestic sizes.

In the Standard field prices have gone to that point where there is no money in mining or producing coal. Screenings are sold at from 10 to 20c., and lump coal can be bought as low as 95c. The only thing that maintains the steam market is the fact that half the operators are dumping their steam sizes on the ground and this is not justified by a heavy domestic demand for lump coal as is usually the case at this particular season.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.30	$1.00@1.10	$1.15@1.20
3-in. lump	.....	....	1.40	....	.....
6-in. lump	$1.50@1.85	....	1.50	1.25@1.35	1.30@1.35
Lump and egg	1.85@2.15	$2.25	.....	....	1.35
No. 1 nut	1.25@1.40	....	.....	0.75@0.80	.....
Screenings	0.30@0.40	....	0.80@0.85	0.10@0.20	0.20
Mine-run	1.05@1.10	....	.....	0.75@0.80	.....
No. 1 washed nut	1.50@1.60	2.25	1.50	....	.....
No. 2 washed nut	1.25@1.35	....	1.35	....	.....
No. 3 washed nut	1.10@1.15	....	.....	....	.....
No. 4 washed nut	1.00@1.05	....	.....	....	.....
No. 5 washed nut	0.15@0.20	....	.....	....	.....

KANSAS CITY

Domestic trade has been slightly brisker, but the usual fall demand is not fully under way.

Most business and office buildings have started their furnaces, but, although the weather was cold enough to demand fires in homes, many depended on gas to remove the chill, and there has been little demand in this direction. However, the cold snap proved that the gas supply will be inadequate this winter.

Coal Contracts Pending

Contract No. 2—Norfolk, Va.—The United States Government is in the market for 2000 tons of bituminous coal for use in waterway improvement work. Bids opened Oct. 12 were as follows: Pocahontas Fuel Co. (14,850 B.t.u.), $2.63. Castner Curren & Bullitt, (14,600 B.t.u.), loading at city pier: Lump, $3.545; mine-run, $2.545; for loading at Lamberts Point: Lump, $3.545; mine-run, $2.59. New River Coal Co. (14,800 B.t.u.), $2.55. Smokeless Fuel Co. (14,800 B.t.u.), $2.53. C. G. Blake Co. (14,850 B.t.u.), $2.55. Nottingham & Wrenn Co. (14,800 B.t.u.), $2.58. Chesapeake & Ohio Coal & Coke Co. (14,850 B.tu.), $2.59 trimmed and $2.57 not trimmed. Johns Bros. (14,800 B.t.u.), $2.53. All communications should be

addressed to E. Eveleth Winslow, Lieutenant Colonel of Engineers, United States Engineer Office, Norfolk, Virginia.

Contract No. 4—Boston, Mass.—Rhode Island Co. is in the market for 90,000 to 100,000 tons of Pocahontas, New River, Georges Creek, or Somerset run-of-mine. Shipments are to be made in about monthly proportions for a year, and the point of delivery is Providence, R. I. All communications should be addressed to E. H. Raquet, Engineer of Tests, South Station, Boston, Massachusetts.

Contract No. 5—Boston, Mass.—New York, New Haven & Hartford R.R. is in the market for 250,000 tons of West Virginia (locomotive) coal, run-of-mine. Shipments are to be made in about monthly proportions for one year, the quotation to be either f.o.b. loading port or delivered alongside N. Y., N. H. & H. R.R. wharf, South Boston, Mass. All communications should be addressed to E. H. Raquet, Engineer of Tests, South Station, Boston, Massachusetts.

CONTRACTS LET

Contract No. 1—Columbus, Ohio—The Ruggery Building has contracted for 300 tons of West Virginia slack coal. Shipments are to be made at the rate of 25 tons per day, beginning Nov. 1, delivery to be made at Columbus, Ohio.

FOREIGN

Guayaquil, Ecuador, South America—La Compania de Alumdrado (Lighting Company) is in the market for 3500 tons of gas coal. Prospective bidders should state the specific gravity, weight per cubic foot, and space occupied by one ton of gas coal. Give approximate analysis including moisture, fixed carbon, sulphur and ash, and a commercial analysis showing the gas per ton of coal, gas per cubic foot of coal, illuminating power of the gas in standard sperm candles, value of one cubic foot in grains of sperm, sperm value per ton of coal, coke per ton of coal (good quality), coke per cent. of coal, ash in coke, sulphur eliminated with the volatile products, sulphur in the coke, tar per ton of coal. Quotations should be c.i.f. Guayaquil. Address The Manager, Compania de Alumdrado, Guayaquil, Ecuador, South America.

South America—An American consular officer in that country has transmitted detailed information relative to tenders which will be received, until Nov. 1, for the supply of coal for government steamer service. American coal dealers who are interested should apply to the Bureau of Foreign and Domestic Commerce, mentioning item No. 14,016 for the reserved information.

South America—Supplementing a previous notice, the Bureau of Foreign and Domestic Commerce at Washington states that details regarding a certain inquiry from South America have been forwarded to the department, and that complete information, including blank forms on which to submit bids for supplying coal under the conditions specified can be had on application. All inquiries should mention item No. 14048, and be addressed to the Bureau of Foreign and Domestic Commerce, at Washington, D. C.

Santiago, Chile, S. A.—Bids are wanted on 400,000 tons of coal, deliveries to be made during the next three years, according to press reports. The coal is to be used on the Chilean Railway. All communications should be addressed to the Department of Materials, Santiago, Chile, S. A.

FOREIGN MARKETS

GREAT BRITAIN

Trade slow and circulars difficult to maintain. Shipping further delayed by naval maneuvers in the North Sea. September exports make a substantial recovery.

The Spanish Government has reimposed the customs duties on imported coal.

The war has caused serious inroads into the funds of trade unions, owing to the increase of members requiring unemployment benefits. The Board of Trade now intimate willingness to make special grants to such bodies.—"The Colliery Guardian."

Oct. 9—Second class Admiralty List coals are in better demand and prices are harder. Monmouthshire large and Cardiff smalls are fairly plentiful. Quotations are approximately as follows:

Best Welsh steam	$4.92@5.16	Best Mountmouthshires	$3.96@4.14
Best seconds	4.32@4.56	Seconds	3.84@3.96
Seconds	4.20@4.32	Best Cardiff small	1.98@2.04
Best dry coals	4.56@4.80	Seconds	1.32@1.56

Freight—Chartering is quiet, but rates remain firm for the Mediterranean, while for South America they are unchanged. Rates are approximately as follows:

Gibraltar	$1.68	Aden	$2.22
Malta	1.68	Colombo	2.34
Marseilles	1.76	Sabang	2.34
Algiers	1.56	Singapore	2.52
Genoa, Savona	1.96	Las Palmas	1.68
Naples	1.74	St. Vincent	1.80
Venice, Ancona	2.88	Rio Janeiro	3.12
Alexandria	1.92	Monte Video	2.82
Port Said	1.86	Buenos Ayres	3.06

British exports for September and the first nine months of the past three years were as follows:

	September			Nine Months		
To	1912	1913	1914	1912	1913	1914
Russia	592,060	668,472	17,398	3,107,885	4,462,660	3,066,925
Sweden	474,974	394,314	633,546	2,838,236	3,275,151	3,055,335
Norway	184,739	174,861	233,754	1,545,995	1,688,549	1,907,090
Denmark	273,030	275,724	405,842	1,960,592	2,213,216	2,267,312
Germany	826,208	833,326	.....	6,039,314	6,783,574	5,256,765
Netherlands	165,984	154,904	276,031	1,348,911	1,544,894	1,457,102
Belgium	132,118	164,448	44,416	1,060,822	1,546,634	1,084,401
France	918,275	1,040,489	569,667	7,187,864	9,567,410	9,040,744
Portugal[1]	92,717	100,840	87,177	861,999	1,030,124	923,186
Spain and Canaries	260,910	270,678	227,401	2,393,304	2,745,182	2,458,578
Italy	760,006	810,994	697,693	6,453,595	7,150,025	6,557,270
Austria-Hungary	65,104	53,761	.....	551,052	796,407	564,362
Greece	45,140	76,091	19,264	455,916	507,251	489,748
Roumania	50,233	30,103	.....	164,308	149,517	218,218
Turkey	47,482	51,501	.....	310,026	184,954	417,437
Egypt[2]	258,775	258,232	133,177	2,149,506	2,259,230	2,193,888
Algeria	92,442	66,505	39,733	708,403	952,241	780,627
Portuguese West Africa	20,861	18,624	37,824	221,997	190,082	153,286
Chile	31,112	27,204	8,040	478,717	457,641	360,391
Brazil	137,842	158,896	59,528	1,123,160	1,445,749	966,618
Uruguay	106,144	65,642	18,866	622,986	568,142	480,522
Argentine Republic	303,924	267,142	153,016	2,269,783	2,725,303	2,362,722
Channel Is.	13,418	14,509	19,915	128,368	121,833	127,223
Gibraltar	32,941	14,940	24,447	251,033	254,791	239,206
Malta	36,658	36,249	13,649	268,504	506,361	311,041
Aden and Dependencies	10,907	22,930	22,125	149,278	127,678	118,850
British India	12,935	8,827	9,222	95,601	125,832	127,261
Ceylon	30,869	23,601	17,969	183,161	174,358	223,037
Other countries	99,751	111,373	89,488	820,107	962,999	907,204
Coke	97,679	125,357	130,264	680,713	838,055	824,325
Briquettes	125,373	179,041	107,001	1,115,631	1,542,365	1,431,938
Total	6,300,611	6,501,578	4,096,453	47,546,767	56,898,208	50,372,612
Bunker	1,593,347	1,825,057	1,332,935	13,202,091	15,545,617	14,581,962

[1] Includes Azores and Maderia. [2] Including Anglo-Egyptian Sudan.

PRODUCTION AND TRANSPORTATION STATISTICS

THE CAR SITUATION

The customary statement of the car supply, which always appears in this department, has been embodied in the article, "An Analysis of the Coal Car Situation," on page 662 of this issue.

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for August, 1913-14, and for the eight months ending August, 1912-13-14, in long tons:

	8 Months			August	
Imports from:	1912	1913	1914	1913	1914
United Kingdom	3,840	3,693	8m308	229	50
Canada	916,453	746,029	669,512	67,418	80,608
Japan	18,616	70,229	44,449	6,564	13,466
Austria and Tasmania	84,554	96,651	137,191	19,017	9,173
Other countries	1,925	2,816	2,053	6	172
Total	1,025,388	919,418	861,513	93,234	103,469
Exports:					
Anthracite					
Canada	2,140,936	2,800,112	2,627,945	388,220	452,538
Other countries	45,394	47,331	39,024	10,310	2,767
Total	2,186,330	2,847,443	2,666,969	398,530	455,305
Bituminous,					
Canada	6,696,010	8,652,472	6,038,926	1,532,227	1,513,096
Panama	312,227	351,850	190,965	30,343	22,067
Mexico	224,561	377,098	315,068	26,137	24,705
Cuba	757,635	868,114	696,111	95,748	79,537
West Indies	480,410	419,496	415,796	42,032	60,550
Argentina	.....	48,626	138,219	.....	25,811
Brazil	.....	200,088	155,225	12,533	54,695
Uruguay	.....	5,163	56,514	5,163	10,920
Other Countries	1,197,509	911,604	1,138,436	82,316	163,795
Total	7,077,177	10,008,012	7,090,084	1,976,124	1,339,086
Bunker coal	4,943,257	5,079,189	5,027,956	669,919	502,000

COAL AGE

Vol. 6 NEW YORK, OCTOBER 31, 1914 No. 18

"BE VERY SLOW TO BELIEVE THAT YOU ARE WISER THAN ALL OTHERS; IT IS A FATAL BUT COMMON ERROR."

FEW people are so constituted that they can accept advice with sparkling eyes, but any man who will balk at the aphorism quoted above, needs watching. If he is allowed to follow his own inclinations long enough he'll probably come to a sudden and violent end.

Reading *between the lines* on tombstones will recall many examples to mind.

Here are a few we discovered in a twenty-acre lot, and it was not entirely filled at that:

A miner who couldn't agree with his "buddy" and the mine foreman about the danger of a piece of loose draw slate in his room.
A driver who knew that all mules would not kick.
A fireboss who could detect gas with a naked light.
A salaried union official who was on a company payroll as well.
A mine foreman who made a practice of riding loaded trips.
A checkweighman who developed a system of dummy check numbers.
A miner who used steel tamping bars.
A trip rider who enjoyed being tickled with the 550-volt current.
A fireman who depended on check valves on a high-pressure boiler.

Then there were several we were not quite sure about:—

A fellow killed in a drunken brawl.
A trapper run down by an electric locomotive.
A machine-runner electrocuted.

We gave them the benefit of the doubt, recalling the words, "Be very slow to believe."

Since making the gruesome journey through the twenty-acre lot, we have discovered an even more distressing obituary, illustrating the truth of the aphorism quoted.

The Rev. Caleb Colton, who wrote the precept and published it in 1821, blew out his own brains in 1832, principally because he lost a large sum of money in gambling hells.

This in spite of the fact that he was a clergyman and a man of brilliant mind. Surely his advice, backed up as it is by the tragedy of his life, rings true.

Discussion of Mining Laws, Legislation and Mine Regulations

By J. T. Beard

IN THE CAMPAIGN FOR IMPROVEMENT *and the securing of higher efficiency and safety in mining, nothing is of greater importance than the careful consideration of those features and elements that relate to and control the management and operation of mines. These controlling features are quite generally included in the various requirements of mining laws and mine regulations.*

o o o

It is a deplorable fact that state mining laws are, in many cases, the result of unwise and biased legislation. Too often has mine legislation been influenced if not controlled by lobbyists whose main object and purpose is to secure the enactment of laws that will favor their own selfish ends. Even the appointment of committees and commissions to draft suitable laws for presentation to legislative bodies has not secured the desired freedom from the same undermining influences; and "minority" and "majority reports" have, alike, been presented to legislatures for their action.

While our law-makers cannot always be expected to be well informed in regard to the practical requirements of mining, their purpose as honest legislators should be to eliminate from their enactments all discriminating features, so that the laws they enact will secure greater safety to mine workers and equal justice to all.

A mining law that imposes unequal burdens on the industry in different districts of the same state, or makes it impossible for coal operators in one state to compete successfully with those of another state tributary to the same market is justly open to criticism. A law that discriminates between mines, in respect to their classification, so as to make it impossible for one mine to operate successfully in competition with other mines working under the same conditions and supplying the same market would be discriminative and likewise open to just criticism. Much of the difficulty from this source has fortunately been removed through the efforts and work of the various interstate commissions. A law that permits the domination of any class or individual over another class or individual, or restricts individual rights and freedom without sufficient cause or reason is unwise and again open to criticism.

There is no work more constructive or more important in journalism, especially in a paper devoted to the welfare and interests of a single industry, than the work of simplifying and improving existing mining laws, to the end that greater safety and justice may be secured in all branches of the work. In the accomplishment of this task, the editors of Coal Age ask the earnest coöperation of all practical mining men, in every branch of the industry. We invite such criticisms of existing mining laws as have appeared from time to time in Coal Age; and ask that correspondents draw attention to inconsistencies, omissions or lack of clearness, in the wording or intended meaning of laws as they appear on the statute books of their respective states.

A question was recently asked, Coal Age, Oct. 3, p. 563, in respect to the meaning of the designation "gaseous mine," in the Bituminous Mining Law of Pennsylvania. In the present issue of the paper, a correspondent questions the justice of the requirement of the Bituminous (Penn.) Mining Law, Art. 24, Sec. 7, under which all examination papers of candidates must be filed in the Department of Mines at Harrisburg and not returned to the candidate.

Let us have a full discussion of all points relating to mining laws, legislatian or mine regulations, by those affected by such laws. Much good can be done by such a frank discussion.

Test of Rice Barriers at Experimental Mine

By Geo. S. Rice* and L. M. Jones†

SYNOPSIS—The explosion, specially arranged for the visit of the American Institute of Mining Engineers on Oct. 9, was of a mild order. This type of explosion is hard to stop, and the ordinary barriers which have proved efficacious in the most violent explosions often fail to restrain those which are less violent. The Rice barriers were proved equal to the demands made on them by the conditions of the experiment.

One of the excursions arranged for the recent meeting of the American Institute of Mining Engineers at Pittsburgh was to the U. S. Bureau of Mines experimental mine, near Bruceton, Penn. This trip was made on the afternoon of Oct. 9. Many members of the Institute, accompanied by some of the Pennsylvania state inspectors, and other mining men, probably about 200 in all, went out to the mine by train and automobiles. They first entered the workings to inspect the arrangements for an explosion test and the "barriers" that had been erected to limit the explosion. Outside the mine, they saw demonstrations with full-size models of two of the rock-dust barriers, which had been erected to show how a cloud of rock dust is discharged from them by the force of an explosion.

Cement-Gun Work

Afterwards, a "cement gun" was used to cover with a layer of concrete some boards set up like a mine stopping. The concrete consisted of 2 parts sand and 1 part cement and was reinforced with wire mesh which had been previously tacked on the boards. This gun had recently been used in the mine to repair countless breaks in the concrete lining of the mine, caused during previous explosion tests; it had also been used to coat the inner part of the entries with a thin layer of 2 parts sand and 1 part of cement without any reinforcement. The object of the coating was twofold; to enable the entry to be more easily cleaned after each test, and to see whether the coating would protect the shale and bone-coal roof from air slaking.

The conditions are somewhat severe at this mine on account of the explosion experiments, so it is hardly a fair test of the durability of the coating. It is hoped that this method of protecting the roof and walls may be durable in commercial mines, and if so, it would be a great economy to employ it and indirectly it would add to safety in the prevention of falls.

After these exhibits the visitors moved up on the hill over the main entries to witness the explosion test. After the word had been given that the electrical connections had been made into the mine, and the physicist had made his tests to determine that the electric circuits were complete, warning whistles were blown, and 30 sec. later the explosion was started by throwing an electric switch in the observatory.

Evidences at the Surface

The first evidence of the explosion was a puff of light dust, accompanied by a muffled sound coming from the mouth of the air course. This was followed by a stronger and more continued puff of dust and smoke from the same point. While this was issuing there was a puff of light dust from the main entry, and after an interval of several seconds this was followed by a prolonged outburst of dust and smoke accompanied by a crashing or booming sound.

The explanation of these separate puffs and sounds appears to be that the first small puff coming from the air course was the shock wave from the cannon; the second and larger one was when the pressure wave issued from the explosion in the butt entry; the first puff from the main entry appeared to be caused either by the shock wave from the cannon, or the shock wave from the explosion itself in the butt entries; the larger burst of

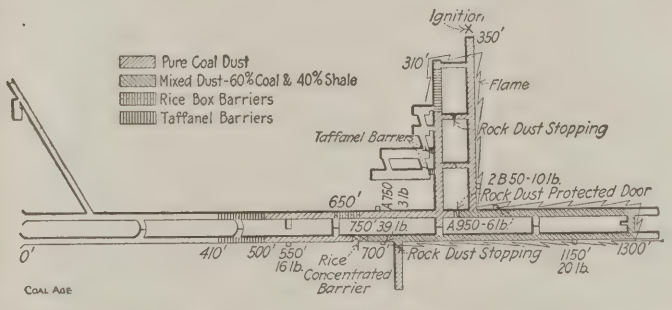


Fig. 1. Test at the U. S. Experimental Mine to Prove Efficacy of New Rock-Dust Barriers

dust and smoke was due to the explosion in the main entry, which as the manometer records later showed attained its maximum immediately before striking the concentrated barrier.

Perhaps one of the most striking features of this experiment was the demonstration of the present knowledge of dust-explosive phenomena which enabled those in charge to plan the conducting and limiting of an explosion along a predetermined path.

A Large Part of the Mine Was Free from Afterdamp

Owing to the explosion being well in the interior of the mine, and as the fan was set to barely turn around, no smoke or dust was observed from either entrance after the outbursts above mentioned. A demonstration was then given of the oxygen breathing apparatus by two Bureau mine-rescue crews of five men each. The advance party entering the main entry carried a guide rope, also a canary to observe whether or not it would be affected by the fumes.

Owing to the retraction of the gases after the explosion the party had to go in 600 or 700 ft. before encountering the afterdamp, which showed its presence by overcoming the canary. After the squad had returned, the fan was started, so as to blow out a large amount of smoke and gas from the main entrance. Then ventilation

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†Mining engineer, Bureau of Mines, Pittsburgh, Penn.

was reversed and many of the visitors including inspectors entered and observed the effects of the explosion.

Details of Arrangements of Test

Referring to Fig. 1, the explosion was initiated by a blown-out shot of 4 lb. of black powder located at the face of the second butt entry, 350 ft. from the air course. Pure Pittsburgh coal dust was distributed for the 350 ft. between the face and the air course at the rate of 2 lb. per lin.ft. For the first 50 ft., and in the inner crosscut it was placed on side shelves but in the balance of the zone, the dust was concentrated on shelving placed across the airway. It has been found that the maximum intensity of explosion is obtained by this method of loading.

In the air course between the second and first butt, there was a rock-dust protected ventilating door, which was located here with the expectation that it would not permit the explosion to pass through it and travel outbye along the air course. On the inbye side up to the last crosscut of the airway, a mixture of 60 per cent. coal dust and 40 per cent. shale was loaded at the rate of $3\frac{1}{3}$ lb.



Fig. 2. View from No. 1 Butt of Remains of Rock-Dust Stopping in 200-Ft. Crosscut

per lin.ft., the mixture being concentrated on cross shelves. This distance is 350 ft. There was a like loading in the last crosscut to the main entry, and out along the main entry 550 ft. At the end of this loaded length of entry was a concentrated barrier. Thus there was a total length of 1300 ft. that the explosion was expected to follow from the origin to the point of extinguishment of the flame.

Coal Dust to Test Value of Barriers

In order to test the efficiency of the various stoppings, pure coal dust was placed in the first butt and in the air course outby the protected door between the butts, also in the main entry outby the concentrated barrier, and in the right butt. For if the flame of the explosion had passed the barriers and caused the ignition of the pure dust beyond, it would have made a much more extensive explosion, and the flame might possibly have issued from the entrances.

Neither the instruments nor other records gave indication of ignition of the pure coal dust in the zones beyond the barriers. Besides the barriers which limited the explosion there were others supplementing these placed outbye the several extra zones of pure dust, for the purpose of exhibiting these types of barriers and also as a safeguard to the mine portals in case the limiting barriers previously described failed to extinguish the explosion. These supplemental barriers were a Rice box barrier in the air-course outby the butt entries and Taffanel barriers in the air course and main entry. The Taffanel barriers were loaded with shale dust and limestone dust was placed on the other barriers.

The Stone Dust Mixed with the Coal Did Not Wholly Prevent Increase of Pressure as Explosion Progressed

The pressures were registered on three French and three British manometers. The registration of the passage of the flame was recorded by strips of tinfoil in the various stations, which, except in the butt entries, are 100 ft. apart. To check these records tufts of gun cotton and matches were placed at intervals in the roof. However, it was found that the latter were not trustworthy with the method of loading on cross shelves which had been adopted. Judging from surface-gallery effects, probably the cloud of coal dust and mixed dust make a thick barrier or veil along the roof, through which the flame cannot penetrate. In order to obtain the maximum effect a great excess of dust was used.

The stations in which pressure manometers were placed and the maximum pressures obtained are as follows:

PRESSURES ATTAINED AT VARIOUS POINTS IN MINE

Station	Lb. per Sq.In.	Location and Remarks
2B 50	10	300 ft. from origin.
A 950	6	In air course after right-angle turn.
A 750	3	In air course outbye the door barrier.
E 1150	20	In main entry 100 ft. outbye the last crosscut.
E 750	39	In main entry inbye the concentrated barrier.
E 550	16	In main entry inbye the concentrated barrier.

(These pressures may be slightly revised upon more thorough measurement and calculation of the records.)

It will therefore be observed that the pressure of the explosion after passing out of the butt entry increased in intensity on its passage along the predetermined path until the flame was extinguished by the limiting barriers.

The Seat of the Explosion Developed Little Pressure

It is worthy of note that the pressure in the entry in which the explosion originated did not rise very high. The explanation that might be made of this is that the entry was not long enough and in a sense the area was restricted. The outlets were choked momentarily, at the mouth, by the blast striking against the rib of the air course, on the outbye side by the ventilating door, and, inbye because it was approaching a dead end.

Had the explosion been well under way, this restriction in outlets would not have checked the intensity of the explosion. The inertia of the air had to be overcome in order to stir up and mix the dust and air.

The Rock-Dust Stopping Was Instantaneously Effective

The flame penetrated into the Taffanel barrier in No. 1 butt about 50 ft. but did not pass through it. It did not pass through the rock-dust stopping in "200" crosscut. This stopping consisted of two sets of six shelves each, with a vertical spacing of one foot, supported by posts. There was a space between the two sets of shelves about a foot wide. This space and the shelves were filled with limestone dust.

The theory on which the device was designed is that if a set of such shelves was placed on each side of a stopping, an advance air wave might overthrow the stopping and the shelves on the far side, but the shelves on the near side would remain up and the explosion wave proper would blow the dust off, forming a cloud which would quench the flame.

The space filled with rock dust in this test acted like a solid stopping and overturned the shelves on the No. 1 butt side. The other set on the No. 2 butt side remained up and most of the dust was blown off the shelves. Notwithstanding the coal-dust loading in this crosscut on both sides of the stopping, the flame failed to pass beyond.

The Other Rock-Dust Barriers Also Proved Effective

The protected ventilating door in the air course also checked the flame. The planks of the rock-dust side-compartments were blown outbye but most of the floor boards of the upper compartment still hung from chains. Some flame passed through the barrier but died away 50 ft. beyond. Evidently it took this distance for an effective dust cloud to be formed and to cool the gases below the ignition temperature of the dust carried along by the explosion. As the pure coal dust placed outbye the door was not ignited, evidently the rock dust blanketed the flame too quickly to permit ignition.

No evidence of flame was noted in No. 1 right butt inbye the rock-dust stopping which was entirely thrown down. The concentrated barrier in the main entry was dismantled, some of the timbers being carried 150 ft. and the limestone dust well scattered. No evidence of flame was noted outbye its original position.

In the air course the boxes of the box barrier, which terminated the coal-dust zone outbye the ventilating door, but which were not called on to extinguish the explosion, were all on the floor, but the bottom boards were still suspended from chains and still held much limestone dust. Three of the boxes were found 25 ft. inbye the position of the first box before the explosion; presumably these were carried inbye by the inrush of air from outside after the explosion had occurred.

There was little coked dust along the course of the explosion. This is not necessarily to be regarded as indicating that there was little heating effect. The ribs, roof and posts were all damp and it is known that coke deposition seldom is found under these conditions.

Taffanel Barriers Have Failed in Slow-Moving Dust Explosions

In conclusion, it might be stated that all the explosion-checking devices used in this explosion test have been tried many times in the Experimental Mine explosions and all of them with the exception of the Taffanel barrier, which has failed in low-pressure slow-moving explosions, have always proven effective in stopping the phenomena. Installation of any of these types for separating different splits, panels or sections of a mine from each other or the balance of the mine would undoubtedly be a big step in advance toward reducing the number of lives lost in large explosions. The Bureau engineers are now preparing a publication describing these devices and it is strongly recommended that they be installed in bituminous mines in connection with a definite plan for making coal dust inert by watering or rock-dusting.

Extracts from a Superintendent's Diary

The most difficult position about our diggings to fill and keep filled, is that of school teacher. We have had them of every height, weight, sex and disposition, but we have never had but one who stayed an entire school year. That one left today, this being the last day of the term. During the last four weeks, however, she has been without an assistant, having tried four during the year and at last deciding to complete the year single-handed rather than break in another one for so short a time.

The old story about "give a dog a bad name" has undoubtedly been responsible in a way for many of our troubles in this respect during recent years, and has had a marked effect no doubt on the type of applicants who apply for our school.

Each new crop of boys and girls seems to have an original way of making life miserable for the teacher, and in spite of all warnings handed down from year to year, each succeeding teacher seems always to have plenty of surprises awaiting her.

Nor are all of the misunderstandings and hasty departures chargeable to the pupils. Several of the teachers (I recall a man and a woman during my reign) have been vanquished by irate mothers who objected to having their sons flogged. We have had a few rather good-sized teachers at that, but some of the mothers of our camp wouldn't consider size or sex of any opponent as a drawback if once they were determined to breathe revenge.

I was much amused at the comments of one of my sons several days after the arrival of the teacher who has just closed her year's work; and reading between the lines I decided that here at last was a teacher who could keep them guessing. My youngster remarked that the teacher was crosseyed and they couldn't tell whom she was looking at, and besides that she was bigger than any boy in the room.

The boys had a way of working in pairs; one boy would attract a teacher's attention and while she was looking at him, he would telegraph instructions with his feet to his partner who would immediately get into action. But with the new teacher, every boy imagined that she was always looking straight at him and he hesitated about making a move.

And then to add to the discomfiture of the boys, she had a way of working into the good graces of all of the parents of the camp. Among other things, she organized a School Improvement Association in which everybody has become much interested, and as a result, as one might expect, all of the parents are much impressed by the teacher.

Several of the boys were foolish enough to appeal to their mothers, as they had long been in the habit of doing, before they realized just how matters stood between the teacher and the mothers; the results were far from satisfactory from the standpoint of the boys, and from that time on, the pupils when in trouble were content with the best settlement they could obtain from the teacher without outside intervention.

And now at night as the boys gather to talk over past events and make plans for the future, they tell the younger lads about how they used to scare away teachers by threatening to blow them up with dynamite, but they always cleverly change the subject when the listeners begin to ask questions about recent history and the crosseyed one.

The Hampton Roads Coals--I

By F. R. Wadleigh*

SYNOPSIS—This is the first of a series of articles that will cover in detail all phases of marketing and shipping the different coals handled at Hampton Roads. This installment gives a brief historical sketch of the port and a general review of coals handled.

It has been impossible to ascertain the exact date of the first coal shipments from Hampton Roads, but it is certain that these shipments were from the mines in the Richmond, Va., coal basin. These mines were opened in 1750, and in 1832 had their maximum output of 132,000 tons, which gradually decreased until in 1882 it was only 54,000 tons.

For years this coal had a monopoly of the coastwise trade in bituminous coal, barges being brought down the James River and through Hampton Roads to New York and Philadelphia. In 1842, the coal was used at the Portsmouth, Va., Navy Yard, the Navy Department having a contract with the Clover Hill mines for 800 tons in that year.

During the Civil War, some of this fuel was used by the Confederate ships and blockade runners. Either this coal, or that from the semi-anthracite mines in Montgomery County, Va., was also sent to Norfolk at that time and was used by the Merrimac in her fight with the Monitor in Hampton Roads.

The Early Operations

The Chesapeake & Ohio R.R. began shipping coal from Newport News a short time previous to 1882, and before this they had loaded coal at Richmond, and sent it down the James River. In the fall of 1882, they were doing quite a large shipping business to Northern ports as well as in bunkering steamships, something over one hundred ships calling for bunkers between October, 1882, and May, 1883.

In 1884, the Norfolk & Western R.R. started work on its first pier at Lamberts Point, but the first regular shipment of Pocahontas coal to Norfolk was made in March, 1883. Between this time and the completion of the new pier, the coal was dumped over a small pier at Norfolk, which could only accommodate barges; any large ships had either to go to Newport News for bunkers or be coaled from barges.

The Newport News and Lamberts Point terminals were gradually enlarged, five more coal piers being installed up to 1914 when two more, the largest on the Atlantic Coast, were put in operation.

For some time previous to 1882, bunker coals for Norfolk were brought down by barge from Baltimore, but the first regular bunkering business in Hampton Roads was started by Belloni & Co., of New York, who in October, 1882, sent F. E. Tweddell to Newport News, to open an agency there for supplying steamships with coal. As the good qualities of the West Virginia and Virginia coals became better known, aided by judicious advertising methods, the shipments from Hampton Roads increased rapidly from less than 60,000 tons in 1883 to 11,994,665 tons in 1913.

A Comparison with the World's Largest Coaling Ports

Taking the three Hampton Roads coaling stations together, Lamberts Point, Sewalls Point and Newport News, the shipments from the Roads are exceeded by only two tidewater coal-shipping ports in the world. Cardiff with its five docks and basins, Roath, Queen Alexandra and Bute Docks, Barry and Penarth exporting 22,574,592 tons in 1913 and Newcastle with its River Tyne docks and export shipments of 15,407,796 tons in 1913, both including foreign bunkers.

If we consider foreign shipments alone, the Hampton Roads tonnage does not stand so well as the following table shows, all of the tonnage being for 1913:

GREAT BRITAIN

Port	Cargo	Bunker	Total
Cardiff	19,282,496	3,292,076	22,574,572
New Castle	13,316,437	2,091,359	15,407,796
Hull	4,629,289	1,473,673	6,102,962
Newport	4,679,212	712,972	5,392,184
Blyth	3,973,495	408,313	4,381,808
Swansea	3,511,133	502,903	4,014,036
Sunderland	3,014,200	312,217	3,326,417
Methil	2,573,852	202,063	2,779,915
Burntisland	1,938,339	177,320	2,115,659
Glasgow	1,927,059	1,270,182	3,208,521
Immingham	1,755,641	347,442	2,103,083
Grangemouth	1,434,747	200,103	1,634,850
Leith	1,420,678	233,815	1,654,492
Goole	1,300,624	112,074	1,412,698
Grimsby	1,197,799	1,013,860	2,211,659
West Hartlepool	1,245,292	242,568	1,487,860
Liverpool	438,142	3,368,809	3,806,951
London	3,371	1,348,308	1,351,679



General View of the Three Main Piers of the

*Consulting engineer, 426 Real Estate Trust Bldg., Philadelphia.

UNITED STATES

	Cargo	Bunker	Total
ampton Roads	2,424,972	972,230	3,397,202
hiladelphia	939,944	599,528	1,539,472
altimore	775,818	429,978	1,205,796
ew York	.....	4,192,264	.....
ew Orleans	.....	418,726	.....

Comparing the total shipments from the larger British ports, with the Hampton Roads totals, only Cardiff and Newcastle show larger shipments, as follows:

Ports	Total Shipments	Ports	Total Shipments
ardiff	25,374,572	Lamberts Point	5,598,716
ewcastle	20,613,767	Newport News	3,111,017
ull	7,035,726	Sewalls Point	3,283,677
ewport	6,192,184		
		Total	11,993,410

The Hampton Roads Coals

The coals that have made Hampton Roads known all over the world are the high-grade semi-bituminous steam fuels from the New River-Pocahontas coal area of Virginia and West Virginia. These are known to the trade as "Pocahontas" and "New River" coals, names derived from the geographical location of the coal beds, "Pocahontas" from the town where the first mine was opened, and "New River" from the river of that name. Of a similar nature, structure, appearance and quality and coming from the same geological measures, these are the standard for steam coals in this country. They are also the only ones that can compete on equal terms with the famous steam coals of South Wales, which have so long had a monopoly of the coal markets of South America and the Mediterranean, though they are now being displaced to some extent by our coals. Their high-heating value, purity and comparative freedom from smoke of combustion, make them of especial value and it is of the greatest importance that their possibilities should be fully recognized; the manner in which they are mined and handled should also be given close attention so that they will last as long as possible.

These coals are part of the Great Appalachian Coal Field, which is about nine hundred miles long, and from thirty to one hundred and eighty miles wide. Beginning near the northern line of Pennsylvania, Latitude 42 deg., Longitude 77 deg., it extends southwestward through West Virginia, Maryland, southeastern Ohio, eastern Kentucky, Virginia and central Tennessee, ending in western Alabama, Latitude 33 deg., Longitude 88 deg. About half-way down and on the eastern border of this field, lies the New River-Pocahontas coal area, covering approximately 2575 square miles.

To give the clearest possible idea of the production, quality and handling of these coals, the beds and fields from which they come, the data given is grouped under each railroad system, with a general classification as follows:

Norfolk & Western	Chesapeake & Ohio	Virginian Railway
Pocahontas Flat Top	New River	New River
Tug River (Pocahontas)	Kanawha	Kanawha
Thacker, including Kentucky coals along Tug River	Thacker	
Clinch Valley		
Kenova		



Norfolk & Western Ry., at Hampton Roads, Va.

The mining methods and preparation are similar in all the fields and will be described under one general heading.

It will be noticed that the New River field is served by both the Virginian and Chesapeake and Ohio roads. Most of the New River coal mined on the Virginian alone is from the Beckley bed, while some of the mines are served by both roads, as given in the following list:

Cranberry	Beckley	Winding Gulfg
Lochgelly	Sprague	Mac Alpin
Beech Creek	Prosperity	Tams
Summerlee	Raleigh C. & C. Co.	Eccles
Carlisle	Sullivan	Glen White
Oakwood	Wood-Peck	Wingrove
Mabscott	Pemberton	Scarbro

The Kanawha, Glen Jean & Eastern R.R., a small line (16 miles) owned by one of the large New River coal interests, connects the Chesapeake & Ohio and Virginian, so that some mines can ship coal over either of the two trunk lines; these mines are as follows:

Sherwood	Kilsyth
Price Hill	Derryhal
Mt. Hope Coal Co.	Nichol
Tamroy	Sun
Graham	Sugar Creek
Oswald	

The following tables will serve as a summary of gen-

eral data regarding the Hampton Roads coals, their distribution as to fields and districts and their handling on the market. The division into districts or fields is an arbitrary one adopted by the railroads, but it corresponds quite closely to the actual division as regards the kinds of coal.

Although there are eight railroads with terminals on Hampton Roads, all of the coal is brought in over three, the Norfolk & Western Ry., Chesapeake & Ohio Ry., and the Virginian Ry. Each has its own districts and coals.

All coal for Tidewater or Eastern points is hauled from the mines to Bluefield, W. Va., where it is weighed and classified. Bluefield is 363 miles from Hampton Roads and 12 miles from the nearest mine, the Pocahontas Field extending 422 miles by rail west of Norfolk, so that the average haul to Tidewater is about 386 miles, from the center of traffic.

The freight rate now applying is $1.40 per gross ton.

No. of Piers	Depth of Water (Feet)	Maximum Capacity (Tons)	Tonnage 1913	District	Location	Freight Rate	Max. and Min Dist. from Hampton Roads Minimum	Maximum
				NORFOLK & WESTERN RAILWAY				
3	32	6800	5,598,716	Pocahontas	Bluestone to Welch and branches	$1.40	375	450
				Tug River	Welch to Iaeger and branches	1.40	399	437
				Thacker	Iaeger to Williamson	1.50	422	470
				Kenova	Williamson to Kenova	1.50	470	489
				Clinch Valley	Richlands to Norton, Va.	1.40 @ 1.50	404	466
				Semi-Anthracite	Montgomery Co., Va.	.....	295	310
				CHESAPEAKE & OHIO RAILWAY				
5	34	9000	3,111,107	New River	Quinnimont to Gauley River	$1.40	371	402
				Kanawha	Gauley River to Ashland	1.50	407	555
				Kentucky	West of Big Sandy River	1.55	509	631
				VIRGINIAN RAILWAY				
1	32	1500	3,283,677	(One district only)		$1.40	388	427

Norfolk & Western Railway

This was the first of the three roads to build large coal piers at Hampton Roads, the No. 1 pier having been put into operation in 1885. This road, originally the Atlantic, Mississippi & Ohio, the main line running from Norfolk, Va., to Bristol, Tenn., 408 miles, built a branch line to the Pocahontas coal field in 1882-3, when the first mine was opened. This branch was gradually extended toward the Northwest, with the opening of more mines, until in October, 1892, the entire line was completed to Columbus, Ohio. At that time, there were 25 mines in operation with an output of 2,528,000 tons, all mining being in the No. 3 Pocahontas bed, with the exception of four small operations near Kenova, in the Kanawha measures.

Today, this road has 2037 miles of main line and serves a total of 248 mines, of which 160 are in the Pocahontas coal beds, the others mining the higher volatile gas and splint coals of southwest Virginia, West Virginia and Kentucky.

To the foresight and sagacity of President F. J. Kimball, of the Norfolk & Western, is due a large share of the credit for the opening and development of the Pocahontas coal field. Far-seeing, clean, upright, a tireless worker, he carried out his ideas in the face of a great many discouragements, building to the coal fields, bringing in capital for and encouraging, their development, then extending his road so as to enter Western markets. The present size and prosperity of his road is largely due to the final carrying out of his plans by men trained under him and in sympathy with his ideas.

The total shipments of the Norfolk & Western for 1913 amounted to 20,768,850 tons, of which 16,000,739 came from the Pocahontas beds. The distribution of these shipments was: Tidewater, 22.3 per cent; Eastern Line Trade, 13.4 per cent.; Western Line Trade, 64.3 per cent. To haul this immense tonnage, which is 60 per cent. of its total freight movement, 1065 locomotives are used and coal cars as follows:

60,000 lb. capacity 1067	100,000 lb. capacity 13,272
80,000 lb. capacity 925	115,600 lb. capacity 13,599
85,000 lb. capacity 2914	180,000 lb. capacity 750

The standard train handled into Lamberts Point weighs 1200 net tons, excluding the locomotive.

POCAHONTAS

	Flat Top	Tug River	Thacker	Kenova	Clinch Valley
No. of mines	98	43	42	13	27
Daily capacity	104,225	19,225	20,825	6,475	9,500
Shipments, 1913	15,140,218	2,559,603	3,138,538	977,895	1,858,125
Coal beds and No. mines in each	Pocahontas No. 3 (81) Pocahontas No. 4 (11) (14)	Davy-Sewell (18) Welch (10) War Creek (6)	Freeburn (18) Thacker (14) War Eagle (5) Alma (2) Warfield (2)	Coalburg (3) Thacker (3) Winifrede (5) No. 2 Gas (1)	Upper Banner Lower Banner Widow Kennedy Imboden Jawbone Pocahontas No. 4 ( )
Trade names	Pocahontas	Pocahontas	Pond Creek Thacker Glen Alum Red Jacket Majestic Cinderella	Thacker W. Va. Splint White Ash, etc.	Toms Creek Clinchfield Raven Red Ash, etc.
No. of selling agencies and general uses of coal	22 Steam Coking Domestic	20 Steam Coking Domestic	18 Steam Gas Domestic Furances Kilns	8 Steam Domestic Furnaces Furnaces, etc.	10 Steam Coking Gas Domestic

CHESAPEAKE & OHIO

	New River	Kentucky	Kanawha
No. of mines	105	1,592,525	167
Daily capacity	50,590	Upper Elkhorn	8,000 (about
Shipment, 1913	6,187,924	Lower	8,816,562
Coal beds and No. mines in each	Sewell (61) Sire Creek (21) Beckley (22) No. 2 Gas (5) No. 5 Block (3)	Van Lear Coalton Auxier Millard Elswick	ch. Eagle (18) No. 2 Gas (64) Powellton (8) Winifrede (9) Coalburg (25) Cedar Grove (9) Stockton (10) No. 5 Block (8)
Trade names	New River Gauley Mtn. Gauley	Elkhorn Millers Creek and others	Kanawha Splin Kanawha Gas Island Creek Cabin Creek and numerous others
No. of selling agencies	15	15+	8+
General uses of coal	Steam Coking Gas Domestic	Steam Coking Gas Domestic Furnaces Kiln	Steam Coking Gas Domestic Furnaces Kiln

VIRGINIAN RAILWAY

No. of mines	62
Daily capacity	26,000 (about)
Shipments, 1913	4,555,531
Coal beds and No. of mines in eahc	Sewell (36) Beckley (22) No. 2 Gas (2) Eagle (2) Pocahontas No. 3 (1)
Trade names of coals	New River Page Long Branch
No. of selling agencies	13
General uses of coals	Steam Gas Domestic Coking



THE NEW STEEL PIER OF THE C. & O. RY.

on all coal from the Pocahontas fields, destined to points outside of the limits of Chesapeake Bay. This is the lowest rates in existence, on any commodity, being only 3.7 mils per ton-mile. On the high volatile coals from the Thacker Field, the rate per gross ton is $1.50.

NORFOLK & WESTERN TERMINALS AT HAMPTON ROADS

Yards—The Lamberts Point Yards contain 52.5 miles of track altogether; the receiving yard will hold 3300 cars of coal, No. 3 pier yard 60 cars, and the No. 4 pier yard 400 cars. There is also a yard for empty cars at the new pier with capacity of 400, and a separate coke car yard holding 130 cars.

Coal Piers—This road now has three piers at Lamberts Point, 17 miles from the ocean, with an hourly capacity of 6800 tons, No. 1 pier having been torn down to make room for the new No. 4 pier.

Pier No. 4 put in operation this year, is one of the two largest in the world, and has already made some notable records in loading ships. Until the completion of the new C. & O. coal pier at Newport News, it had the greatest handling capacity and was the largest in the world, 1200 ft. long, 90 ft. above low water, 32 ft. of water alongside, and 30 ft. wide at the water end. It has a handling capacity of 4500 tons per hour into ships, from four to six of which can be coaled at one time. This pier has loaded 3826 tons into a ship in two hours and a half, 7500 tons in four hours and ten minutes and 12,000 tons in twenty hours.

The car to be unloaded is dropped from the pier classification yard by gravity to the car-dumper incline, first going over the scales; here a barney and rope haulage takes it to the dumping cradle of one of the two car dumpers. It is then turned over, dumping the coal bodily into a pier or transfer car, each of which holds 110 tons; the transfer car is then run on the elevators and lifted straight up to the floor of the coal pier, where it is run by its own power (electric) over the pockets into which the coal is discharged through bottom doors, operated by air. There are 62 pockets, each with a telescopic movable chute, down which the coal goes to the ship's hold.

Coal Mines—The coal operations on the Norfolk & Western are divided by the railway company into five fields, as follows:

Field	Daily Capacity	No. of Mines	Kind of coal	Commercial Shipments, 1913
Pocahontas Flat Top	104,225	99	Semi-bituminous	13,925,397
Tug River	19,225	43	Semi-bituminous	2,075,342
Thacker	20,825	42	Bituminous	2,189,422
Kenova	6,475	12	Bituminous	818,147
Clinch Valley	9,500	27	Bituminous	1,708,951

The shipments over the N. & W. coal piers at Hampton Roads are made up of coals from all these fields, with the exception of the Kenova, but over 90 per cent. comes from the Pocahontas and Tug River Field, all sold under the trade name of Pocahontas.

Recent Legal Decisions

Effect of West Virginia Mine Foreman Law—The provisions of the West Virginia Mine Foreman Law do not exonerate operators from the duty of using a reasonable degree of care to provide safe and suitable appliances for use by their miners. (West Virginia Supreme Court of Appeals, Cheeks vs. Virginia-Pocahontas Coal Co., 82 Southeastern Reporter 756.)

Discrimination in Furnishing Freight Cars—The distribution of coal cars to shippers, including cars owned by the shippers and those used by a railway company for its own fuel, in interstate commerce, is a matter involving preference and discrimination, and one for investigation by the Interstate Commerce Commission. (United States Supreme Court, Texas & Pacific Ry. Co. vs. Abilene Cotton Oil Co., 27 Supreme Court Reporter 350.)

Lien for Price of Mining Machinery—A manufacturing company which sold mining machinery to a coal company, under an agreement that title should remain in the manufacturing company until payment of the price, by failing to record the contract does not lose rights to retake the machinery, as against a lien for rent or royalties claimed by the owner of the land on which the machinery was installed. (United States District Court, Northern District of West Virginia; Jeffrey Mfg. Co. vs. Mound Coal Co.; 215 Federal Reporter 222.)

When Oral Contracts Are Enforceable—The Statute of Frauds, under which contracts not to be performed within the space of one year are made unenforceable unless evidenced by a written memorandum signed by the party to be bound thereby, does not invalidate an oral contract to cut mine props and ties from a tract of land, although the contractor contemplates that more than a year will be consumed in the work, if the contract can be performed in less than a year, and if no time is specified in the agreement. (McClanahan vs. Otto-Marmet Coal & Mining Co., 82 Southeastern Reporter 752.)

The Conservation of Anthracite Coal

By R. V. Norris*

SYNOPSIS—The writer shows how anthracite coal is being conserved in its extraction, preparation and colliery use. The degradation of sizes in the retail yards may increase the amount of pea, buckwheat and dust as much as 10 per cent.

Conservation is such a use of a natural product that the largest proportion commercially possible may ultimately be available. It certainly is not the locking up of all such material for the use of future generations. Anthracite coal, because of its limited quantity, particularly requires conservation methods in its exploitation, and such methods are properly classified into: Mining, preparation, power production and marketing:

Mining Methods

The two general factors modifying conservation in mining are the minimum thickness of the bed mined and the percentage of recovery:

Thickness of Bed Mined

In deciding which beds are and which are not mineable, we face, at once, the question of profitable operation, and it may be conceded that other things being equal, beds which are 6 ft. and over in thickness are more cheaply mined than those which are thinner. If we eliminate all variations other than cutting and loading in making our calculations, the relative cost of mining for varying thicknesses is a matter of simple calculation.

Let

- a = Allowance for rock in cents per inch per yard;
- h = Normal required thickness, in inches, on which allowance is based;
- x = Thickness of coal, in inches, as measured for allowance;
- x^1 = Net thickness of coal, in inches;
- f = Capacity of mine car, cubic feet;
- w = Width of chamber in feet;
- s = Thickness, in inches, which will give one mine car per yard of chamber. Assume loose coal occupies 1½ times the volume of an equal weight of solid;
- c = Cents per car allowance;
- m = Mining price per car, no allowance.

Then

$(h - x)\,a$ = Allowance per yard of chamber;

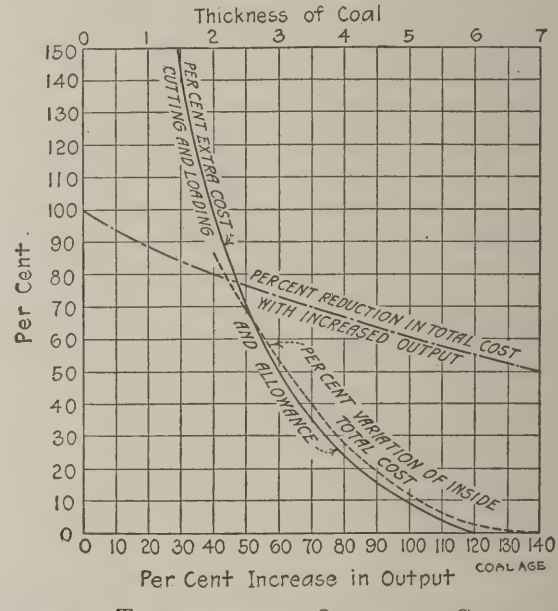
$f = \frac{3\,w\,s}{12} \times 1\frac{1}{2}$ $\therefore$ $s = \frac{8\,f\,x^1}{3\,w\,s}$ = Number cars per yard of chamber width;

$$c = \frac{\frac{(h-x)\,a}{\frac{x^1}{s}}}{} = \frac{h\,a\,s - a\,s\,x}{x^1}.$$

From this, for any particular conditions, the cost for each thickness may be calculated, and a curve constructed showing the relation between cost and thickness, as shown in diagram.

Unfortunately, all the costs which vary with the thickness of bed are not susceptible to calculation, but in general the inside costs increase rapidly with the mining of thinner coal, and the diagram showing the variation of cost with thickness is believed to represent fairly the average conditions in this district. It was constructed by plotting a large number of actual costs and then drawing the average curve.

We find ourselves facing the dilemma whether we shall mine the coal which is profitable in itself or a mixture of profitable and unprofitable coal which, through the preponderance of the latter, will result in a profitable output. Our first thought would naturally be that only the coal which is actually profitable should be mined, but when we make a more complete inquiry we find another condition in the relation of output to cost. As but approximately one-third of the inside cost is expended in actual cutting and loading, and as the greater part of the outside cost is but slightly dependent upon output, the cost per ton will be found to vary greatly with the coal production, even with a fixed unit cost for cutting and loading. How great this variation may be is indicated on the diagram, and it is apparent that a large output



Relation of Thickness and Output to Cost of Coal

from beds which show a relatively high mining cost may be actually more profitable than a much smaller output exclusively from the larger and cheaper beds.

Hence, it is apparent that, even from the standpoint of immediate profit, it may be advisable to mine the thinner beds with the thicker, and considering the ultimate yield of a property, there can be no question as to the advisability of such a course. The actual minimum mineable thickness being dependent upon so many conditions is not susceptible to general determination and should be studied for each individual case.

Pillar Sizes and Distribution

The general method of mining in the anthracite region is by room and pillar, with modifications adapting it to the mine conditions or too often to the idiosyncrasies of the superintendent or foreman. The early mining was done largely by haphazard, leaving irregular chambers and pillars with the result that squeezes were frequent,

Note—Article read before the Engineering Society of Northeastern Pennsylvania, Oct. 15, 1914.

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extensive and disastrous. It is evident that if a given percentage of regularly distributed pillar is required to support overlying strata, the same or even a much greater percentage irregularly distributed may fail to accomplish the result.

Therefore, in chamber and pillar mining, a regular distribution of pillars is essential, involving the careful layout of the workings and the driving of all chambers on line. Further, to obtain the greatest ultimate output, the first mining must be planned so as to leave pillars of sufficient strength to assure support to the overlying strata until second mining can be prosecuted. Under normal conditions the pillar width for first mining may be calculated by Bunting's formula, which, transposed, gives:

$$p^2 + \left(\tfrac{2}{3}\,T - \frac{DT}{300}\right) p = \frac{CDT}{300}$$

where p = pillar width; C = chamber width; T = total thickness of bed; D = depth.

The advantage of carefully projected mining over excavation by hit-or-miss methods is shown in the increase of yield from former performances, in which the output averaged was less than 50 per cent. The maximum extraction was only 65 per cent. on first mining. Under old methods there was but little hope of appreciable recovery from second mining and the percentage accepted in February, 1913, for the estimation of assessment values, ranged for flat measures under 500 ft. deep from 79 per cent., where the coal measure was less than 6 ft. thick down to 65 per cent. where the bed was as much as 30 ft. in thickness.

Removal of Beds in Order

While the mining was largely in individual hands, each operator desiring the greatest possible immediate return, no attention was paid to the order in which beds were mined. The larger or more accessible beds were opened, mined and caved without regard to overlying coal, with the result of injuring, and in some cases irretrievably ruining overlying beds relatively close to those mined, and often seriously cracking beds even more distant.

It is now a recognized principle that overlying coal should be fully removed before second mining is started beneath it, and present knowledge would indicate that first and second mining should follow each other as rapidly as possible to avoid the deterioration of timber and the loss of coal from spalling, as well as to minimize the cost of reopening the workings and relaying the track.

Use of Shaft and Check Pillars

Modern mining systems laid out to obtain the greatest ultimate yield include provisions for the safety of mine openings and the localization of troubles, such as ample shaft support and the now usual provision of check pillars left throughout a property. Every tenth or twelfth chamber is omitted for the purpose of localizing any difficulty and avoiding the old-time extensive squeezes. Further, safety pillars are now usually left beside and under important openings, such as tunnels and slopes. As all this coal is ultimately gained in second mining, such safety provisions are true conservation and operate materially to increase the ultimate yield.

Flushing

While culm flushing has been thus far utilized primarily for support, or rather to prevent the disintegration of pillars, the practice will unquestionably result in larger ultimate yields, and will minimize damage to the surface and to overlying beds by decreasing the settlement from the removal of coal. Further, sand flushing appears to promise excellent support, and its use, hardly warranted by the present small margin of profit, should result in the recovery of much coal not at present considered available.

Mining from Underlying Beds

Where beds are relatively close together, it is often found practicable to remove the overlying bed through rock holes from the underlying, decreasing the development expenses, halving the cost of maintaining gangways and increasing the ultimate yield.

This is particularly effective in the steep-pitching measures and large beds of the southern field. The Lehigh Coal & Navigation Co. is now recovering stupendous amounts of coal in the Panther Creek Basin in the Mammoth bed, which is here standing vertical and 60 ft. thick, by driving gangways in the underlying Skidmore, and opening in a bottom split of the Mammoth, which was disregarded in first mining. This method was detailed in W. G. Whildin's paper, on "Steep-Pitch Mining," which was read at the Pottsville meeting of the Anthracite Section of the A. I. M. E. He reports that by present methods a yield of 65 per cent. of the total contents is obtained against less than 40 per cent. under older systems.

Similar methods in mining the Mammoth bed in the Shenandoah basin have disclosed the fact that in the original mining, to avoid annoyance from an insufficient pitch, the chambers were driven so as to leave, near the gangway, half or more of the coal in the top and at the top of the chambers as much or more in the bottom. Actually, over 50 per cent. of the present output of the William Penn colliery is from such workings in the Mammoth, the coal coming almost entirely from areas in which second mining had been considered completed and which were marked as exhausted on the old maps.

Use of Undercutting Machine

Within the last two or three years, extensive experiments have been made in the use of undercutting machines, especially in thin beds in the Lackawanna field, and the results give bright promise of economies sufficient to warrant the mining of beds too thin to be workable at a profit under present methods. Under average conditions, it is at present usually unprofitable to mine less than 2 ft. 8 in. to 3 ft. of coal by itself, though thinner beds are occasionally mined to increase output and thus lessen fixed charges, and in this way may actually be profitable, though if bearing their full share of such charges they show a loss.

Further, the use of undercutting machines should result in a larger percentage of prepared sizes, thus increasing the average return and permitting greater cost in mining. The employment of mining machines also leads to the adoption of modified longwall methods promising an increased ultimate percentage of removal.

General Observations on Mining

The details of improved mining methods and of possible further improvement might be extended almost indefinitely, including such items as improved transporta-

tion, the use of steel and concrete for roof support, the consolidation of pumping and hoisting operations, and the better laying out of development aided by extensive borehole exploration of difficult territory in advance of actual mining. As every saving in cost permits a higher cost of actual mining, the result of such improvements must be the recovery of larger percentages of the coal in the ground.

Preparation

From the hand breaking and fluke roll of the sixties, with the rejection of all small coal, to the present perfection of economical preparation is a wide step, resulting in not only saving fully 30 per cent. of the coal which was formerly rejected on account of size, but in making possible the mining and sale of coal from the impure beds, which is of such a character from stratification with impurities that its preparation for market was impossible even twenty-five years ago.

Screens

Among the breaker improvements tending to a greater recovery may be mentioned screens; first, round, which were inefficient on sizes below ¼-in. mesh, then the Coxe gyrating screen, which, on larger sizes, is today the most economical, but which presents inherent structural and operative difficulties preventing its general adoption, and now the shaking screen at its maximum development. Whether the ultimate in screening has been reached, the future only will show, but, personally, I believe that, in future, better methods, minimizing the present attrition, will be found.

Slate Pickers and Jigs

In removing impurities the advance has been even more marked than in screening practice. From the hand-picking of a short generation ago, has developed the various dry pickers adapted to certain classes of coal and the jigs, also due for their first introduction to that pioneer in preparation, Eckley B. Coxe. The lines of future advance appear to be more in the line of perfection of details and reduction of attrition losses than in new principles, though there are still possibilities in a steady upward current of water, which has proved most efficient in copper practice.

Breaking

Perhaps the greatest advance in conservation in the preparing of coal has been in the breaking of the mineral. When the demand was sufficient for lump and larger sizes, the economy of rolls was relatively unimportant, but as the market conditions have changed, so that fine sizes of anthracite now replace the more costly lump, steamer and broken coal, the necessity has developed for breaking down all large coal to relatively small sizes.

A realization of the great losses formerly involved in the use of rolls of convenient sizes with poorly placed and dull teeth, resulted first in the more scientific placing of teeth and the design of separate rolls suitable for the work required of each. Then it was realized that the losses due to dull teeth were important and unnecessary. Later a study was made of the effect of speed on economy in crushing. A reduction of the peripheral speed of the rolls from about 950 ft. per min., the usual practice, to 250 ft., is shown by Paul Sterling, Trans. American Institute of Mining Engineers, Vol. 42, p. 286, to have reduced the percentage of pea and under, made in crushing lump coal from 20 per cent. to 12, a saving in this one item of 40 per cent. of the loss in fines.

One further factor remains to be studied in crushing practice, the diameter of the rolls. This is a difficult and costly matter to determine and has not thus far been scientifically considered, but it seems probable that there should be a particular diameter of roll best suited to each size of coal and it would appear that investigation on this factor in coal crushing would result in an increase of efficiency.

Breaker Construction

Further economies have been and can be made in the handling of coal in the breakers. Drops can be reduced, the speed of sliding decreased so as to reduce losses by impact. The handling, particularly of large-sized coal, can be largely avoided.

The breakage in elevators is greater than in conveyors, due to necessary attrition and impact in loading and discharge. Slow-moving belts are ideal, but the high-speed belts, such as are usually installed, probably cause more loss in breakage from the impact of delivery than they save because of the more gentle loading and carrying.

Loading

In car loading, the installation of tilting box-car loaders unquestionably reduces breakage, while the conveyor loaders throwing coal to the ends of the car increase it.

Bone

Further, modern practice has made possible the mechanical cleaning of coal and the elimination of the slate almost entirely thereby. Thus, anthracite as delivered to the market is free from impurity, though containing most of the coal content of the boney layers. Instead of crushing the bone or actually rejecting it, it is now cleaned of its impurities and this has added materially to the ultimate yield.

Power Production

The percentage of the whole coal mined which is used as fuel at the collieries has risen within the last 25 years from about 5 per cent. to a present average of nearly 12 per cent. of the shipments. The extension and increasing depth of the mining operations would have caused a larger increase in consumption than has taken place had it not been for the introduction of improvements in practice.

Boilers

In the early eighties, practically all boilers were of the cylinder type, evaporating as an average not over 6 lb. of water per pound of combustible, and burning pea and No. 1 buckwheat coal. At present nearly all are of tubular type, evaporating 9 to 10 lb. of water per pound of combustible, and usually burning the finest sizes of coal mixed with ground breaker refuse.

Engines

The engines used at that time were all of the plain slide-valve type, taking steam throughout the stroke and using on the average over 60 lb. of steam per hp.-hr., and in some cases as much as 135 lb. Today high-grade engines for continuous work are the rule rather than the exception, and in these the steam consumption has been

reduced nearly to 30 lb. per hp.-hr. In hoisting engines, while steam economy has not progressed as far, owing to the necessity for absolute control and for rapid starting and stopping, great improvements have been made in designing engines with ample valve area, and with cylinders properly proportioned to their work, but there is still opportunity for economy in the introduction of compound condensing hoists, at least in the deeper shafts, as has been done under the impetus of costly fuel in our Western states.

Pumps

The greatest improvement in steam consumption has, however, been in the pumping plants. The simple direct-acting pumps designed for low steam pressure have been replaced by multiple-expansion engines. These are, in many cases, condensing and designed for high steam pressure. As a result the steam consumption is reduced from an average of over 70 lb. to 20 and in some notable examples to as low as 14 lb. per hp.-hr.

Pipe Covering

The covering of steam lines, too, has removed a tremendous loss, which, in a single colliery examined some years ago, would have aggregated nearly 400,000 lb. of steam in each 24 hr. As a result, 1330 b.hp., which would have been required had the pipes been uncovered, was not needed. This saving was almost equal to the 1366 hp. actually in use.

Electricity

The substitution of electric for steam and animal power, particularly for haulage and pumping, has also resulted in great economies, and the present trend toward central generating stations with the highest grade of machinery, will further help balance the fuel consumption of collieries, which is necessarily increasing steadily.

Drainage Tunnels

Beside the improvements in pumping machinery, much fuel has been saved by the driving of drainage tunnels, such as the Jeddo and Beaver Meadow, and that of the Lehigh Coal & Navigation Co.; these, beside freeing the collieries from the danger of flooding, save much fuel, which would otherwise be required to actuate the pumps.

Marketing

In the transportation from the mines to the market, the carriage itself is beyond reproach. Careful tests made some years ago absolutely failed to show any breakage in the car itself. On the other hand, the handling of the retailer is about the worst example of inefficiency conceivable.

Beginning at the terminal, coal is generally dumped directly from the car into pockets, with a vertical drop of many feet. From these it is drawn by chutes extending over barges, into which it falls, making a clear drop often averaging 20 ft. or more. Then it is removed in grab buckets, hoisted into a tower, dropped into cars or onto a belt conveyor, dropped again vertically into further pockets or onto piles; finally it is drawn under pressure into wagons and dropped into the consumer's cellar.

At each of these brutal transfers, screening is required and the resultant screenings are sold at a low price as "pea and dust." All this unscientific handling adds to the cost to the consumer without advantage to anyone. Tests have shown average loss in passing through pockets and into boats of 10 per cent. of egg coal converted into pea and under.

Storage Plants and Mechanical Handling

In contrast to this, witness the losses in properly designed storage plants, which, on prepared coal in three large plants, averaged but 2.84 per cent. converted into pea and under, and the excellent handling in places in New York harbor, where, by the use of McMyler car dumpers and telescoping chutes, coal is transferred from cars to boats with but slight deterioration in size.

Retail Yards

In general, the point in marketing toward which attention from the standpoint of conservation should be directed, is the handling by the retail dealers. Some of the wholesalers also break and otherwise reduce the sizes of the coal unnecessarily, in their yards. It is in the distributing yards that one of the greatest and most easily avoidable losses in the business is found.

Conclusions

In the above an attempt has been made to outline the improvements made and to indicate possible future developments tending to reduce the waste and thereby conserve coal resources. But this paper would be not merely incomplete but unjust, did it fail to call attention to the wonderful conservation now being practiced by the great coal companies, in mining all possible coal almost regardless of present profits and in endeavoring to attain the ultimate possible output from the lands entrusted to their charge. Furthermore, they have made persistent efforts for the larger conservation of human life and have sought diligently to take from coal mining the stigma of being one of the hazardous occupations.

Coal Docks on Lake Erie

Appended herewith is a table of coal docks at lower Lake ports, giving the name of the port, the name of the railroad owning the dock, the type of machine used in loading coal aboard vessels, together with the capacity of the machine per hour. The information contained in the table was obtained direct from the operators and is accurate and uptodate.

Port	Railroad	Capacity*
Erie[1]	Pennsylvania Co.	25
Erie[2]	Pennsylvania R.R.	30
Conneaut[2]	B. & L. E.	14
Ashtabula Harbor[2]	Pennsylvania Co.	32
Ashtabula Harbor[2]	Pennsylvania Co.	30
Ashtabula Harbor[2]	L. S. & M. S.	20
Ashtabula Harbor[2]	L. S. & M. S.	20
Fairport[2]	B. & O.	25
Cleveland[1]	Pennsylvania Co.	30
Cleveland[2]	Pennsylvania Co.	20
Cleveland[2]	Pennsylvania R.R.	20
Cleveland[1]	Erie R.R.	20
Cleveland[2]	W. & L. E.	20
Lorain[2]	B. & O.	10
Lorain[2]	B. & O.	20
Huron[2]	W. & L. E.	20
Huron[2]	W. & L. E.	20
Sandusky[3]	C., C., C. & St. L.	1
Sandusky[2]	B. & O.	3
Sandusky[2]	Pennsylvania Co.	24
Sandusky[1]	Pennsylvania Co.	30 to 40
Toledo[1]	Hocking Valley R.R.	40
Toledo[2]	Toledo & Ohio Central R.R.	20
Toledo[2]	C., H. & D. Ry.	30
Toledo[2]	W. & L. E.	6

[1]Wellman-Seaver-Morgan machine. [2]McMyler machine. [3]Excelsior machine. [4]Two Brown Hoists of 40 cars capacity each.

*In railroad cars per hour.

Note—From the "Marine Review."

Power Department

The Coal-Mine Power Plant

SPECIAL CORRESPONDENCE

SYNOPSIS—In coal mining, the power plant is frequently grossly neglected. It is in reality the mainspring of the whole coal-producing equipment and no pains nor means should be spared to render it as reliable as possible.

Much attention has been given during recent years to the application of electricity to colliery purposes. Efforts have been put forth by electrical manufacturers toward securing apparatus which should be as far as possible mistake proof, and at the same time rugged, simple and especially designed to withstand the neglect and rough handling inherent to operation underground. Simultaneously, progress has been made in the education of men employed in the mine regarding the proper use of electrical apparatus and the dangers attendant upon carelessness or misuse. As a result, much of the prejudice which at first existed with reference to the employment of electricity in mining operations has disappeared.

Attention should now, however, be drawn to a matter which may well become of greater and greater importance as electricity becomes more extensively used. This is the question of the power house, which supplies the energy to the colliery.

This may at first sight appear to warrant no great consideration. It is usually, however, the matter which is passed over as being too simple for comment, which affords the opportunity for trouble, and the mining power plant at the present time occupies for the most part a rather dangerous position.

At the beginning of electrical application, a small plant sufficed for the needs of the colliery, and an installation of this description could be attended by a comparatively small staff, who possessed no great experience. Today, however, a gradual process of extension in electrical application is going on in most mining developments involving an increase in the size and output of the power units. Conjointly, there is a distinct tendency to connect more than one mine onto a general system supplied from the main generating station.

This brings about some important changes in conditions. The power station is greatly increased in size and usually in complexity, with the result that unless great care is taken to standardize equipment and simplify operations, as the use of electric power increases the problem of supervision becomes considerable, with the result that a man possessed of a much higher order of technical knowledge and experience is required therefor than was formerly the case.

In many instances, especially where several mines are connected to one power house, due to heavy transmission losses incident to the use of direct current a change of the method of distribution to polyphase alternating current is being made, and for the operation of this latter much technical knowledge is necessary.

CONTINUITY OF SERVICE IS IMPORTANT

In installations which supply light, heat and power to industrial communities, it is readily recognized that the supervision and operation must be of a highly skilled nature. Colliery plants as a rule are smaller in output than the average power plant for a community, and there is a tendency to cheapen the cost of operation by utilizing services of men who may not have the same technical qualifications.

It is at once apparent that it is important to maintain continuity of supply on an industrial lighting and power circuit. It is, however, even more important to maintain continuity and reliability in a colliery plant, even though its size may be smaller and its operation local, because much depends on such continuity.

It is not necessary to elaborate on the serious consequences, both as regards life and property, which might be involved in an undue stoppage of a ventilating fan. The mine output is also vitally affected by the continuity of power supply, for at the present time when electric coal cutters and locomotives, electrically operated screens and washing plants are the order of the day, failure of power supply at any point involves dislocation of the work, a reduction of efficiency, and the loss of output.

To accomplish continuity of supply, two main factors are essential. The first is reliable equipment in the power house simplified as far as possible, and standardized to the utmost limit so as to reduce the difficulty of supervision to a minimum. The second is due provision for an adequate staff possessed of a proper degree of technical knowledge working under conditions promoting bodily health and mental clearness.

It is not proposed to here consider examples where such conditions are not fulfilled, although it would be by no means a difficult stretch of the imagination to believe that some colliery plants do not wholely measure up to these requirements. It may, however, be pointed out that a mining power plant should be designed with liberal ground space and due provision for systematic extension both as regards boilers, engines and electrical machinery.

THE SWITCHBOARD IS AN IMPORTANT ELEMENT

As a rule, the chief danger arises at the switchboard. An equipment of this kind designed on the principle of standard panels, properly safeguarded at the front, and so wired that any switchboard attendant can, either by reference to a wiring diagram or by a quick inspection of the connections at the rear of the board ascertain the course of the current at any time is the one to be preferred.

The switchboard should be capable of being easily kept clean without danger at any time and due space should be provided both in front of and behind it to allow an attendant to work in a perfectly uncramped manner.

In reality, the switchboard is the pivoting point of the whole station, because here the entire power output is concentrated and from this point it is distributed. Consequently, no reasonable expense should be spared in making it both safe and convenient. Above all, no portion of a switchboard or any switching apparatus about the power house which has been erected in a temporary manner should be allowed to become permanent. This remark applies with equal forcibility to cables connecting the various parts of the electrical apparatus.

One of the most important objects to be kept in view in designing a mining power plant is the comfort of the employees. This is not urged from any philanthropic or humanitarian motive, but simply as a matter affecting the reliability of power supply. The chief dangers are insufficient light, undue heat, awkward corners, cramped conditions, and waste products.

The power house which has dark places and corners invites break-downs. It is impossible to maintain the requisite amount of cleanliness and safety when the only possible way of thoroughly examining the plant is by the light of a portable torch. This condition leads naturally to leaks of steam and hot water in the piping, and to loose screws, bad insulation and other troubles in the electrical equipment.

Light is essential to observation and maintenance and the management has only itself to blame if the plant fails owing to bad design from this cause. Moreover, darkness conceals filth and dirt which whether found in a deposit of dust on bearings, or a greasy film on electric contacts and insulators are the forerunners of more or less serious disaster.

A High Temperature Should Be Avoided

A common fault in power houses, particularly those operated by steam, is the prevalence of too high a temperature, both in the boiler house and engine room. This has a bad effect not only upon the insulation but the electrical output as well. It is even more marked in its effect on the condition of the operating staff. No man can work properly when placed under conditions where he continually feels limp. Under such circumstances supervision is relaxed and there is a tendency to shirk. Jobs that ought to be done are put off indefinitely with the result that repairs are not executed until they become unduly costly.

Parsimony in proper ventilation is paid for by increased maintenance cost and the highest grade of workman regardless of whether he be a fireman, engine driver or switchboard operator, will not long remain in places where he is subjected to a maximum amount of discomfort. The result of all this is that the only men available for continuous employment in badly designed stations, are those that are the least competent to operate the machinery.

A due consideration of the comfort of employees means that better attention is paid to apparatus, and breakdowns are minimized. If the apparatus is so arranged that it can only be attended to by a vast amount of running about for the inspection of meters, steam and water gages and the like, it is practically certain that something will be neglected. For this reason awkward corners and inconvenient levels should be avoided, and gages as far as possible be brought as near as local conditions will permit to the eye level of the attendant.

A power plant which can only be operated by climbing over or crawling under pipe work, or threading a precarious trail, past festoons of temporary cable, is not only a death trap to the men operating it, but may be the cause of various disasters among those in the mine who are dependent upon a continuous and efficient supply of electrical power.

Careful Provision for Waste Disposal

An item which is often overlooked in power plants, particularly those of medium size, which cannot indulge in elaborate systems of fuel and ash conveyors, is that of the proper disposal of waste products from the boilers. The result of neglect, particularly if the plant is undermanned, is that accumulations of clinkers and ash are found on the boiler-house floor, impeding the work of the firemen, providing a good distributing center for pernicious dust and dirt throughout the building and heating an already uncomfortable atmosphere.

If wheelbarrows have to be employed to get rid of the ashes, the track to the dump should be wide and direct and not too long. Due provision in the shape of man power should be made to get rid of the ashes as quickly as possible after they are drawn from the furnaces. A fireman cannot work properly if he has to contend with an uneven floor, and crumbling masses of clinker.

Other points could be enumerated which result from conditions attendant upon mismanagement of even such medium-sized plants as are required at coal mines. The above, however, may suffice to draw attention to the fact that because a plant is situated upon the surface and not in the heart of the mine, it must not therefore be treated with disrespect. Such a plant is the central point upon which the whole operation of an electrically driven mine depends, and sufficient care should be taken both as regards equipment and working conditions, to insure that no possible chance can be given to breakdowns other than those caused by such gross carelessness that the services of the man responsible therefor may be immediately dispensed with.

Many a man is reasonably efficient under reasonable conditions. Few are sufficient geniuses to guarantee results when proper means for procuring the same are not afforded.



Engine and Small Passenger Coaches Used to Convey the Men Three Miles from Tipple to Mine, Mill Creek Coal and Coke Co., Cooper, West Virginia

Developing a Sixteen-Inch Coal Seam

By J. F. K. Brown*

SYNOPSIS—Description of a small operation managed by one man who is averaging a profit of about 30c. per ton. The methods of mining and handling the coal are unique. Each miner not only cuts his coal, but loads and trams it to the tipple.

The scene of this exploit is in Central New Brunswick, Canada, and its successful operator, a self-taught miner. It is true that he is making only his living out of his efforts, but his methods point the way to future success. Furthermore, he has accomplished what "legions" of American engineers have failed to do.

A section of the seam is shown in Fig. 1. It is generally considered to be in the non-productive Millstone grit, of the Carboniferous system. The overlying stratum averages about 100 ft. in thickness and is made up mainly of a heavy blocky sandstone and beds of shale. One of these beds lies directly over the coal. This shale is impervious to water, and this fact apparently preserves the workings dry.

The coal outcrops in the bed of the river, but being

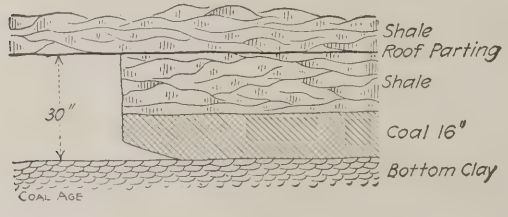


Fig. 1. Showing Section of the Coal Seam

itself together with the shale weathered by many seasons of frost and rain, the actual outcrop is entirely concealed by vegetation.

Fig. 2 shows the entrance to one of the main levels. At this point the banks of the stream fall roughly from the tableland above in a heavily wooded bluff, at an angle of about 45 degrees, the bed of the stream being about 140 ft. below the seam. A section is shown in Fig. 3.

In working, the main level is driven in on the coal a width of approximately 10 ft., enough to provide a double track if needed. Owing to the shape of the areas, this level was at first driven south and at an angle to the teeth of the coal. At a distance of 300 ft. in, levels are turned at right angles about 30 ft. apart. Thereafter, in the usual American practice, these levels are opened out 20 ft. from the main roadway, to a width of 15 ft., forming a room on one side of the roadway. This is continued for a distance of 30 ft. when the men turn and take 30 ft. out of the other side of the road, narrowing down again when they approach the main roadway. Under this system any pillars that are formed are immediately taken out, and further it has the advantage of operating what is practically a piece of a longwall section in which some area is left to dispose of surplus stone,

*Sydney, N. S., Canada.

Method of Mining

The height of the actual working is about 30 in. This leaves 14 in. of stone, which must be mined as well as the coal, and sent away. Three cars of stone, more or less, to one of coal is the collier's usual production. The undercutting of the coal takes place above the coal seam. At the parting between the coal and the shale there are a few inches of a finer grained and softer shale, and this is easier to mine than in the coal, besides having the very important advantage of leaving all the coal intact for market purposes.

The miner's picks when used to mine at either the



Fig. 2. Looking up Hoisting Trestle. Entrance to Level on Left

bottom or top of the seam soon become blunt in comparison with those used in mining the shale. This appears to be due to the presence of an occasional thin band of iron pyrites which appears at this point. No explosives are used, the coal parts perfectly from the pavement. In working, the shale is mined and taken down first, trammed or filled out of the way. Timber as required is next set, after which the coal is in turn lifted and run outside. The roof would seem to be of a short-break nature, but certain partings if taken and maintained will stand well. Fig. 4 shows a section of the workings at present being operated.

Past operations have never gone very far from the outcrop, with the result that there are a great number of old tunnels dotted along above the bed of the stream wherever the cover has been strong enough to permit working. A little water leaks through from the old areas into the

present areas. The dip is slight, the field forming what would be termed elsewhere a level field.

Handling the Mine Water

Pumping troubles are avoided by arranging a ditch which is cut to a considerable depth in the center or side of each entry with just enough grade for free water drainage. This, of course, will serve only a limited area, but there is ample fall from the mouth of the mine to the bed of the stream to allow of the use of a siphon which will take care of all the water made in the mine for many years to come. There are also indications that once the present development gets past the limits of the old workings, the mine will in all probability be dry, and it is to be hoped, not too dry.

Up to the present, as all the operations are near the mouth of the level, the miners tram both their coal, and what stone they cannot stow, outside. Here the slope to the bed of the stream forms a convenient dumping ground, and doubtless in the past, many hundreds of tons of shale have been weathered away by the stream, and carried out to the ocean. The coal is trammed in small boxes holding about 700 lb. each. Although these boxes are very small, they are a convenient size, considering the height of the workings. One man can attend to running them out to the surface, and, in case of a derailment, they are easily put back upon the track. Light rails are used and since this steel is placed by men unacquainted with the work, derailments are frequent.

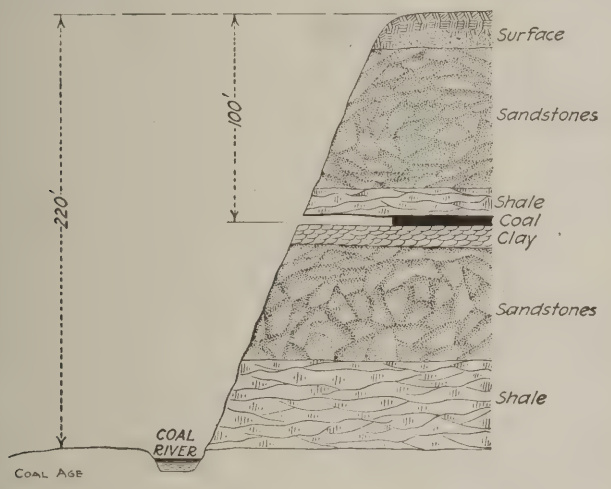


Fig. 3. The Seam Lies about 140 Ft. above the River

Handling the Coal

The coal from the mine is weighed and is then tippled into a two and a half ton hopper truck. An incline laid on a 3-ft. gage rises at an angle of 45 deg. to the top of the river bank, and the truck when full is hoisted to the top by a small steam hoist. At the top, and on the general tableland, a larger storage hopper has been built, and into this the small hopper truck automatically discharges. From here the coal is carried away by wagon a distance of over a thousand yards before it finally reaches the railway siding and is deposited in railway cars.

These would appear to be insurmountable objections to profitable working in other regions, but despite the thin seam, the mining of three boxes of stone to two of coal, the extra handling of the fuel, and the carting of it by teams, there is a profit on the operation. There are, of course, no pumping costs, no haulage costs, no winding costs, and no ventilation questions.

The quality of the coal is excellent, that is, as measured by the standard of the fuels against which it has to compete. Its ash content is high as compared with American coals, but not as compared with a number of the Canadian seams. A comparative table is given below, the first column being the thin coal:

ANALYSIS OF CANADIAN COALS

	Thin Coal	Joggins	Spring-hill	Vale	Drum-mond
Water	4.300	.....	.....	1.40	0.72
Volatile matter	31.275	40.89	34.09	28.80	25.73
Fixed carbon	53.175	48.33	54.33	55.30	65.35
Ash	11.250	10.78	11.58	14.50	8.20

In addition, the analyst gives the heat units as 14,148 (Thomson), and says "The coal possesses excellent coking qualities and forms a hard coke, well fused and bright in appearance. The evaporative power of the coal is high and compares favorably with the best Welsh bunkering coals."

The main fault of the seam is its tendency to break in handling, although doubtless this is aggravated by the unnecessary number of times during mining that it is thrown from one conveyance to the other. The price obtained for the coal, while high as compared with the majority of American mines, is actually less than the sum received by the Nova Scotia collieries with their thicker seams, by approximately 25c. The coal mined from this thin seam sells for $2.55 per ton on the railway cars.

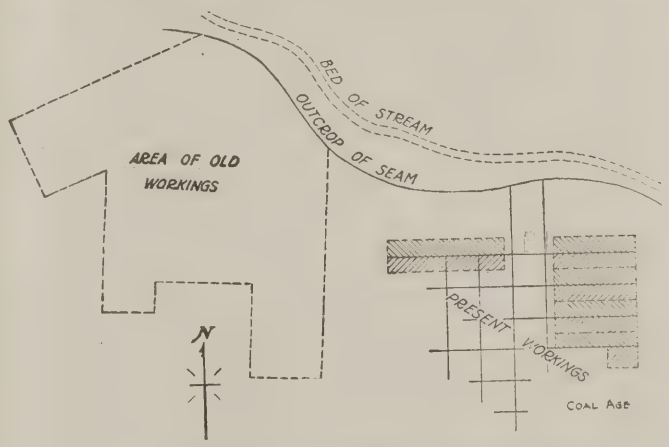


Fig. 4. A Section of the Workings Now Being Operated

Reasons for Success

While quite a number of little matters have helped to bring about the success of this tiny mine, there are two main reasons, and these are low capital outlay and low supervision costs. That these points are important cannot be denied, but it is a strange thing that other people with more money and better training appear to forget their significance the moment the first sod of a new enterprise is turned.

The wages earned by the men working, none of whom have any knowledge of mining except what they have learned through experience in this coal, average about $3 per day. In the mine the money is earned on the tonnage put out, and the rate paid is $1.34 per ton of coal extracted. For this the miner undercuts his coal, takes down the stone, trams it to the dump, sets his

timbers, lifts and gets his coal to the mouth of the mine, an average distance of say 500 ft. Therefore the total mining cost is entirely covered by this extremely modest figure.

Administrative Duties

Then come the duties of the management, which start at this point. The management, represented in the singular by the operator himself, weighs the coal, hoists the self-dumping car when full, and attends to all the questions of time and tonnages. When the hopper at the top of the incline is full, cars are called for on the railway line up to the capacity required, and a double team requisitioned; the coal is then carted over to the railroad. This operation costs 25c. per ton.

Timber grows on the estate, at the mouth of the mine in abundance for the requirements of the squad employed. The price paid is 85c. per 100 ft. for 4-in. stuff, and $1 for 6-in. timbers. The cost of this item approximates 10c. per ton of coal mined.

Cost of Mining

Overseeing, weighing, hoisting, clerking and any other odd matters occupy only part of one man's time, and that man in this case is the proprietor. Then there are sundry items, such as lamp oil, lamps, tools and sundry repairs, blacksmith work, and the small amount of supplies required. Altogether the actual cost of getting the coal can, with fair accuracy, be tabulated by one who was on the ground, somewhat as follows:

Mining	$1.34
Timber	0.10
Repairing and blacksmith work	0.12
Surface trucking to railway spur	0.25
Sundry supplies	0.13
Overseeing	0.30
Total	$2.24

We have left about 30c. on the ton, which may be called legitimate profit.

As the photographs will readily show, there has not been much capital expended, and this sum together with the little required for the initial development of the mine, over and above the value of the coal extracted, I estimate at $2800. Twenty tons a day is the output maintained, and this amount about represents the limits of one man's activities in the direction of attending to all the duties above described. At these figures, however, with increased output, there could be quite a nice little profit.

It is now proposed to equip this small mine with modern mining appliances underground, which will be described at some future date.

The owner also has the further advantage, in that he sells to only one customer, the owner of the leasehold, and so has no bad debts to meet, and only one account to keep. The owner of the lease resells at a profit sufficient to at least cover the government royalty. The operator, therefore, instead of having to pay a royalty, accepts a fixed sum for the coal mined.

While it is agreed that the circumstances are exceptionally favorable to the thin seam working, it must also be agreed, that in this mine the case was made to suit the circumstances. There are no particularly striking innovations in methods of operation, and that being so, the successful initial work is mainly a triumph of common sense.

The Labor Situation

The principal development in the labor situation of Ohio during the past week was the movement started in the miners' organization demanding a referendum vote on the proposition of accepting the operators' offer of 44.61c. for machine-mined coal on the mine-run basis in the eastern Ohio district. The local of the union at West Wheeling adopted such a resolution recently and it is said a similar preference was expressed by the miners' union at Glencoe. These actions show the temper of the rank and file of the miners' organization, which is anxious to return to work despite the effort of officials to keep them in line on the strike proposition. So far no efforts have been made to resume the wage-scale conferences. Among the families of the miners in eastern Ohio, there is much suffering reported, which is being relieved by local committees and the Ohio mining department.

Rebuilding of Tipples to Conform with Mine-Run Law

Many of the larger operators in the Hocking Valley district have secured plans and figures on the rebuilding of tipples to conform to the new law but contracts have not yet been made. The market is weak and it is hard to raise money for such rebuilding of equipment. This is especially true of the Sunday Creek Co., where efforts are being made to conform to the decree of the court separating the companies from railroad control by Nov. 4. Until the reorganization is effected, it is believed that nothing will be done toward rebuilding the tipples of the company. It is estimated that the cost to that corporation alone will be $250,000.

Governor Cox Promises Resumption after the Election

Governor Cox in his campaign for reëlection promised that the strike would be ended the day after the coming November election. This statement was made to the idle miners in an effort to secure their votes and to prejudice them against the operators. Just how the strike would be settled he failed to say but inferred that the operators would be glad to give the miners their demands after the election. This statement which was repeated several times roused the ire of some of the operators who object to the governor playing politics in that manner.

In the meantime, the miners' officials are busy securing loans in an effort to finance the strike during the winter months. This is taken to indicate that the miners' officials do not believe the governor's statements, as they would not need to lay plans for securing money if the strike was to end the day following the election.

The Royalton Explosion

A gas explosion followed by fire occurred early Oct. 27 in the mine of the Franklin Coal & Coke Co., Royalton, Franklin County, Ill. Shortly before the explosion, 300 men entered the mine; only a cageful of the day force remained on the surface. At the present writing, 47 bodies have been recovered and it is believed that there are now no more left in the workings. More than 80 men taken from the mine living are said to have been overcome by afterdamp, and of these two died at the surface.

Editorials

The Mulga Inquest

The prevailing opinion is that an inquest at a mine disaster is a liberal coat of whitewash over a corporational crime. We note nothing so generous in the award of C. L. Spain, the coroner of Jefferson County, Ala., on the Mulga disaster.

He shows that employees most carelessly broke down an important ventilating door, that they did nothing to replace it and that as a result the mine was the scene of a disastrous explosion. But he forgets to censure them.

No! The men are not dead; they killed their fellows by the most wanton folly and, still living, the coroner hesitates to censure them. But he does not hesitate to censure the company's management for failing to call the men out of the mine. Though he omits to declare it, the company officials *may* have known the door was down and would be consequently rightly participants in the charge of carelessness. But why omit the colored men, Lee and Rodgers, in the indictment? Surely a motorman and a trip rider should know the danger of leaving a door open.

The inquest does not whitewash the company, but rather applies the brush liberally to the colored help.

The last clause of the verdict, requiring that every working place be examined three hours before it is entered by the workingman, seems to suggest that there is a doubt in the mind of the jury as to whether the gas accumulation really arose from the broken door or resulted from conditions existing long prior to its destruction. For, as the door was broken only an hour before the explosion, what good would an examination do, however carefully conducted, if made about five hours before the explosion occurred? The disaster happened at 9 a.m., and the examination of the place which exploded should, according to the coroner, have been made not later than 4 a.m., three hours before anyone went to work.

Nevertheless the coroner is right in his recommendation, even if his advocacy of the change throws a doubt on his finding as to the cause of the explosion.

The British Coal Exports in September

The British coal exports for September show a substantial recovery from the low figures immediately succeeding the first shock of the war in August. The movement in September showed an increase of about one-third over that for August, the respective figures being 4,096,453 tons in September, as compared with 3,209,399 tons during the preceding month. However, the tonnage is still only about two-thirds normal, the September movement in 1913 aggregating 6,501,578 tons. But in view of the unfavorable conditions prevailing in manufacturing circles, this loss is by no means as heavy as might have been expected, particularly since exports to Germany and Austria-Hungary have been cut off entirely.

In the movement to the South American trade, there has been a particularly heavy decline; for example, the Argentine Republic, which took 267,142 tons in September, 1913, this year only imported 153,016 tons. The respective exports to Brazil during the same periods were 158,896 tons in 1913, and 69,528 tons in 1914. This would seem to present a golden opportunity for the American exporters. But, as a matter of fact, it is highly probable that this reduction in fuel imports is but the inevitable reaction incident to a reduction in South American exports to England. In other words, it is essentially a curtailing in demand rather than any permanent loss of market.

A further interesting phase of the British exports is the enormous increase in tonnage to countries immediately contiguous to Germany. Thus the exports to Denmark increased from 255,724 tons in September, 1913, to 405,842 tons last month. Some three or four other countries show a like heavy increase, and at first glance it would seem that Great Britain apparently is supplying Germany with fuel. As a matter of fact, however, these countries have all been large importers of German coal, and this increase no doubt accounts for the displacement of the German product in these markets.

"When That I, Deborah, Arose"

The purposes of the present incumbent of the presidency of the United States are animated by the most noble of sentiments. And it is in the fact that the people have such unbounded faith in him as an honest, unimpeachable man that the danger lies. He may, we fear, violate the laws and the spirit of legislation without any protest being raised. We have seen how ready he is to withdraw forces from Colorado, despite the fact that the United States is bound by the constitution to guarantee domestic order in the states.

The fault with Mr. Wilson is that he believes that he and all good men in office should be above the law, but only on Oct. 20 at the meeting of the American Bar Association did he openly declare it. We will quote his words just as they are, and ask the reader to note their occasional faulty construction, and one instance where a slang expression has crept in. We recall to his remembrance that President Wilson normally writes almost perfect English. Few there are who have a more complete command of language. We surmise therefore that the President did not read his address, and so his statements in it might not meet unquestioned his own more careful consideration if he pondered them at his leisure.

> What I wanted to suggest to this association is whether we sufficiently apply those same ideas to the municipal law we seek to administer. Citations seem to play so much larger role than principle. There was a time when the thoughtful eye of the judge rested upon the changes of social circumstance and almost palpably saw the law rise out of human life. Have we got to a time when the only way to change law is by statute?
>
> The changing of law by statute seems to me like mending a garment with a patch; whereas law should grow by the

life that is in it, not by the life that is outside it. I should hate to think that the law did not derive its impulse from looking forward rather than from looking backward; or rather that it did not derive its instruction from looking about and seeing what the circumstances of men actually are and what the impulses of justice necessarily are.

Understand me, gentlemen, I am not venturing in this presence to impeach the law. For the present by the force of circumstances I am in part the embodiment of the law, and it would be very awkward to disavow myself. But I do wish to make this intimation, that in this time of world change it is worth while looking inside our municipal law and seeing whether the moral judgments of mankind are made square with every one of the judgments of the law itself.

Public life, like private life, would be a very dull and dry matter if it were not for this belief in the essential beauty of the human spirit and the belief that the human spirit could be translated into action and into ordinance. Not entire. You cannot go any faster than you can advance the average moral judgments of the mass, but you can go, at least, as fast as that, and you can see to it that you do not lag behind the average moral judgments of the mass.

I have in my life dealt with all sorts and conditions of men, and I have found that the flame of moral judgment burned just as bright in the man of humble life and limited experience as in the scholar and the man of affairs. And I would like his voice always to be heard, not as a witness, not as speaking in his own case, but as if he were the voice of men in general, in our courts of justice, as well as the voice of the lawyers, remembering what the law has been.

My hope is that being stirred to the depths by the extraordinary circumstances of the time in which we live we may recover from those depths something of a renewal of that vision of the law with which men may be supposed to have started out in the old days of the oracles, who communed with the intimations of divinity.

President Wilson is a student. He remembers how the Court of Chancery started. Laws were few and did not assure anything resembling equity between man and man. The king therefore took a churchman and left it to his conscience to decide right from wrong wherever the statutes were silent. Gradually precedents arose and the court which was founded at first on private judgment became largely a tribunal with decisions which were dependent on previous rulings and was therefore as reliable as the courts which based their decisions on the statute law.

But the struggle between precedent, which is reliable, and conscience, which is dependent on the point of view of the individual, was long and bitter. Selden died in 1584 and his "Table Talk" shows the attitude toward equity as it was then administered, the chancellors then contrasting themselves boldly with the lawyers and claiming unlimited freedom of moral action.

Equity is a roguish thing. For law we have a measure—know what to trust to; equity is according to the conscience of him that is chancellor, and as that is larger or narrower, so is equity. It is all one as if they should make the standard for the measure we call a foot a chancellor's foot. What an uncertain measure would this be! One chancellor has a long foot, another a short foot, another an indifferent foot; it is the same thing in the chancellor's conscience.

As the equity court was originally created, it would have been utterly foreign to American notions, as also to English, at the time of the American revolution. But as it had evolved into a court based on tangible precedents, and as its pronouncements had been for centuries modified by legislation wherever the conscience of the people opposed the opinion or precedent of the court, it was found not to be at variance with the ideas of a democratic people and was suffered to exist.

But if the court is again to be given a conscience or rather a permission to gage the "moral judgment of the mass" and decide issues on that basis, the end will be as uncertain as the judgments of men or rather, should we say, as the judgments of the judgments of men.

Worse yet will it be if the foundation of our interpretation of the constitution and the laws is to be assailed and we are going to ask, not what the writers meant and what the words actually conveyed when written and approved, but what we think the moral judgment of the public might perchance have them mean today.

Are we to leave to judges and the executive this momentous decision? If so let them write the laws direct without such trifling restrictions. What have the people to do with legislation anyway if the President is to be followed in his erratic yet well meant suggestions?

President Wilson seems tired both of law and of equity. He desires that his judicial appointees, as well as himself, may be to the American people as Moses, Aaron, Deborah and Kun-fu-tse. He would not have them trammeled with statutes or even with precedents. As he says, they will decide as of the "oracles" of God and the "intimations of divinity." In fact, only Deborah who left no precedents behind would truly meet with the approval of Mr. Wilson.

Some such divinity must hedge President Wilson when he, in violation of the provisions of the Constitution, threatens to remove the troops from Colorado, which would have otherwise nothing to do, and proposes to leave the workmen engaged there subject to the ruffianism of the undesirables from the Balkan States. Most of these men have never worked in the Colorado mines, yet they are permitted to destroy the property by which American workingmen desire to acquire a living.

For him we wish another vision and prompting him we hope he will have another prophet than W. B. Wilson of the Department of Labor. We fear that it is the latter voice prejudiced by years of professional agitation which the President regards "as not speaking in his own case but as if he were the voice of men in general."

The Necessity for Caution

Firebosses cannot be too careful when going their rounds just previous to the time when the working shift goes on duty. A case which supplies a lesson occurred at a mine in Scotland, where a fireboss met death by an explosion while inspecting the pit. No one living saw the accident, but it transpired that the man had been suffocated by the afterdamp. Near his body was found a safety lamp, together with an ordinary naked pit lamp. The jury found that the explosion had been caused by the presence of the naked light. Other instances have occurred of firebosses taking naked lamps with them on their round of inspection, although it is a contravention of most mine laws. Many explosions have been caused by lights of this description. It is a dangerous as well as a reprehensible practice "when looking for gas."

Branches of the Northumberland Miners' Association are urging the insertion in the British Coal Mines Act of a clause making it compulsory that every mine shall "rest" for a period of not less than four hours per day, so that the air may be purified. They are of the opinion that the growth of nystagmus is due to the methods which prevent the mines from being cooled and cleaned every day. They also assert that the atmosphere in mines has been made worse by the poisonous fumes arising from high explosives now in use. Some food for thought here.

Sociological Department

More West Virginia Gardens

The Elk River Coal & Lumber Co., at Widen, Clay County, W. Va., recently held a garden competition for the miners in the Rich Run mine, with the following result:

First prize for prettiest front yard, B. C. Gallimore, $10.
Second prize for prettiest front yard, Dr. R. H. Eanes, $5.
First prize for best vegetable garden, Louis Buratti, $10.
Second prize for best vegetable garden, T. J. Young, $5.
First prize for neatest and cleanest premises, Harley Booth, $10.
Second prize for neatest and cleanest premises, Frank Nagle, $5.
First prize for best combination vegetable and flower garden, J. L. Williams, $10.
The $10 prizes were equally divided between the tenant and his wife, and the $5 prizes were awarded to the wives of the tenants. The judges were: R. S. Strickland, J. C. Hiltabidle, J. Swan and J. A. Murphy.

Widen is near the center of West Virginia, at the head of the Buffalo Creek & Gauley R.R., a branch of the Coal & Coke R.R. It is a long way distant from the Weyanoke and Gary mines, the gardens of which have received recognition in these columns.

Testing the Eyesight of Mine Foremen and Firebosses

The eyesight of all mine foremen and firebosses in West Virginia is being tested, so that they will be fully qualified to detect gas in any place in the mines they examine.

An order to this effect was issued a few days ago by Earl A. Henry, chief of the mining department, after a conference with coal operators in various sections of the state. The operators fully approve of Mr. Henry's ideas on the subject, and advised him to issue an order to have them carried out, and they promised their hearty cooperation.

"It is apparent," says Mr. Henry, "that the men charged with the work of making mine examinations should have eyesight as nearly perfect as locomotive engineers, who are required to be able to distinguish the difference in colors of danger signals along the railroads. This is only a matter of taking the necessary precautions to have the mine foremen and firebosses fully qualified in their particular kind of work.

For the last two weeks, Chief Henry has been holding mental examinations in various parts of the state, and those candidates who have passed these examinations are being sent to competent physicians near their homes for eyesight examination. To those who satisfactorily pass this additional test, certificates will be given. The results of the eyesight examinations are being forwarded to the mining department, and Chief Henry declares that there are only a few cases where the eyesight of the men has been found so defective as to warrant certificates being withheld.

It is explained, that in many cases the presence of gas in working places would be detected by its effect upon the flame of the safety lamp were it not that the mine foremen and firebosses are unable to see as well as they should.

Ellsworth Community Meet

SYNOPSIS—This meet was remarkable for the large percentage of men in training, about one person in nine of the men in the mines and at the ovens showing an expert knowledge of first aid. The demonstration was held on home grounds so that all might attend. The children and the adolescent population took a part as important as that allotted to the adults.

The meeting at Ellsworth, about to be described, was known as the Third Annual Mine-Safety demonstration of the Ellsworth Collieries Co., but that corporation does not confine its interest to the men in its mines and at its ovens, but has an equal concern for them in their homes and a no less marked desire to make Ellsworth a desirable place for their families.

The visitor to our first-aid meets sees a mere sprinkling of women, no children and only the very best of the company's men. A visit to an Ellsworth meet is different. The whole community is in evidence. As can be seen in the first two sections of the panorama, the children and their teachers occupy the first seats and a careful review of the long lines of people will show a number of "citizens in the making."

Held at Home Where All Can Attend

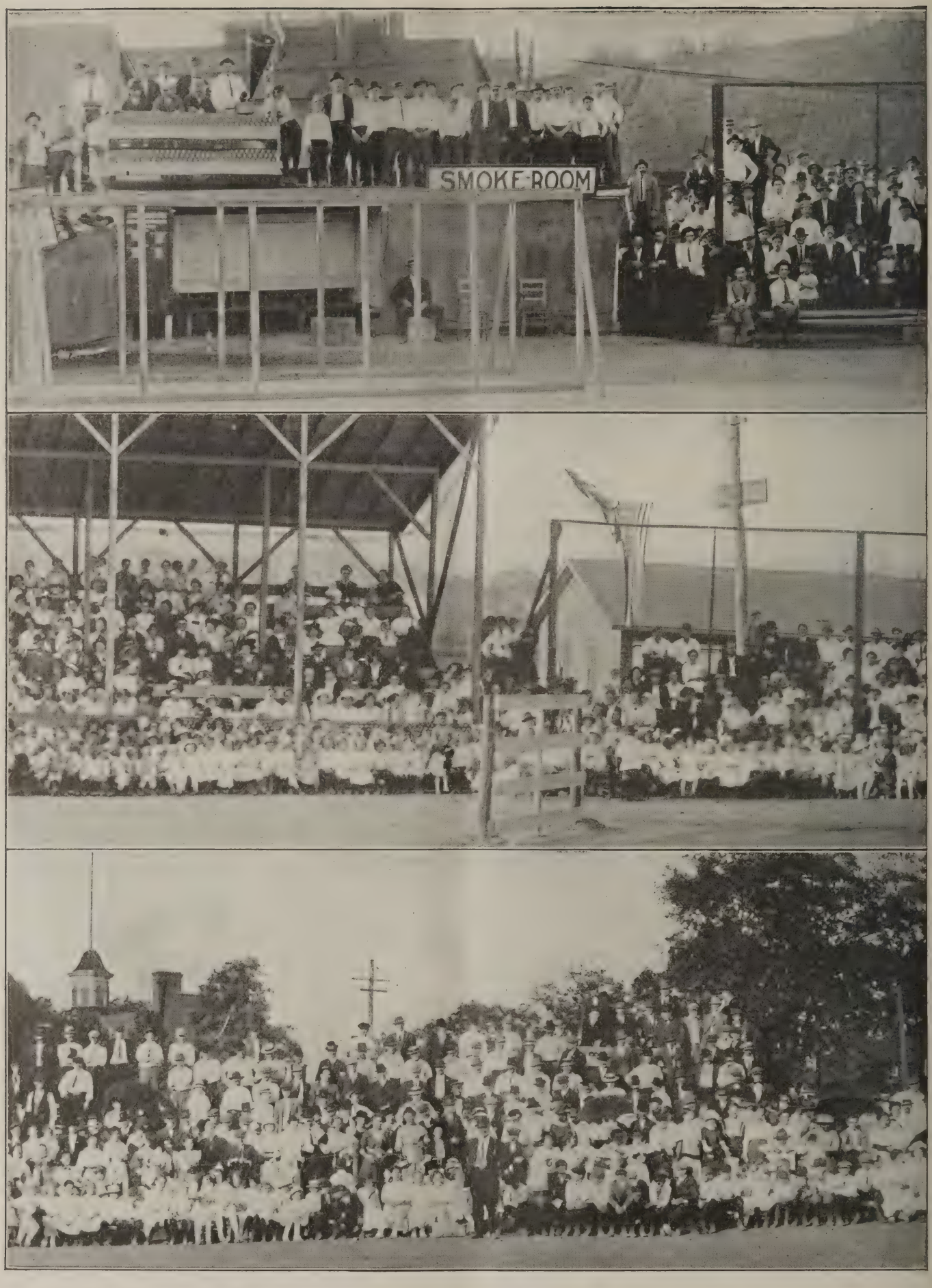
Of course, this characteristic of the meet arises largely from the fact that it is held in the town of Ellsworth, where many of the miners and their families live, and not, as is usual, at a park several miles away. But a more important reason, and those who know Ellsworth and Cokeburg will be the first to declare it, is that the Ellsworth Collieries Co. has employed a sociological superintendent, E. E. Bach, who has kept the idea of the community needs clearly in mind.

The unfortunate part of the social work around mines has been that it has not included a sufficiently wide scope; the schools, the entertainments of the adults, the pleasures of the young boys and girls have been entirely overlooked, and at best safety, sanitation and village comeliness have covered the whole ground.

The reader will be interested to note in the panorama the commissary girls, the camp-fire girls, the boy scouts and the special stands for the children. Yet the long line of helmetmen back of the last mentioned squads shows that mine-rescue work has not been forgotten, even though the Ellsworth and Cokeburg mines have so far, we believe, never called on the services of their trained men.

The Emphasis Is Laid on the Schools

The meet was held on Tuesday, Sept. 22. A special car with several officials and guests arrived at 10:30 a.m. and immediately made an inspection of the schools, where the children sang their songs and performed their fire drill.



At the Ellsworth Meet the Children Take a Leading Part with Their Parents. The



Camp-Fire Girls and Local Bands Are Striking Community Features of the Celebration



THE CHILDREN AT THE FIRST-AID MEET AT ELLSWORTH, PENN., FORMED A LIVING FLAG AND A RED CROSS AND SARY ARE WORTH NOTING AS WELL AS THE

The building, containing 500 children, was emptied in 1¼ min. Luncheon was served in the clubroom for guests at 12 o'clock and at 1 p.m., with the arrival of the Cokeburg train, the celebration commenced.

The Ellsworth-Cokeburg band, with Americus Pardini as director, gave a concert, and then children lined up in procession behind the Ellsworth-Cokeburg boys' band. The members of this organization can be seen in the second section of the panorama, standing on a platform erected specially for them.

BOY SCOUTS AND CAMP-FIRE GIRLS

As will be seen, some of the children were grouped so as to form an American flag and others to represent the Red Cross. There were also maypole drill girls, tambourine girls and kindergarten athletes. The boy scouts, under Scout-master M. H. Moran, acted as messengers, and the camp-fire girls served lunch to the 900 school children and 200 first-aid men and other participants at the close of the exercises.

ELEVEN PER CENT. OF THE MEN ENROLLED

The Ellsworth Collieries Co., at Ellsworth and Cokeburg, mined 1,729,000 tons in 1912. It had 30 teams entered in the demonstration or one team for 57,000 tons annual capacity. To put the matter another way; there are about 1700 men in the mines of the company. Thus, there is one team to 57 men or one enrolled first-aid man to every 9.4 men. This is also a remarkable record and shows that first-aid has become popular among the miners, a large proportion of whom are men of foreign birth. These, too, are not of the most assimilable types, being largely Slavs and Russians. With the latter, who are unusually hard to approach, Mr. Bach is having much success.

Owing to lack of space, it has been necessary in the



PERFORMED MAYPOLE EXERCISES. THE SUBSTANTIAL BUILDINGS AND HOMES, THE BOY SCOUTS, THE COMMIS-LONG LINE OF HELMETMEN AND THE AMBULANCE

panorama to omit one of the largest groups of participants, the aim being to make the presentation representative rather than complete.

The three teams scoring 100 per cent. were as follows:

American team: Alex McBurnie, captain; Alex Lilly; John Williams; Walter Arnholt; John Rogers and Charles Welling. Italian team: Dominick Duluce, captain; Joe Rucello; Mike Curello; Joe Rosetta; Nick Ceci and Dan Lowby. Slovak team: Steve Petura, captain; Joe Litichy; Joe Sokol; Tom Kotula; Joe Peshik and Adam Ohutksey.

The judges of the work were Dr. W. T. Davis, of the American Red Cross, Washington, D. C., Doctors L. W. Hoon, R. Stewart and G. K. Hays, of Monongahela, and Dr. T. W. Hunter, of Charleroi. Owing to the length of the program only one mine-rescue event was demonstrated by the teams from Ellsworth Mines 1 and 2 and Cokeburg, respectively. The work was done in the imaginary mine shown to the left of the first part of the panorama. The judges in this exhibition were C. G. Brehm, of the Oliver & Snyder Steel Co. Coal Department, and W. W. Fleming, of the Republic Iron & Steel Co.

Six boys, between 10 and 11 years, gave a remarkably proficient exhibition of first-aid, after the adult teams completed their first-aid work.

The guests from out of town included E. A. S. Clarke, president of the Lackawanna Steel Co. and Ellsworth Collieries Co., New York City; C. H. McCullough, Jr., vice-president of the steel company and general manager of the coal company, Buffalo, N. Y.; G. W. Burleigh, a director in both corporations, New York City; W. A. James, chief engineer of both companies, and W. A. Luce, assistant general manager and director of the Ellsworth Collieries Co., Pittsburgh, Penn. W. R. Crane, dean of the mining department of Pennsylvania State College, was also present.

During the last 20 years, 177 persons have lost their lives through accidents caused by spontaneous combustion in coal mines in the United Kingdom.

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No.2—I have always considered that it was an unjust act on the part of the framers of the Pennsylvania bituminous mining laws, to legalize the nonreturn of their examination papers to candidates trying for certificates of qualification as inspectors, foremen and firebosses. I have never been able to discover any good or even plausible reason why these papers should be retained and filed in the Department of Mines, at Harrisburg, as "state documents." If my idea of such documents is correct they are intended either for public investigation under the supervision of the department or to be used as references by the department.

In the first event, no one other than the applicants themselves would have sufficient interest in such papers to take the trouble and go to the expense of an examination; and, in respect to the latter, I cannot conceive in what way the papers would be of any material value to the department, for the purpose of reference. That there must be a reason it is fair to assume, but what that reason is must be purely a matter of conjecture. The most natural supposition for a candidate to make is that he is refused the return of his papers in order to hide any evidence of possible fraud or to avoid exposing any ignorance or error, on the part of the board in the correction of the papers.

While such a reason is, of course, within the range of possibility and may or may not be true, it is clear to any unprejudiced mind that the refusal to return the examination papers of a candidate, after the examination is completed and the marks determined, cannot but have a psychological effect on the candidate that is detrimental to either his mental or moral stamina. Such a refusal proclaims the superiority of the examining board in a manner that is neither pleasing nor helpful to the candidate and far from satisfactory in the event of his failure to pass the examination. In a word, this requirement of the law practically makes the examining board supreme, without affording the unfortunate candidate his unquestioned right of satisfaction.

It has often been remarked that "an examination is not a means of finding out what a man *does* know, so much as ascertaining some of the essential things he does *not* know." Now, it is the important things that we do *not* know that are of the greatest interest to us. Indeed, acquainting ourselves with the essential things of which we are ignorant is one of the chief elements of success.

No argument is required to prove the fact that every man is entitled to the benefit that may accrue from a knowledge of his mistakes. For this reason, to deprive a candidate of the opportunity of knowing and studying the exact points wherein he has failed in examination is undeniably an act of injustice to the candidate. On the ground of "equal rights to all men," guaranteed by our constitution, a law requiring such action on the part of any examining board should rightly be declared unconstitutional.

While referring to the examination of candidates for certificates of qualification to act as mine foremen, firebosses, etc., there is another question of equal importance to that I have just discussed; namely, the personnel of the examining board and the ability of its members to pass on the technical qualifications of candidates. Examining boards are quite generally composed of representatives of the state, the coal companies and the miners, respectively. Unfortunately, the manner in which the representatives of the last two classes named are appointed is no guarantee of their individual qualifications or ability to pass on the technical questions that must be asked in these examinations.

It is true that the representative of the coal companies is generally a superintendent who is, or should be, by virtue of his position, well versed in both the technical and practical principles of mining. However, I do not think that it is too broad an assertion to make to say that two-thirds of our mine superintendents are incapable of passing on technical questions relating to mining. This assertion by no means reflects on the practical capability of these men to act as mine superintendents. Neither do I mean to say that any man who accepts a position on an examining board, to act as representative for his company, necessarily belongs to this class. It may be stated with all fairness, however, that the capabilities of any member of an examining board should not be less than those required by law of the candidates whom they examine, in order that they may be able to pass with exactitude on the questions asked the candidates and the answers given in reply.

The same is true of the miners' representative on the examining board, who the law requires shall be "a man in actual practice," or actually engaged in the mining of coal. It is to this member of the board that many candidates in examination look for justice and, in order that he may faithfully acquit himself of the duties of his office and meet the expectations of candidates, he should be able to pass a similar examination himself. In other words, *he should himself hold a certificate of competency obtained by having successfully passed a previous examination.* Without such qualifications on the part of the representative of the miners, their interests, in this regard, are but indifferently safeguarded.

This aspect of the law I believe could be materially improved by permitting the miners to choose, as their representative, a man who is duly qualified to sit upon the board, without regard to the position he occupies in the industry. If they were granted this franchise, I am assured that they are so fully awake to the requirements that their choice would be a good one.

I regard this question of sufficient importance that it should demand the consideration of every man engaged in the mining industry, in whatever capacity he may serve.

Mining men should ask for the repeal of the statute to which I have referred and the substitution therefor of a mandatory law compelling the return of candidates' papers, with all errors properly marked and the correct answers given as determined by the official board.

I. C. PARFITT.

Jerome, Penn.

Fuel Economy in Coal Mining

Noting the numerous references, in COAL AGE, relating to the need of greater care in the purchase of coal for fuel purposes and the need of economizing on the use of fuel in other industries, it seems to me of growing importance to apply the same principle of economy in the use of fuel for the production of power, in coal mining.

A few years back, the fuel question, at coal mines, was not considered worthy of any consideration. The ease with which coal could be hoisted from the mine and dumped into the boiler-house chute made this item appear an inconsiderable expense from the coal operator's standpoint. It might be that from 15 to 20 boxes of coal would be dumped into the boiler chutes in a day, of which no account would be taken. In fact, frequently, the operator did not care what amount of coal was used for this purpose.

That condition has greatly changed, and today all uptodate operators and superintendents are making every effort to economize in the use of fuel at the mines, for power purposes. In this respect, I may be regarded as a crank; but coal has a value to me, without reference to the abundance of its supply at the mine. I consider coal is always worth its market value to the coal operator, as well as to the manager of other industries where coal must be purchased.

When inspecting a mine, I investigate the fuel question as carefully as any other matter. I want no leaky joints in steam lines or leaky valves, either in the boiler house or anywhere else about the plant. It is extremely important that blowoff valves should be tight or fuel will be wasted. Scaly boilers, dirty flues, as well as leaky joints and valves are robbers of fuel. A careless fireman can waste many times more fuel than could be paid for by his wages.

Once every year the engines and other machinery should be indicated by a competent engineer, who is capable to check up the system and ascertain the efficiency of the boiler plant, in respect to the consumption of fuel. By this means, he will be able to make many valuable suggestions, both in respect to the heating arrangements around the plant and the appliances for heating the feed water of the boilers. I consider the heating system should be in circuit and traps arranged to carry off the water of condensation, while the waste steam is conducted back to the heater.

Feed-water heaters should be kept clean and in good working order. Much economy is effected by heating the feed water to a constant temperature of 200 deg. F. or above.

In respect to the consumption of fuel, it is important to give close attention to the drainage system, both on the surface and in the mine. All surface waters should be prevented, as far as possible, from finding their way into the workings of the mine, which will greatly reduce the duty of the pumps. The drainage system underground should be as concentrated as possible, all the water, as far as practicable, being drained by ditches into the main sump. By thus reducing the amount of water to be pumped and concentrating the work, much economy can be effected in fuel consumption in mine drainage.

At all plants where coke is manufactured, the breeze or fine refuse of the coke should be carefully collected and burnt in the boilers, instead of being thrown on the waste dump. A car and a half of breeze is about equal to one car of good coal for fuel purposes. As the boiler plant is commonly located close to the ovens, the cost of collecting and transporting the breeze to the boilers should be practically *nil*.

In order to keep everyone alive to the importance of economizing fuel, at a coal mine, an exact record of every car of coal dumped should be kept on the weigh sheet, whether such car goes to the boilers or to the loading chutes. Every competent foreman should make it his business to know how much coal is consumed by the plant in his charge. Every tipple should have a separate chute for the coal for boilers.

A good plan is to have the boiler track of the same gage and connected with the mine track, so that mine cars can be run into the boiler house every night, for the purpose of loading the ashes, which in many cases can be used advantageously to ballast the tracks in the mine. An important point in the firing of boilers is to keep the ashpit clear, which saves the grate-bars. The ashes make a good track ballast, and the mules can do better work when the roadbed is thus kept in good condition.

PENNSYLVANIA ENGINEER.

Oliphant Furnace, Penn.

Proposed Method of Working to Reduce Expense of Upkeep

In connection with the discussion of various methods of working, the following proposed plan will be of interest in relation to reducing the expense of upkeep of the roads and air courses in a mine.

Since taking charge of the mine where I am at present employed, I find that, at the present rate of progress, it will take from six to seven years to drive and finish a single pair of butt-entries from the main entries to the next pair of face entries, a distance of 1200 ft. The reason for this great length of time is that too many butt-entries are being kept open and the work is scattered over too large an area. The maintenance of these entries requires a large amount of timber, besides entailing a considerable extra expense for retimbering roads and air courses and keeping up the tracks.

In addition to the extra cost of maintaining long roadways and air courses, there is a considerable increase in the expense of haulage. Because of the work being so scattered, drivers are compelled to haul long distances and much time is lost of necessity, which would not occur if the work were more concentrated. Another large loss results from the fact that when the mine closes down for the summer, as it frequently does, much of the pillar coal is crushed and cannot be recovered when work is again resumed in the fall.

To overcome these difficulties and losses, I propose to concentrate the work by driving two pairs of butt-entries, the entire distance of 1200 ft. between the main and face entries. When this has been done and the work

opens up in the fall rooms will be turned, starting from the inby end or close to the face entries. A sufficient number of rooms will be turned off both entries to give the daily output desired. At the present time, we are driving rooms a distance of 140 ft. with a width of 18 ft. Since the coal is 3 ft. 6 in. thick, I estimate that each room will yield about 300 tons of coal in the first working.

By driving two pairs of butt-entries and opening 24 rooms on each entry of each pair, making 96 rooms in all, I believe we can count on sufficient coal for an output of, say 1000 tons per day. By this arrangement, instead of the work being distributed through 13 pairs of entries, as formerly, it will be much more concentrated. Fewer drivers will be required to perform the same work, and it will be possible to maintain a much lesser length of roadways and air courses.

The coal, in this mine, is undermined by compressed-air punching machines, each machine-runner cutting the coal in six rooms. I estimate that the butt-entries can be driven the entire distance (1200 ft.) in six months or, say from July to February, inclusive. Then, if the rooms started from the inby end can be driven up in four months, this will leave two months for drawing back the pillars in these rooms before the close of the season.

My plan is to lay a 3-in. air line to the face of each pair of butt-entries, which will supply sufficient air to operate two machines on each entry, each of these machines cutting six rooms each shift, or 12 rooms per day. If this arrangement is successful, it will be possible to work out the 48 rooms on each pair of butt-entries, in 12 months.

I further plan to work out the remaining 16 rooms on each butt-entry and draw back the entry pillars and room-stumps the following winter. By this system, I expect to work out the entire area of coal in our tract in three years, with very little loss of coal and a greatly reduced expense for upkeep. The expense of maintaining the roadways, in the present system of working, is exceedingly heavy on the first 200 yd. of the butt-entries, owing to the fact that the rooms in this distance have been worked out and the pillars drawn, which throws a heavy weight on the entry pillars.

In the proposed new system, the first 450 ft. of the butt-entries will remain in solid coal until the 24 rooms inby from this point are worked out and finished. Besides the reduced cost of upkeep, the new system will afford better coal in pillarwork and secure greater safety to the miners.

MOSES JOHNSON.

Taber, Alta, Canada.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Diameter of Water-End—The diameter of the piston or plunger of a direct, double-acting pump is calculated from the required actual capacity or discharge and an assumed efficiency of the water-end, for a given piston speed.

The **water-end efficiency** of a direct-acting piston or plunger pump will, of course, vary with the age, condition and workmanship of the pump and packings. The average efficiency in **mine work** is generally considered as not much exceeding 65 per cent. at the water-end; while that of a new pump or one in good condition and well packed, may be 85 per cent.

The diameter (dw), in inches, of the piston or plunger required to discharge a number of gallons (G) per minute, at a piston speed (S), in feet per minute, assuming a water-end efficiency (Ew), is calculated by the following:

Rule—Divide the required discharge of the pump expressed in gallons per minute, by the assumed water-end efficiency, and that quotient by the piston or plunger speed in feet per minute and multiply the square root of the last quotient by 4.95; the product obtained will be the required diameter of the piston or plunger, in inches.

Expressed as a formula, this rule is

$$d_w = 4.95\sqrt{\frac{G}{E_w S}}$$

Or, assuming, as is common, a water-end efficiency of 85 per cent., Ew = 0.85 and the formula becomes

$$d_w = 5.37\sqrt{\frac{G}{S}}$$

Example—Assuming an average water-end efficiency of, say 65 per cent., calculate the required diameter of the plunger of a pump capable of delivering 300 gal. per min., at a piston speed of 60 ft. per min.

Solution—The required diameter of the plunger, under the assumed conditions, would be

$$d_w = 4.95\sqrt{\frac{G}{E_w S}} = 4.95\sqrt{\frac{300}{0.65 \times 60}} = 13.7 \text{ in.}$$

Diameter of Steam-End—The diameter of the steam cylinder of a direct-acting pump is calculated from the total pressure on the water-end when the pump is in operation and the available steam-cylinder pressure. As previously shown (see Pressure Required in Pumping), the diameter ratio between the steam and water ends of a direct-acting pump is equal to the inverse ratio of the unit or gage pressures on these two ends, which, by transposition, gives the following formula:

$$d_s = d_w\sqrt{\frac{p_w}{p_s}}$$

In most cases, especially in the operation of large pumps, it is safer to make a suitable allowance for the loss due to friction in the pump, which may reduce the effective steam-cylinder pressure from 5 to 10 per cent.

The Coal Age Pocket Book

Length of Stroke—The size and capacity of pumps are commonly estimated for a given speed of the piston or plunger, expressed in feet per minute. The length of stroke is determined with respect to the diameter of the steam cylinder, and may vary from the length of such diameter to 1½ or 2 times that length. There results a loss of efficiency in the steam-end when the stroke of the pump exceeds twice the diameter of the steam cylinder.

Number of Strokes per Minute—The piston or plunger speed of a pump, expressed in feet per minute, divided by the length of stroke in feet, gives the number of strokes the pump makes each minute; according to the formula,

$$n = \frac{S}{l}$$

Discharge of a Pump—The discharge of a direct, double-acting pump is found by reversing the two formulas previously given for calculatig the diameter; thus, for any efficiency Ew.

$$G = 0.0408\, E_w S d^2$$

Or, for an assumed water-end efficiency of 85 per cent.,

$$G = 0.03468\, S d^2$$

Example—Find the discharge of a 6-in., double-acting pump, running at a speed of 100 ft. per min., assuming an efficiency of 75 per cent. If the length of stroke is 10 in., find the number of strokes per minute.

Solution—

Discharge, $G = 0.0408 \times 0.75 \times 100 \times 6^2 = 110.16$ *gal. per min.*

Number of strokes, $n = 100 \times 12 \div 10 = 120$ *strokes per min.*

Example—Calculate the required dimensions of a direct, double-acting pump capable of handling 9000 gal. of water per hour, under an effective head of 502 ft., when the available steam pressure at the pump is only 40 lb. gage, assuming a piston speed of 100 ft. per min.

Solution—The required capacity of this pump is 9000 ÷ 60 = 150 gal. per min.; then assuming an efficiency of, say only 75 per cent. to make suitable allowance for wear and depreciation in use, the required diameter of the water-end (piston or plunger) is

$$d_w = 4.95\sqrt{\frac{G}{E_w S}} = 4.95\sqrt{\frac{150}{0.75 \times 100}} = 7.0 \text{ in.}$$

The water-end pressure is

$$p_w = 0.434 \times 502 = 217.8 \text{ lb. per sq.in.}$$

Since the available steam-cylinder pressure is 40 lb. per sq.in., the required diameter of the steam-end or the steam cylinder is

$$d_s = d_w\sqrt{\frac{p_w}{p_s}} = 7\sqrt{\frac{217.8}{40}} = 16.33 \text{ in.}$$

In this case, it is proper to assume a stroke of, say 20 in., making the size of the steam cylinder 16x20 in., by slightly increasing the steam pressure above the estimated 40 lb. gage. The size of the pump is, therefore, 7x16x20 in.

Inquiries of General Interest

To Prevent the Freezing of Mine Shafts

We have been considerably annoyed in previous winters and the work of hoisting coal has been much delayed by the accumulation of ice in the hoisting shaft. With a view of avoiding this trouble we have had under consideration, recently, two methods.

By one of these methods, it is proposed to heat the intake air to such a temperature that the water draining down the shaft will not freeze in cold weather. The other proposed plan is to line the shaft by the "gun-crete" method, so as to render it waterproof. By this plan, the entire shaft would be lined with an inch of reinforced concrete, applied by means of the cement gun that is now so extensively used in all cement work, in mining and other industries.

In choosing between these two methods and deciding which is the best means to employ for the purpose of avoiding the trouble to which we have referred, we desire to gain what information we can from the experience of others along this line. I might add that we are inclined to consider the first method mentioned more favorably than the second, for the reason that the steam used for the heating of the intake air would accomplish, at the same time, the humidification of the mine air, which is so much to be desired during the colder months of the year. We shall be glad to have your views in reference to the matter and to hear from other readers of COAL AGE who have had experience similar to our own.

A MINE SUPERINTENDENT.

————, Ohio.

We heartily commend the choice of correspondent for the purpose in view, although it must be admited that there are certain disadvantages arising from the heating of the intake air passing down a hoisting shaft. These disadvantages, however, are slight in comparison with the advantages to be gained.

For the purpose of heating the intake air in the hoisting shaft of a large mine, we would suggest the installation of a system of steam pipes, say 1 to 1½ in. in diameter. The pipe line should be arranged to zigzag downward at the sides and on the faces of the shaft where the water is most troublesome. Each pipe line should connect with a pipe that will conduct the steam beyond the shaft bottom and permit it to discharge into the intake air current, at a point where the temperature of the air more nearly approaches that of the mine.

If the steam were allowed to discharge into the cold air at the shaft bottom, its condensation would cause a fog or mist that would impede the work of the cagers and trip-runners, but, discharging into the warmer air at a short distance inby from the bottom of the shaft, the moisture is quickly taken up by the warm dry air of the current and carried into the mine.

As is quite commonly recognized today, such a humidification of the air entering the mine prevents the absorption of moisture from the mine workings and the consequent drying of the dust throughout the mine by the air current. The adoption of this method of heating the intake air, therefore, accomplishes two valuable purposes. It not only prevents the freezing of the shaft but affords the desired humidification of the air current and greatly reduces the danger of explosion due to the accumulation of dry dust in the workings.

The disadvantages of this method, to which we referred previously, are chiefly two: (1) The men working on the shaft bottom, the cagers, trip-runners and oilers, are compelled to work in a somewhat warmer atmosphere, which enervates or weakens some men more than others; (2) the heating of the downcast air produces a certain air column in the downcast hoisting shaft that is opposed to the general circulation and, to this extent, imposes an added duty on the fan.

The waterproofing of the shaft, on the other hand, by the so called "gun-crete" method, besides lessening the work of pumping, provides a clean, dry lining for the shaft and decreases the friction of the air current, which may become quite appreciable in deep shafts of contracted area, in the ventilation of a large mine requiring a considerable air volume.

We shall be glad to have readers of COAL AGE *who have had experience in similar situations discuss this question from a practical standpoint, giving their ideas and conclusions.*

Equivalent-Orifice Formula

Kindly explain how the constant 0.0004 is derived in the formula for finding the equivalent orifice of an airway or mine. The formula to which I refer is

$$A = \frac{0.0004\ q}{\sqrt{w.g.}}$$

in which A is the area of the orifice (sq.ft.); q the quantity of air passing (cu.ft. per min.); and $w.g.$ the water-gage (in.).

A STUDENT.

Belleville, Ill.

The formula given by correspondent is derived from the well known formula for the theoretical velocity (v) in feet per second, due to a given head (h) in feet, $v = \sqrt{2\ gh}$, combining this with the ventilating formula $q = av$ and allowing for *vena contracta,* the coefficient being 0.62, and multiplying by 60 to reduce to minutes.

$$q = 60 \times 0.62\ A\ \sqrt{2 \times 32.16\ h} = 298.3\ A\ \sqrt{h}$$

But, taking the weight of 1 cu.ft. of air as 0.0766 lb., since the pressure per square foot is 5.2 $w.g.$, the head is 5.2 $w.g.$ ÷ 0.0766 = 67.88 $w.g.$, which substituted for h, in the last equation, gives

$$q = 298.3\ A\ \sqrt{67.88\ w.g.} = 2457\ A\ \sqrt{w.g.}$$

Hence, $$A = \frac{1}{2457}\ \frac{q}{\sqrt{w.g.}} = \frac{0.0004\ q}{\sqrt{w.g.}}$$

Examination Questions

Hoisting Engineers' Examination, Held at Springfield, Ill., Oct. 12, 1914

(*Selected Questions*)

Ques.—Find the approximate horsepower exerted by a pair of hoisting engines, cylinders 30 in. in diameter, steam pressure, 60 lb.

Ans.—Since the power exerted by an engine depends on its speed or the number of revolutions per minute and this is not stated, the question as it reads cannot be answered.

However, assuming that these engines have a piston speed of, say 600 ft. per min., and that the steam pressure given is the mean effective pressure in the cylinder, the horsepower developed is

$$H = \frac{2\ (0.7854 \times 30^2) \times 60 \times 600}{33{,}000} = 1542+\ hp.$$

Ques.—Find the useful horsepower during a hoist of two tons of coal up a shaft 1500 ft. deep, in 50 seconds.

Ans.—Assuming that the term "useful horsepower" refers to the power consumed in the hoisting of the *coal* only, disregarding the dead load of the rope and friction and supposing the car and cages to balance each other as they do in a double-compartment hoist, the horsepower in that case is

$$H = \frac{2 \times 2000 \times 1500}{\frac{5}{6} \times 33{,}000} = 218+\ hp.$$

Ques.—If the safety valve on a boiler is 4¾ in. in diameter and the lever is 38 in. long from the fulcrum to the center of the weight and 4½ in. to the center of the valve, the weight being 85 lb., what is the pressure of the steam exerted on the valve, in pounds per square inch?

Ans.—In answering this question, the weight of the lever, valve and valve-stem acting through their center of gravity must be ignored, since these are not given in the question.

The area of the valve is $0.7854 \times 4.75^2 = 17.72$ sq.in. Then, calling the required steam pressure, in pounds per square inch p, and equating the moment of the total pressure on the valve with the moment of the weight, we have

$$17.72\ p \times 4.5 = 85 \times 38$$

$$p = \frac{85 \times 38}{17.72 \times 4.5} = 40.5\ lb.\ per\ sq.in.$$

Ques.—The total pressure on the steam piston is 100 tons; if the diameter of this piston is 24 in., what is the pressure of steam per square inch?

Ans.—The area of the piston is $0.7854 \times 24^2 = 452.39$ sq.in. The pressure per square inch on the piston is, therefore, $100 \times 2000 \div 452.39 = 442+$ lb. per sq.in.

Ques.—What will be a safe working load for a steel hoisting rope ⅞ in. in diameter?

Ans.—The question should state whether an ordinary steel rope or an extra-strong steel rope is intended, as a 6-strand, 19-wire ordinary steel rope 1 in. in diameter has a breaking strain of 34 tons, while that of a similar extra-strong steel rope of the same diameter is 39 tons.

The formula for determining the strength of 6-strand 19-wire hoisting ropes is based on the breaking strains of the same class of rope 1 in. in diameter. Thus, using a factor of safety of 5, the safe working load for a 6-strand, 19-wire hoisting rope, of each class, is

Ordinary steel,

$$L = \tfrac{1}{5}\ (34\ d^2) = \tfrac{1}{5} \times 34\ (\tfrac{7}{8})^2 = 5.2\ tons.$$

Extra-strong steel,

$$L = \tfrac{1}{5}\ (39\ d^2) = \tfrac{1}{5} \times 39\ (\tfrac{7}{8})^2 = 6.0\ tons,\ nearly.$$

Ques.—What weight will a single engine of the following dimensions lift: Diameter of cylinder, 2 in.; length of stroke, 18 in.; geared at 4 to 1; diameter of drum, 6 ft.?

Ans.—The question omits to state the available steam pressure in the cylinder and, therefore, as the question reads, it cannot be answered.

However, assuming that the available steam pressure is, say 50 lb. per sq.in., the total cylinder pressure will be

$$P = 50\ (0.7854 \times 12^2) = 5655\ lb.,\ nearly.$$

Now, assuming that this total pressure is applied horizontally to the crankpin, which is one-half the length of stroke or 9 in., and calling the required weight to be lifted, W, the radius of the drum being $(6 \times 12) \div 2 = 36$ in., and equating the moment of the steam pressure multiplied by the ratio of gearing with the moment of the load, we have

$$5655 \times 9 \times 4 = 36\ L$$

$$L = \frac{5655 \times 9 \times 4}{36} = 5655\ lb.$$

Ques.—What are the four electrical units?

Ans.—The four common electrical units are the volt, ampere, ohm and watt.

Ques.—Define the four electrical units.

Ans.—The *volt* is the unit of electromotive force or the so called "pressure" of an electric current. It corresponds to the pressure producing the circulation of air in an airway or of water in a pipe.

The *ampere* is the unit that measures the "strength of the current" or the quantity of current flowing. This unit corresponds to the volume of air passing in an airway or the quantity of water flowing through a pipe.

The *ohm* is the unit of resistance. It is the resistance of a current of one ampere, flowing under a pressure of one volt.

The *watt* is the unit of electrical power. It is the power required to pass a current of one ampere, under a pressure of one volt. It corresponds to the work in foot-pounds per minute, in ventilation.

Ques.—How many gallons of water will a tank hold that is 9 ft. 11 in. high and 53 in. in diameter?

Ans.—The capacity of the tank is

$$\frac{119\ (0.7854 \times 53^2)}{231} = 1136+\ gal.$$

Coal and Coke News

Harrisburg, Penn.

An order was issued by the Inter-State Commerce Commission on Oct. 20, requiring several railroads in the bituminous region, namely the Pittsburgh & Lake Erie and the Baltimore & Ohio, to make through rates on coal from the Avella group of mines in Washington County, to points outside of Pennsylvania and these rates should not be more than 10c. per ton higher than the through rates from mines on the West Side Belt R.R. The new rates must go into effect on the first of next year and be in force for two years.

The decision is the outcome of a complaint filed by the Pittsburgh & Southwestern Coal Co., the Pryor Coal Co., the Waverly Coal Co., and the Avella Coal Co. against the Wabash-Pittsburgh Terminal, the West Side Belt Line, the Pittsburgh & Lake Erie, the Baltimore & Ohio and other roads, declaring that the rates on coal from their mines are unreasonable and unlawfully discriminatory.

No joint rates are maintained from the Avella group of mines, and the local rate of 30c. per ton is charged by the Wabash-Pittsburgh Terminal for hauling coal to Pittsburgh Junction, while joint rates are in effect from mines on the West Side Belt Line. The complainants say they are entitled to the same consideration.

The commission on the above date heard argument and reserved its decision at a meeting in the Federal Building, Philadelphia, on the complaint of the Mitchell Coal & Coke Co. against the Pennsylvania R.R. to recover damages for alleged illegal rebating.

The case was originally filed in the District Court and resulted in a verdict of $40,000 for the coal and coke company. Upon appeal to the Supreme Court the latter tribunal reversed this finding on the ground that the complaint should have been made to the commission, and, in the event of a favorable finding, suit should have been brought in court.

The industrial railroad cases involving the claims for restoration of allowances to the "Short Lines" by trunk lines will be argued on Nov. 19. The final testimony will be taken Nov. 9 in two cases postponed from this week. Fifteen railroads are involved.

PENNSYLVANIA

Anthracite

Jeddo—The G. B. Markle Coal Co., in whose mines the man was hurt, is financing the return to his parents in Italy, of 24-year-old Cosemo Scalpi, whose back was broken last March and who can never walk again. The company will send along a man to nurse the patient on his 4500 mile journey.

Parsons—Fire of unknown origin, on Oct. 22, broke out in the washery operated by Samuel Chase, of Wilkes-Barre. The frame structure was outside of the city limits, but to protect property on the lower side of the creek and in the city, several streams were turned on the blaze by the city firemen. The headway gained by the flames before an alarm was sent in made it impossible to save the washery, however, and it was destroyed.

Harrisburg—An informal report recently issued by the Department of Mines says that the state inspectors, operators, and miners are all working toward the end of safety, there having been a decided decrease in the number of fatalities during the three months ending Sept. 30, 1914, compared with the corresponding quarter of 1913. The comparisons of these fatalities are as follows:

Anthracite, 1914—killed, 137. Bituminous, 1914—killed, 102.
Anthracite, 1913—killed, 156. Bituminous, 1913—killed, 154.
Decrease, 19, or 12 per cent. Decrease, 52, or 34 per cent.

Statistics of non-fatal accidents have not been completed, but it is believed they will make as favorable a showing as the fatal accidents.

Wilkes-Barre—The threatened strike at the Stanton Colliery at Wilkes-Barre was averted recently by the patchers returning to work pending an investigation of their grievance that too much work is being placed upon them.

It is estimated that there are about 300 breakers in the anthracite coal region, costing on an average $200,000 each, some of the larger and more elaborate buildings running as high as $300,000 to $500,000. It is alleged that if the preparation of anthracite for market after it is mined were conducted as a separate industry, it would require a capitalization of at least $100,000,000.

Bituminous

Connellsville—The Connellsville coke production and output recently established a new low record, and is still going down. This record was 237,000 tons, or a drop of 8000 tons from the previous week. With the blowing out of 1200 ovens by the H. C. Frick Coke Co., a still further decrease in production was effected. It is believed by some that the output will run as low as 225,000 tons by the close of October.

Johnstown—Alleging that hurts he received in the mines of the Citizens Coal Co., on Oct. 8, 1914, permanently disabled him and prevented him both from playing baseball and earning a living at his occupation of coal mining, John Russel has filed a suit, asking $10,000 damages.

Brownsville—The Lilley Coal Co., with one of the largest and best equipped plants in Fayette County, has shut down its operation indefinitely. The company owns about 700 acres of coal land. It has a new plant, and if running at full capacity would employ 400 men. The plant has only been operating two days a week for the past two months. On Oct. 15, it is stated, 85 men were laid off and notice was given later that the plant would shut down indefinitely on account of lack of orders.

Big Bend—Coal operators in this vicinity report that many new orders have been received lately from Eastern coal dealers, who say they are storing immense quantities of fuel on the Atlantic seaboard. It is said the orders are in sufficient volume to keep the mines in operation until well into the summer.

Greensburg—The appraisement filed in the United States district court of the assets and properties of the Pittsburgh-Westmoreland Coal Co., by Julian Kennedy and R. C. Crawford, the appraisers appointed by the court, is $13,676,115. The total net obligations of the company are about $6,800,000. The company went into the hands of receivers July 29 last on account of the maturity of a $900,000 two-year note issue which matured Aug. 1 and which it was unable to take care of on account of the sudden breaking out of the European war. The net operating earnings of the company for the last fiscal year prior to the receivership was $899,465. It is understood that the interest coupons will be paid when due.

WEST VIRGINIA

Vivian—The tipple of the King Coal & Coke Co., located on Laurel Creek, was recently damaged considerably by fire. The origin of the fire is not known. The flames were discovered about 9:30 o'clock in the evening, and were not under control until about 4:30 a.m. The damage is estimated at approximately $20,000, which is said to be covered by insurance.

Moundsville—The Ben Franklin Coal Co. of West Virginia has discontinued the use of open lights at its Panama mine in the southern part of Moundsville, and has installed electric safety lamps, the latter being now in use. The Hirsch electric safety lamp, which has been approved by the U. S. Bureau of Mines, is employed. It is believed that this is one of the biggest steps for the safety of employees and property which has been taken by any West Virginia coal company.

TENNESSEE

Jellico—Demonstration teams representing 18 mining companies of Kentucky and Tennessee have signified their intention of competing for the Mine Foremen's Association's prizes to be offered at the field day to be held here shortly.

KENTUCKY

Barboursville—Miners have returned to work in the Tye Fork district on a compromise basis after a strike which had tied up operations for some time. It is stated that changes in the wage scale after the companies had installed electrical apparatus were not satisfactory to the miners. Both sides made concessions, it is understood, but details are lacking.

Louisville—The second operation of the Harlan Coal Mining Co., the Snead & Meguire enterprise, was opened at Kayu in Harlan County on Oct. 24. This is on the opposite side of the valley from the Coxton operation of the company and though a separate tipple, screening plant, etc., are required, the same loading facilities will be employed. The Harlan company is operating regularly in spite of the condition of the market.

Central City—The agreement under which the local mine of the Central Coal & Iron Co. has resumed operations provides that arbitration of differences between the company and the miners shall be disposed of by the National Executive Board of the United Mine Workers. The difference between the miners and the company was on the appointment of D. Stewart Miller, commissioner of the Operators' Association, as arbitrator for the company. Many improvements, including a new tipple and engine chutes and betterments inside the mine have been completed at a cost of $50,000.

Jenkins—Six out of twelve of the mines of the Consolidation Coal Co. and the Elk Horn Mining Corp. in the Jenkins-McRoberts-Fleming-Haymond-Hemphill field have closed down owing, it is said, to conditions brought about by the European war and the stagnation of markets throughout the country. Several hundred men are out of employment as a result of the closing of the mines.

OHIO

Pomeroy—In an effort to arrive at a correct interpretation of certain clauses of the agreement entered into last May, a series of conferences will be held at Pomeroy between the United Mine Workers and representatives of the Jackson Coal & Mining Co., the Newton Coal Co., and the Hutchinson Coal Co., operating in what is known as the Pomeroy Bend. There has been a misunderstanding between the coal company and its employees as to the meaning of Sections 1 and 19 of the agreement, which pertain to the suspension of work.

Cleveland—The No. 8 operators learned on Oct. 26 that the United States supreme court has refused them an injunction against the Ohio Industrial Commission to prevent the commission from enforcing the Ohio screened coal law. It also has denied the plea of the commission, which was to throw the case out of court as frivolous. The court held the screened coal law to be of such vital importance that the case should be heard immediately and set the full hearing for Nov. 30. This means that the highest court will probably render an opinion on this measure by Jan. 1, 1915. Sitting as a court, District Judges Fater and Killits and Circuit Judge Warrington held the screened coal law constitutional early in the summer.

Glouster—A meeting of the miners employed by the Sunday Creek Co., and the Pittsburgh Coal Co. will be held at Glouster at 1 p.m., Oct. 31, for the purpose of trying to get all of the operators to comply with the mine-run law. A different method is pursued at various mines which is said to be unsatisfactory to the miners.

New Philadelphia—Another effort is on foot for the organization of a miners union among employees of the small retail mines in the district surrounding New Philadelphia. A meeting was held recently, called by William F. Lincks, president of Sub-district No. 3. Several previous attempts to organize the retail mines have failed.

Columbus—There is considerable speculation in coal circles in Ohio over the coming changes in the organization of the Sunday Creek Co. According to the latest ruling of the courts, Nov. 4 is the time fixed for the separation of the ownership of the company from the Hocking Valley, the Lake Shore and the Chesapeake & Ohio railroads. So far no announcement has been made locally. It is pointed out that the reorganization of the company at this time is a most difficult problem and it is believed an extension of the time may be granted by the courts.

INDIANA

Terre Haute—The delegates from this city to the American Mining Congress at Phoenix, Ariz., Dec. 7, are J. C. Kolsem, W. E. Van Winkle and Frank Richards.

The Pittsburgh Mining Co. has brought suit against the Big Four Ry. Co. for $3000 damages, alleging that a train wrecked a coal tipple at the mine near Sanford.

ILLINOIS

Farmington—The old Maplewood mine, or Black Hawk No. 1, will be again placed in operation in about six weeks, so it is alleged. This mine has been idle for the past five years, nothing being done in the way of upkeep or repairs during that time. It has taken the pumps almost a year of steady pumping to empty the pit so that men could move about therein.

Princeton—The property of the Marquette Third Vein Coal Mining Co. will be sold at sheriff's sale at Princeton on Monday, Nov. 2. This sale will be made to satisfy a judgment of Patrick Carney. Carney is now dead, but the money is due his estate. The mine is said to be worth approximately $100,000.

NORTH DAKOTA

Ryder—It is said that the reservation coal lands are to be thrown open for entry in all probability by next fall, not sooner than September of 1915. They have yet to be appraised, and the appraisers have not been named. The regulations pertaining to the opening rest entirely with the Secretary of the Interior, so that no one can bespeak authoritatively how these lands are to be opened. It is thought, however, that because of the small number of these claims, less than a thousand, they will be thrown open to general settlement.

COLORADO

Denver—Contending that mine guards are being sworn into the Colorado militia during the reorganization, John R. Lawson, an officer of the Colorado district of the United Mine Workers, recently presented a protest to Chairman Foster of the House Mine Committee against the withdrawal of the Federal troops from the strike district.

WASHINGTON

Seattle—Speedy settlement of the strike that has been on in the Carbonado coal mines for nearly a month is promised as a result of a protracted peace conference that has just come to a close in this city. Officers and members of the Washington Coal Operators' Association representing the Carbon Hill Coal Co., owner of the mines, and officers of District No. 10, United Mine Workers of America representing the strikers, were the conferees. The grievances responsible for the strike were satisfactorily adjusted and an agreement under which the men will return to work unpenalized was reached.

FOREIGN NEWS

St. John, N. B.—The coal output in the Minto coal region is not equal to the demand, and it will be necessary to greatly increase operations if the demand is to be met. At present, the daily output is about 300 tons. This will be brought up to 400 tons. It is said that Sir Thomas Tait, who is at the head of the Minto Coal Co., has been looking into the question of establishing a distillation or byproduct plant at the mines.

RECENT COAL AND COKE PATENTS

Smoke Jack. W. Reenstrom, Chicago, Ill., 1,108,234, Aug. 25, 1914. Filed May 7, 1914. Serial No. 836,943.

Grate Bar—J. H. Dietz, Cleveland, Ohio. 1,111,059. Sept. 22, 1914. Filed Apr. 18, 1914. Serial No. 832,771.

Mine Car Wheel—A. B. Day, Knoxville, Tenn. 1,109,906, Sept. 8, 1914. Filed Jan. 28, 1914. Serial No. 730,480.

Miners' Auger. J. Underaton, Hocking, Iowa, 1.104,231. July 21, 1914. Filed May 21, 1913. Serial No. 769,097.

Mechanical Stoker—A. G. Elvin, Somerville, N. J. 1,111,531, Sept. 22, 1914. Filed Feb. 24, 1913. Serial No. 750,124.

Boiler Tube Cleaner. F. Herle, Chicago, Ill., 1,104,262. July 21, 1914. Filed Dec. 10, 1913. Serial No. 805,700.

Steam Generator—A. A. Cary, New York, N. Y. 1,109,041, Sept. 1, 1914. Filed Oct. 26, 1911. Serial No. 656,798.

Mining Machine Chuck—F. Nugent, Mace, Idaho. 1,109,865, Sept. 8, 1914. Filed Sept. 23, 1913. Serial No. 791,381.

Gas Producer—T. B. Benner, Cortland, N. Y. 1,110,372, Sept. 15, 1914. Filed Mar. 21, 1914. Serial No. 826,369.

Spark Extinguisher—E. Thompson, Radnor, W. Va. 1,109,486, Sept. 1, 1914. Filed Aug. 16, 1913. Serial No. 785,181.

Fire Box for Boilers—J. M. McClellon, Everett, Mass. 1,111,266, Sept. 22, 1914. Filed Oct. 1, 1909. Serial No. 520,556.

Underfeed Furnace. R. S. Riley, Providence, R. I., 1,103,625, July 14, 1914. Filed Oct. 20, 1911. Serial No. 655,821.

Water-Cooled Fire Bar. R. Grabowsky, Hanover, Germany. 1,107,291. Aug. 18, 1914. Filed Sept. 4, 1912. Serial No. 718,457.

Suction Gas Producer. M. F. Derrick, Montreal, Canada, 1,107,917, Aug. 18, 1914. Filed June 12, 1913. Serial No. 773,309.

Inclined Grate for Furnaces—G. H. Thacher, Jr., Albany, N. Y. 1,109,266, Sept. 1, 1914. Filed Oct. 22, 1912. Serial No. 727,148.

Mine Drilling and Channeling Machine. L. J. Daft, Seattle, Wash., 1,108,342, Aug. 25, 1914. Filed June 23, 1913. Serial No. 775,270.

Water Tube Boiler—R. Delauney, Belleville, St. Denis, France. 1,109,627, Sept. 1, 1914. Filed Dec. 11, 1913. Serial No. 806,044.

Automatic Stoker for Locomotives—P. M. Thayer, Plymouth, Ind. 1,109,802, Sept. 8, 1914. Filed Mar. 6, 1913. Serial No. 752,313.

Coal Conveyor. J. Dodds and W. Brown, Cambuslang, Scotland, 1,104,481. July 21, 1914. Filed May 31, 1910. Serial No. 564,191.

Grate Bar. B. C. Stewart, assignor to Murphy Iron Works, Detroit, Mich. 1,107,860, Aug. 18, 1914. Filed Jan. 16, 1914. Serial No. 812,563.

Mining Machine. H. A. Kuhn and W. W. Macfarren, Pittsburgh, Penn., 1,107,239, Aug. 11, 1914. Filed Nov. 30, 1908. Serial No. 465,299.

Automatic Stoker. E. A. Jones, Scranton, and J. E. Jones, Throop, Penn., 1,107,217, Aug. 11, 1914. Filed Apr. 4, 1913. Serial No. 758,914.

Adjustable Heat and Fuel Economizer. M. M. Gillam, Flushing, N. Y., 1,107,605, Aug. 18, 1914. Filed Feb. 20, 1914. Serial No. 819,912.

Locomotive Fire Box Construction—L. G. Parish, New York, N. Y. 1,110,815, Sept. 15, 1914. Filed June 15, 1914. Serial No. 845,079.

Spark Arrester and Smoke Treating Device—H. A. Weber, Hartford, Conn. 1,109,884, Sept. 8, 1914. Filed Oct. 15, 1912. Serial No. 725,860.

Mine Ventilating Apparatus. W. Clifford, assignor to Ellicott Co., Pittsburgh, Penn., 1,107,264, Aug. 18, 1914. Filed Jan. 4, 1912. Serial No. 669,329.

Cutter Head—L. F. Hess, assignor to Hess Dustless Mining Machine Co., Ansted, W. Va. 1,109,988, Sept. 8, 1914. Filed Nov. 9, 1912. Serial No. 730,480.

Pyriphoric-Ignition Miner's Safety Lamp—F. Fattinger, Treibach, Austria-Hungary. 1,109,055, Sept. 1, 1914. Filed Dec. 16, 1911. Serial No. 666,144.

Boiler with Fire Tube Superheater. S. Hoffman, assignor to Locomotive Superheater Co., Wilmington, Del., 1,104,756. July 21, 1914. Filed Jan. 12, 1912. Serial No. 670,734.

Refractory Arch for Locomotive Boiler Furnaces—C. B. Moore, assignor to American Arch Co., New York, N. Y. 1,109,692, Sept. 8, 1914. Filed Nov. 17, 1908. Serial No. 463,070.

Bottom Construction for Furnaces. H. H. Blake, assignor to Blake Crusher and Pulverizer Co., Pittsburgh, Penn., 1,104,402. July 21, 1914. Filed June 30, 1911. Serial No. 636,294.

Process for Regulating the Temperature of Combustion—J. M. Rusby and J. H. Taussig, assignors to United Gas Improvement Co., Philadelphia, Penn. 1,110,991, Sept. 15, 1914. Filed Dev. 27, 1909. Serial No. 535,178.

PERSONALS

Fred Vinton has resigned his position as mine foreman for the Penn-Mary Coal Co. by which he has been employed for the past eight years, and has accepted a position as superintendent for the Greenwich Coal & Coke Co., at Saxton, Penn.

J. C. Arnold, general sales manager of the Interstate Coal & Mining Co., is pushing his sales campaign on the strength of the use of steam shovels in mining, which it is claimed produces a finer and cleaner coal than the ordinary system.

Col. W. H. Thomas and Jairus Collins of Bramwell, W. Va., together with N. D. Maher, vice-president of the Norfolk & Western R.R., are making arrangements for placing a creditable display of coal and coke from the Pocahontas coal fields at the Panama Exposition in San Francisco next year.

Benjamin S. Daddow, of Ashland, Penn., who has been employed as chief clerk of the Mahanoy and Shamokin Division of the Lehigh Valley Coal Co., has been promoted to the position of chief clerk to Mining Superintendent Thomas Thomas, of the same company, with headquarters at the general office in Wilkes-Barre.

Miss Margaret Jordan has accepted a position as domestic science instructress, directress and helper, for all families of the employees of the Leckie Coal Co., the Panther Coal Co., and the West Virginia Pocahontas Coal Co. Miss Jordan is a graduate of Columbia University, and her new duties will be to visit the various operations at regular intervals, instructing the housewives in domestic economy, sanitation, teaching the children healthful recreation, and in every way assist in uplifting the communities in which her work lies.

OBITUARY

Andrew A. Bruch, manager of sales for the S. Flory Mfg. Co. of Bangor, Penn., who has been with the company since its inception, died on Oct. 20.

Michael H. Healey, aged 45, a member of the Executive Board of District No. 1, United Mine Workers of America, and one of the best known union men in the anthracite region, died on Oct. 20, at his home, 431 Fourteenth St., Scranton, Penn., of kidney trouble.

Andrew Roy, the first mine inspector in Ohio, died at his late home at Wellston, Ohio, recently, from old age. He was 80 years old and a well known character in the mining industry of the state. The deceased was born in Scotland. He served in the Union army during the Civil War. After the war he was a candidate for secretary of state of Ohio but was defeated. He was appointed on a commission to investigate the condition of mining in Ohio and his report led to the establishment of the mine inspectors' department. He was appointed the first chief inspector on Apr. 6, 1874 which office he held for four years. On Feb. 12, 1880, he was re-appointed chief inspector by Governor Charles Foster and served for another four years.

CONSTRUCTION NEWS

Holsopple, Penn.—The Victor Coal Mining Co. of Holsopple will shortly put into commission new equipment to operate its mine electrically.

Middlesboro, Ky.—It is announced that the Low Ash Mining Co. is to install electrically operated cutting and haulage machinery in its mines near here.

New Orleans, La.—The Illinois Central R.R. Co. recently awarded to the Roberts & Schaefer Co., of Chicago, a contract for a large barge loading plant to be built immediately at Harahan Incline, New Orleans.

Charleston, W. Va.—The Boone County Coal Corporation will shortly develop coal mines on Beach Creek, a tributary of Little Coal River. This firm will also build a tipple and establish a town, constructing two miles of railroad.

Toledo, Ohio—New coal docks, modern car dumping and coal hoisting machinery, and additional yards, all to cost more than half a million dollars, are to be added to the terminal facilities of the Cincinnati, Hamilton & Dayton R.R. in Toledo, within the next few months. The improvements have just been authorized, and preliminary surveys, plans and specifications are being worked out by the company's engineers.

Chicago, Ill.—The Roberts & Schaefer Co., of Chicago, has just concluded a contract with the Louisville & Nashville Ry. Co., for the equipment of a 1000-ton reinforced-concrete Holmen type locomotive coaling plant with weighing facilities, for installation at the new Radnor Terminal at Nashville, Tenn.

A contract was also concluded with the Louisville, Henderson & St. Louis Ry. Co. for the building of a similar tipple of 200 tons capacity, with proper weighing facilities at Henderson, Ky.

Charleston, W. Va.—A railroad will be built through the densely wooded portion of Nicholas County for the development of the natural resources in coal and lumber there found. The Cherry River Southern R.R. Co. has completed the permanent survey for the route of the proposed line, and will, it is expected, let the contract for the construction of the road at the earliest possible moment. This road will be about 35 miles long, and will extend from Curtin in Nicholas County, to Bay's Ferry, where the counties of Nicholas, Green-

brier and Fayette converge. About 100,000 acres of valuable coal and timber land will be tapped by this road.

Huntington, W. Va.—What is believed to be the first step in a movement to utilize and turn to commercial advantage the water power afforded in the valley of the upper Guyandotte River is seen in the incorporation of the Logan Light & Power Co. of Logan, with an authorized capital stock of $1,500,000. The incorporators of this firm are George W. Stevens, Jr., E. S. Aleshire, and R. P. Aleshire, of Huntington, Curtis McComas, of Barbourville, and W. C. Lawrence, of Logan. The intention is to erect a power house at Logan, and from that center distribute commercial current to the various mining operations in Logan County and throughout the Guyandotte Valley generally.

NEW INCORPORATIONS

Terre Haute, Ind.—The Fairmount Coal Co. has been dissolved.

Jersey City, N. J.—The Mexican Coal & Coke Co. of Jersey City has decreased its capital stock as a New Jersey corporation from $5,000,000 to $50,000.

Elberfeld, Ind.—The Elberfeld Coöperative Coal Co. has been organized with a capital stock of $2000, for the purpose of mining and dealing in coal. The incorporators are C. A. Wiggs, William Rostron, and B. Fulling.

Tacoma, Wash.—The Scranton Coal Mining Co. has been organized in Tacoma with a capital of $300,000. The incorporators are Ernest Hutchins, A. L. Hutchins, B. W. Watkins, and F. M. Lane; Eugene Carr is attorney.

Listonburg, Penn.—The Somerset Quemahoning Smokeless Coal Co. has been organized with a capital of $10,000. The incorporators are J. H. Saulsbery, Eleanor M. Saulsbery, of Punxsutawney, John T. Harrington and Marion Harrington, of Horatio.

INDUSTRIAL NEWS

Birmingham, Ala.—The Tennessee Coal & Iron Co.'s rail mill and open hearth department at Birmingham, which was closed Oct. 1, resumed operations on full time Oct. 22.

Pittsburgh, Penn.—Shipments of coal and coke over the Pennsylvania Lines east of Pittsburgh and Erie for September, show a total of 6,024,214 tons, or a decrease of 295,168 tons.

Athens, Ohio—Negotiations have been completed for a loan of $100,000 by which the line of the Hocking-Sunday Creek Traction Co. will be extended to Athens. The loan was made by Close Bros., of Chicago.

Bluefield, W. Va.—During the month of September, the Norfolk & Western R.R. hauled 2,509,916 tons of fuel from the mines along its right-of-way. This was divided as follows: Pocahontas region, 1,390,531 tons; Tug River, 295,332; Thacker, 295,776; Kenova, 110,158; Clinch Valley, 158,393, and other Norfolk & Western territory, 4781 tons, the balance being received from other railroads.

Fayetteville, W. Va.—For the month of September, the Chesapeake & Ohio R.R hauled 2,082,675 tons of coal from the Kanawha, New River, Guyan, and Kentucky districts. The Kanawha district furnished 709,535 tons, New River, 587,455 tons, Guyan, 555,445, and Kentucky, 230,200 tons. The Guyan district lacked only 32,000 tons of equaling the New River output hauled by the Chesapeake & Ohio.

Scranton, Penn.—It is reported that the city of Scranton pays more for its domestic fuel than is charged at tidewater, in spite of the fact that freight charges are added to the fuel shipped to these points. It is said that Scranton pays $4 per ton net, without the cost of handling, while Paterson, N. J., for instance, gets the same grade of coal for $3.35. It is alleged that complaint will be made to the State Utilities Commission.

Washington, D. C.—Freight rates on bituminous coal from mines in Washington County, Penn., to destinations on the Pittsburgh & Lake Erie and Baltimore & Ohio railroads in other states, were recently held by the Interstate Commerce Commission to be unreasonable and discriminatory to the extent that they exceeded by 10c. a ton rates for similarly located mines for the same destinations. This decision affects many roads and a considerable traffic.

Clarksburg, W. Va.—Announcement was recently made that the Hygrade Coal Co. had leased its Page mine at McWhorter to J. S. Klinefalter & Co. These holdings consist of 150 acres of Pittsburgh coal, all of which is leased to the new corporation. The Page mine is modernly equipped, having been in full operation for some years, but it is stated that the lessees will continue to operate the mine on full time, and will probably make considerable improvement in the equipment.

New York, N. Y.—The local unions will petition President Wilson to effect a speedy settlement in the Colorado coal strike situation. Ernest Bohm, secretary of the Central Federated Union, recently received a telegram from a committee of the Trinidad coal strikers, asking the New York unions to petition the President to take speedy action in forcing the coal operators to comply with the requirements laid down as the basis of settlement of the Colorado coal strike.

Washington, D. C.—Reductions in the rate on coal from mines in Oklahoma and western Arkansas to Weatherford, Tex., were recently ordered by the Interstate Commerce Commission, in the case of the Weatherford Chamber of Commerce and others against the Missouri, Kansas & Texas and other railroads. The roads were directed to reduce from $2.50 to $2.25 per ton, the rate on lump coal, and from $1.70 to $1.65 per ton the rate on slack. These reduced rates are to take effect Dec. 1.

Huntington, W. Va.—The Chesapeake & Ohio Ry., including the C. & O. of Indiana, during last year used 41,000 carloads or 2,000,000 tons of fuel, for which $2,220,000 was paid. By adding to this $813,000 which it cost to transport this coal to the various points on the road, and $85,000 which was spent by the company to put it on the tenders of locomotives, it will be seen that $3,098,000, or $1.55 per ton was spent by this railroad for fuel. This is equal to 8½ per cent. of the gross earnings of the road during this period.

Washington, D. C.—The Supreme Court recently agreed to review a decision by Federal Judge Dayton of West Virginia, since reversed by the Federal District Court of Appeals, holding that the United Mine Workers of America is a monopoly in restraint of trade. This decision was made in the case of the Hitchman Coal & Coke Co., which brought anti-trust proceedings against John Mitchell, T. L. Lewis, and William B. Wilson, as officers of the miners' union, and against the union itself. The company alleged that the organization was destroying its business.

Washington, D. C.—The case of the United States against the Lehigh Valley R.R. Co., the Lehigh Valley Coal Co., and the Lehigh Valley Coal Sales Co. has been set for argument Nov. 11, before Judge Hough in the Southern District Federal Court of New York. The Government brief which was recently filed contends that the Lehigh Valley R.R. Co., through its subsidiaries, has monopolized the production, transportation, and sale, of anthracite coal from mines along its lines, and asks the Court to compel the railroad company to dispose of the stocks of its subsidiaries to persons who are neither its stockholders nor agents.

Frankfort, Ky.—The Circuit Court of this (Franklin) County has upheld in toto the Workmen's Compensation act which was questioned in a test case given its preliminary hearing here recently. Judge Stout upheld the contentions of the State Board of Arbitration in every detail and granted the mandatory injunction which was asked by the Board against the printing concern which declined to comply with the provisions of law. The case went at once to the Court of Appeals and its hearing in that body will be expedited. In this connection it may be noted that the Board has extended the time for the employers to report the means they are going to use to comply with the act, from the first of November to the first of December. The coal operators of the state, who have favored the act all along, are well pleased with the turn affairs have taken.

Connellsville, Penn.—A suit of much interest to coke men of the Connellsville region was completed recently in the Superior Court of Massachusetts when J. K. Dimmick & Co., a former coke brokerage concern with offices in Uniontown and Philadelphia, was given the decision in a breach of contract action. The suit was brought against the Dimmick firm by the Federal Coal & Coke Co., whose offices are in Boston, and whose plant is at Fairmont. The concern sued to recover $20,000. Breach of contract was alleged, it having been declared that the Dimmick firm contracted for 24,000 tons of coke, and refused to take the remainder after 500 tons had been shipped. A defense that the coke was of an inferior quality is said to have been made by the Dimmick concern, and a cross suit was brought to recover $1200 or 5c. per ton commission on the deal. The court awarded the suit to the Dimmick company, giving it $1200 with interest.

Coal Trade Reviews

General Review

Cold snap starts the retail anthracite trade moving, but the mines continue short of orders. Bituminous outlook pessimistic. Cancellations the rule and mines are reducing working schedules.

The recent cold snap has had a stimulating effect upon the retail anthracite trade, but with all dealers generally well stocked, it will have to continue for some time before the beneficial effect will be felt at the mines. Many of the large companies are already receiving cancellations, and a few have been forced to reduce their working schedules. The Upper Lake ports are reported as choked up with coal, though shipments are still substantially less than last season. The large amount of individual coal going to Tidewater is also indicative of the adverse situation. On the other hand, there is a notably healthy undercurrent through the trade, particularly as compared with average conditions in other industries.

Bituminous operators are distinctly pessimistic. In spite of the rigid curtailment, cancellations of orders are constantly threatening to develop heavy accumulations, and agencies are occasionally forced to make liberal concessions. Unsold portions of consignments to consuming centers are exceedingly difficult to move, and with heavy stocks in all directions, it is difficult to see where there can be any betterment. The improvement in some phases of the financial situation is creating renewed hopes in certain quarters.

Further curtailment in both general manufacturing and the iron and steel industries has created an additional heaviness in the Pittsburgh district. The customary fall advance in the circular is not being discussed, while the Lake shipping, which has been a disappointment throughout the season, has slowed up still further. Instead of an increased consumption, as is usually the case at this period, it seems to be falling off. Consumers are well stocked, but the mines are still urging coal forward, and some is occasionally noted on demurrage.

Ohio prices have softened under the influence of the continued weakness in domestic grades, the dull steam business and the falling off in Lake tonnage. Production has slowed down materially, and even in the event of cold weather it will be some time before the effects are reflected back to the mines. Some hopes of a final rush in the Lake trade are still entertained, reports from the Upper Lake ports indicating that considerable coal is moving to the interior.

The Middle Western operators have succeeded in relieving some of the pressure on slack coal by diverting a portion of the demand to straight mine-run. Prices on slack recently touched the lowest point in the history of the trade, but they are substantially better now. The general market continues heavy. There seems to be practically no demand whatever, and the past week has witnessed still further declines.

ATLANTIC SEABOARD

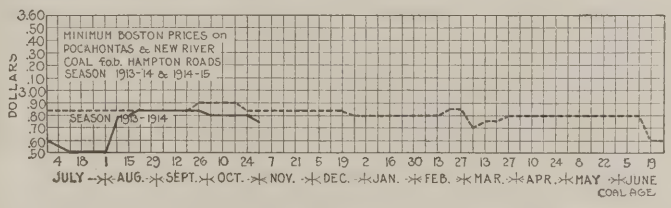
BOSTON

Weakness in Hampton Roads coals likely to be more pronounced. Inland demand now as slack as Tidewater. Pennsylvania grades also somewhat off in price. Anthracite only in light demand and independent offerings again in evidence.

Bituminous—The week has developed some soft spots in the Pocahontas and New River market; several of the agencies have quietly been offering coal at a liberal concession from the $2.85 price. This condition is not widespread as yet, but it is certainly significant. Unless present indications fail, there will be a general slump in Hampton Roads coals by the early part of November. The usual effort is being made to cover up the f.o.b. basis of such sales as are effected, and so far the low-priced offerings are confined to alongside business at points like Boston, Providence and Portland. Only a rigid curtailment can correct the present state of the market. The extremely mild weather has not only reduced coal consumption, but transportation has been moving on record time, and practically every point is surfeited with supplies.

For inland delivery, there is practically no inquiry. At Mystic Wharf, Boston, the season price of $3.78 on cars is still quoted, but it is doubtful if a price 50c. less would be attractive enough today to make a sale of any considerable tonnage. At Providence, $3.40 on cars has been named, a figure that would analyze back to $2.62 f.o.b. Hampton Roads, based on the lowest marine freight. Unsold balances continue to keep the market weak, and with the heavy stocks everywhere, it is difficult to see how there can be any improvement for weeks to come.

The Pennsylvania grades are also showing the effect of the dull market. Most of these coals, however, are sent to the loading ports only on firm orders, and there is nothing like the proportion of distress coal at New York and Philadelphia that prevails at the Virginia terminals. At the same time, prices have had to be modified in many instances to secure any orders at all.



There are no new developments on Georges Creek. The shippers are caught up on their contracts and new business on this coal is as much out of the question as on any of the other standard grades.

Anthracite—The retail dealers complain of exceptionally light business. There has been no weather to burn coal, and stocks continue at the maximum in most cases. Shipments have fallen off very noticeably and loading dispatch at New York has correspondingly improved. One of the signs of a dull market is the offering of various independent coals at Boston and points East at prices a few cents under the company circular. The difficulty with independent shippers, as with others, is that they cannot furnish the proportion of stove coal required, and egg and chestnut are a drug on the market.

Bituminous prices at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.85@1.45	$1.20@1.55	$1.67@1.77	
Philadelphia*.....	2.10@2.70	2.45@2.80	2.92@3.02	
New York*.....	2.40@3.10	2.75@3.10	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.75@2 8
Boston†.....	.....	.....	.....	3.50@3 78
Providence†.....	.....	.....	.....	3.40@3 7

* F.o.b. †On cars.

NEW YORK

Working schedules in the bituminous field are much reduced. Outlook pessimistic. Anthracite operators curtailing production though the recent cold snap has improved conditions.

Bituminous—The market outlook continues distinctly pessimistic. A particularly adverse development of the week was a well defined rumor of a substantial cut in the circular on New River coal. The working schedules in the mining regions have contracted still further; it is unofficially stated that the Berwind-White interests have reduced to a two- or three-day basis per week, the two-day schedule probably predominating. Many of their miners are seeking employment in other fields, and in fact this is becoming so general throughout all the mining regions that the situation is rapidly becoming distressing.

But even in the face of all these adverse conditions features of a constructive nature are not entirely absent. The rapid decline in the rate of exchange down to a more normal basis, together with other favorable developments, such as the more hopeful outlook in cotton, are expected to have a steadying effect. There is no absolute pressure to sell at Tidewater, accumulations being relatively restricted and no demurrage coal reported. The demand from tramp steamers is holding up in a most satisfactory manner.

Prices are irregular and are showing weakness, though the market is still quotable on the former basis which we continue as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—A sharp cold snap during the current week had a much needed stimulating effect upon the markets which were showing a decided tendency toward heaviness. Some of the large companies, as, for instance, the Reading, had already been forced to curtail operations, while practically all were receiving cancellations. The line trade all over the country has shown a distinct falling off, while the amount of individual coal coming to Tidewater is sufficient indication of the slowing up at interior points. It is generally agreed that the local dealers are all well stocked up, and it will probably take a long spell of cold weather before the trade will get back to a satisfactory basis. On the other hand, however, the situation is not by any means as bad as might be expected, considering conditions in general.

Egg coal is still in excess supply in all directions. Stove coal is becoming more plentiful all the time, straight cargoes being readily obtainable. Nut is only fair, and pea coal about the same. Steam sizes are heavy and difficult to move.

The New York hard-coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.65@5.10	$5.05	$4.60@5.05
Egg	5.35	5.00@5.35	5.30	4.95@5.30
Stove	5.35	5.35	5.30	5.30
Chestnut	5.60	5.50@5.60	5.55	5.45@5.55
Pea	3.55	3.45@3.55	3.50	3.40@3.50
Buckwheat	2.80	2.50@2.80	2.50@2.75	2.25@2.75
Rice	2.30	2.05@2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.70@1.80	1.75	1.50@1.75

PHILADELPHIA

Cooler weather creates some improvement in anthracite, but operations are curtailed. Small sizes still in surplus. Demand for domestic is absorbing current output.

Anthracite—The past week was more seasonable, but did not have the snap that indicates the trade has reached the point where uninterrupted operation of the mines may be expected. Mitchell Day was celebrated by a complete cessation of mining, and it is understod that several of the large companies were idle for an additional day or two. It is the heaviness in the small sizes that is interfering with a larger production of the domestic grades. The market appears to absorb the current output of broken, egg, stove and nut, but even the inducement of substantial concessions on the steam sizes finds little response from the trade. Everyone is complaining of the unsatisfactory conditions, and the consensus of opinion seems to be that nothing but good coal-burning weather, and plenty of it, will add backbone to the trade.

Prices at Tidewater rule about as follows:

	Circular	Individual
Broken	$4.75	$4.50 @ 4.60
Egg	5.00	5.00
Stove	5.00	5.00
Chestnut	5.25	4.90 @ 5.10

Bituminous—There is practically no change in the bituminous situation. If anything, the past week has been less fruitful in the way of new business and requisitions for tonnage on contracts. Industrial curtailment has caused quite a number of cancellations, or postponed deliveries, and it is quite apparent that manufacturers are not laying in any more supplies than will be sufficient for their immediate needs. The market is such that no stated price can be used as a basis for coal from any particular district. Coal on demurrage is likely to be disposed of at figures which will hardly net the freight, and it is understood there is quite an accumulation at Tidewater points, some of which is aproaching the danger line. On all sides comes the same story, and it is difficult to find an operator with a cheerful outlook for the future.

BALTIMORE

All branches of the coal business unsatisfactory. Extremely low prices for soft coals. Anthracite demand poor. No great industrial resumption now expected.

There is little of a satisfactory nature in the present coal situation here and the same condition seems to exist everywhere else. The operating interests of this section are facing a number of problems. Even at reduced time and with many mines closed entirely, a surplus is constantly threatened through cancellations from consumers who ordinarily take a large amount of fuel at this season.

In West Virginia, good fuels, such as three-quarter gas and first grade steam coals, were offering to the trade at anywhere from 80 to 90c. Slack was selling around 40c. Western Maryland steam coals sold ariously to the trade at the mines at from 75 to 85c. Pennsylvania low-grade fuels were offering anywhere from 85c. to $1, with better grades at $1.05 to $1.15, and best coals of the state around $1.35. But it was hard to sell even at such sacrifice figures, in many cases considerably below actual production expense.

The entire situation seems to be due to the poor industrial call. The trade has now resigned itself to the situation and does not look for an early resumption of activity.

Anthracite conditions are none of the best. With no real cool weather, there is a flat period in the trade, now that summer deliveries have been closed out for some time.

The export trade continues to hold up fairly well. A number of Mexican charters were noted among the recent announcements.

HAMPTON ROADS

Some improvement in foreign movement. Prices stationary, with slightly above normal quantity of coal on hand.

Although shipments from Hampton Roads to foreign ports have not been exceptionally heavy, at the same time there has been a decided improvement over last week's movement. Some large cargoes have gone to New England ports and the government has taken in the neighborhood of 15,000 to 16,000 tons into colliers. The largest percentage of coal moving has been Pocahontas and New River mine-run, although there have been several cargoes of high volatile and nut and slack shipped.

The accumulation of coal in the railroad yards is still above normal, with fair shipments en route from the mines. Quite a large tonnage is due at the various piers, and with the vessels now in port the accumulation will be considerably reduced. Quotations are about the same as they have been during the last few weeks. Owing to the warm weather, the domestic demand is light and dealers are complaining of poor sales.

Of the foreign steamers tied up in Hampton Roads at the outbreak of the war, all, with the exception of two, have cleared and left for various loading ports. During the week the Virginian Ry., at Sewalls Point, did excellent work in the bunkering of the "Anglo Saxon" and "Anglo Columbian," approximately 2500 tons of bunkers being put aboard the latter steamer in the short time of seven working hours.

Of 13 steamers reported to have been sunk by the German cruiser "Karlsruhe," over half of them have been either loaded or bunkered at some time at one of the Hampton Roads ports.

The following cargoes have cleared from Norfolk and Newport News, between Oct. 16 and 23, inclusive:

Norfolk				Newport News			
Date	Vessel	Tons	Destination	Date	Vessel	Tons	Destination
16	Frankrig	2253	Barbadoes	16	Auchendale	6218	Havana
17	Trodenskjold	5560	Canal Zone	17	Ella	2047	Santiago
19	Berwindvale	7938	Havana	17	Ekaterini	5432	Brindisi
21	Santa Isabel	3006	Havana	17	Leonatus	3131	Port au Spain
22	Noordijk	4467	Bahia	17	Josef Fredrik	2964	Havana
23	Homewood	2335	Santa Fe (AR)	17	Amista	6044	Montevideo
23	Chimu	2676	Chilian Ports	20	Gemma	4875	Brindisi
23	Tasmania	5268	Spezia	23	Westerdijk	4332	Montevideo

COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Karen	Norwegian	Baltimore	Colon	1072	
Rio Blanco	British	Philadelphia	Rio Janeiro	2580	
Haakon VII	Norwegian	Baltimore	Tampico	1379	
Biemiller		Philadelphia	Porto Rico	858	
Alicia B. Crosby		Philadelphia	Portland	1016	
Winnegance		Philadelphia	Lubec	251	
J. Howell Leeds		Philadelphia	Gloucester	393	
Margaret		Philadelphia	Porto Rico	1236	
John A. Hooper		Baltimore	San Francisco	1321	
Sophie H.	Dutch	Virginia	Rio Janeiro	1864	

Note—Steamers are indicated by **bold face** type, all others being schooners.

LAKE MARKETS

LAKE TRADE

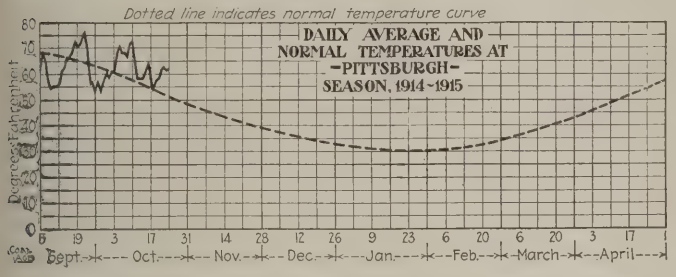
No season in Lake trade has ended as dismally as the present one. Ordinarily there are very fine finishes in the trade owing to the desire of shippers to have their commodities moved before navigation becomes impossible. Nothing of the sort, however, characterizes the present season. Shippers some time ago began to send their own vessels to dock owing to their inability to provide them with cargoes. —"The Marine Review."

PITTSBURGH

Lake shipments still lighter and will soon end for the season. Line demand slightly less. Prices irregular and practically unchanged, except for rather less irregularity in slack.

Lake shipments have decreased further and the movement will soon be over. The demand from the Northwest has

been an almost continuous disappointment throughout the season, and the last hopes of an improvement have, of course, disappeared. Manufacturing demand has shown a slight decreasing tendency in the past week or two, as the iron and steel mills are operating at still lower rates, one estimate having it that last week the steel mills as a whole operated at only 45% of capacity. Domestic trade shows a slight improvement, but retail dealers are still ordering in as small quantities as possible.



Prices are as low and irregular as ever, even slack showing no decided strengthening in keeping with the decreased output of screened coal and the fact that Lake shipments of ¾-in. coal will be entirely finished in a very few weeks. Slack is quotable this week at about 50c. as minimum, against 40@50c. last week. Best grades of gas coal, in prompt lots, command in the neighborhood of $1.15, but there are occasional lots offered down to about a dollar. Nothing definite can be learned as to new circular prices, which, according to custom, should shortly be announced. The old circular, still nominally or officially the market, is: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Still much complaint of unseasonable weather, and anthracite trade is sure to be affected soon. Bituminous accumulating on track everywhere. Grave outlook when the Lake trade is shut off.

Bituminous—There is not much chance of improvement in any branch of the coal trade so long as the present weather continues. There is as much coal in consumers' hands as they want to carry and the mines are still urging it forward, often paying demurrage on it, when they ought to be realizing all the profit they can. The jobbers say that if there is demurrage to pay, the mines will have it to settle. Reports come from the mines that they are able to run only three or four days a week at the most, and quite often less than that. This is the time of the year when the consumption of bituminous ought to increase steadily, but it appears to be falling off instead. Complaints of poor trade multiply. Iron furnaces continue to shut down and mines run more slowly. Canada is buying so little that some shippers say there is hardly an excuse for covering it, except to keep acquainted with their old customers. Quotations continue unchanged, though all prices are weak, slack especially so, on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley coal is about 25c. below Pittsburgh, except slack, which is about on a par with it.

Anthracite—The demand is fair, but in no way as rushing as it sometimes is. It is not believed that there is any disposition to cut down the amount required, so the quietness is acceptable to the wholesalers, though the local dealers are complaining about it some.

Shipments by Lake are fairly good, though not what they were last fall. Shipping agents say that they are sure of coal enough at Upper Lake ports, and there is no need of haste. It is reported that sales at Upper Lake ports are not active, and more will be necessary if further shipments are to be made from here, as storage room is practically all taken up. The amount shipped for the week, according to custom house figures, is 139,000 tons, which is a fair fall average.

Rail line shipments of anthracite are improving and should continue to do so for some time.

TORONTO, CAN.

Market well supplied and business quiet. Prices steady.

Owing to the continuance of mild weather, the coal trade remains unusually quiet for the season. The market is well supplied and large consignments are being received by dealers in anticipation of the close of navigation. There is no change in prices, quotations being well maintained as follows: Retail —Anthracite, egg, stove and nut, $7.75; grate, $7.50; pea, $6.50. Bituminous, steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale, f.o.b. cars, three-quarter lump, $3.78; screenings, $2.64.

TOLEDO

Situation continues unchanged and generally heavy. Closing of domestic mines creates a shortage of small sizes.

Conditions have changed but little, domestic demand still being light, while steam coal is moving slowly as compared with other years. Owing to the fact that many Hocking domestic mines are closed down altogether, nut, pea and slack are showing more strength. Lake business is unchanged. The T. & O. C., C. H. & D. and Hocking docks are all moving some coal, and the C. H. & D. is making a better showing than it did a year ago.

Railroad movement continues light and there is no congestion noted here. The uplake coal handled thus far this season by the C. H. & D. here amounted to 1,000,000 tons, and the company officials are predicting that the season's tonnage will reach 2,350,000 tons.

COLUMBUS

Curtailed production due to falling off in domestic demand. Steam business slow and Lake trade is not so active. Prices have weakened.

The feature of the coal trade in Ohio is the continued weakness in domestic grades, which has curtailed production. This, coupled with the dull steam business and a falling off in Lake tonnage, has had a bad effect on the trade generally. Prices have softened materially and the tone of the market is not as good as formerly. These conditions are believed to be only temporary, however, and a turn for the better is expected as soon as lower temperatures prevail.

Dealers' stocks are sufficient for present needs, and they are only buying a small amount. Cancellations have been frequent. Buying is now being done for delivery in the first half of November. There is no likelihood of an advance soon and $1.75 coal is now out of the question before the first of the year. Retailers say there is still a fairly good demand for the fancy grades, such as Pocahontas and West Virginia splints. Hocking lump is also moving fairly well.

Little change is reported in the steam trade. Manufacturing is still quiet, and there has been practically no increase in fuel requisitions. Buying in the open market is still the rule among certain factories. Railroads are only taking a fair tonnage, and the prospects for the future are not considered bright.

The Lake trade shows a slight falling off, due to congestion at some of the upper Lake docks, but this condition is being relieved and a fairly good movement is expected right up to the closing of navigation. Lake prices have not changed materially and shipments to the interior are heavier. Production has been slackened during the week and the Hocking Valley is now producing only about 45% of the average. The same percentage prevails in Crookville, Jackson and Cambridge districts. In the Pomeroy Bend district, the output is estimated at about 70 to 75% of normal.

Anthracite is in fairly good demand among the trade and prices are as high as formerly.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Re-screened lump	$1.60	$1.70	.....
Inch and a quarter	1.50	1.50	$1.40
Three-quarter inch	1.40	1.40	1.35
Nut	1.15	1.30	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.50	0.55	0.50
Coarse slack	0.40	0.45	0.40

CLEVELAND

Sharp fall in temperature has stimulated the retail trade. Prices are generally stiffer and there is a better tone to the market.

Colder weather that has forced heating plants to fire up, brought a liberal lot of orders to the retail dealers Monday. This was the first real fall business of the season and it has had a most beneficial effect since the local trade depends upon one- and two-ton lots for more than half of its business. The increased reail trade did not affect the wholesale market and will not before the latter part of the week, but the weather had a bracing effect upon spot car business. Coarse coals moved readily and fine coal was in brisk demand. This brought a stiffening in prices and some slight advances in certain lines.

Youghiogheny slack was sold at $1.70 with Panhandle at $1.60 to $1.65. Fairmount slack, which has been very low for several weeks, was up to $1.65 and operators were not cutting the price for orders for shipment. Hocking and Goshen slacks are not being offered, as the lighter production of larger sizes has so reduced the output of these grades that there is only sufficient for contract requirements. No. 8 from West Virginia has been sold largely on consignment the last few weeks, but it brought quoted prices in sympathy with other coals. For the first time this fall the

market looks as if it would continue to hold above the rock bottom level at which it has been so frequently during the last few months.

The Lake trade is rapidly drawing to a close. Only such cargoes as are needed to round out contracts are being shipped. It does not seem likely that any considerable amount of coal will be moved during the rest of the season and practically no coal will go up the Lakes after Nov. 15.

Prices for current shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.75	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.75	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1¼ in.	.....	$2.40	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$2.05	$2.05
Mine run	2.75	2.25	1.95	1.90	1.95
Slack	2.40	1.65@1.70	1.65	1.65	1.65

CINCINNATI

No change noted and the demand continues light. Colder weather will make some improvement. Transportation and labor conditions are excellent.

The continued mild fall weather and the lack of any improvement in the industrial demand has resulted in about as dull a market as possible. The hoped-for improvement among manufacturers has not yet taken place, although there are encouraging signs that it may develop in the near future. So far, however, the better feeling has not made itself evident in an increased demand for fuel, which must evidently await a decided increase in the extent of operations.

The domestic market, as far as the storage demand is concerned, is generally understood to be about filled, but there is undoubtedly a large volume of business to be handled in one-ton orders when the first cold snap comes. It is not likely, however, that even colder weather will help much for some time, as the retail trade is well stocked.

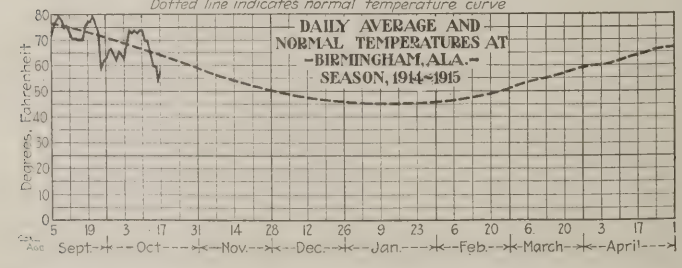
SOUTHERN

LOUISVILLE

Market generally demoralized. Still large excess of slack. Mining slowing down.

Generally speaking, the Kentucky coal market is demoralized by the weather and the curtailment in industrial operations. The extent to which it has been affected is shown by the fact that many of the mines which produce the fancy and the advertised brands of domestic coal are now selling these for steam use. In addition to this, some operators are dumping their nut and slack on the ground in order to dispose of it. Such mines have large contracts to fill in domestic coals and have to get it out, but they have been unable to dispose of their steam grades. The railroads are profiting to a considerable extent, having much steam coal turned over to them for the demurrage and freight charges.

Mines are slowing down on production and this is tending to strengthen the domestic market, in which prices are more or less steady. It is not common, however, for operators to get business at prices which are at all reasonable, while almost anything that looks like real money for steam coals gets the order.



COKE

CONNELLSVILLE

Small furnace coke contract closed at $1.75, the highest regular asking price. Market quiet. Production and shipments further decreased.

A contract for a relatively small monthly tonnage of furnace coke, to run to the end of the year, has been closed with an eastern Pennsylvania consumer at $1.75, ovens, practically the highest price now seriously quoted. There are negotiations for one or two lots for November shipment only, on which $1.75 or less will be done, as there are sellers of some brands for early delivery at as low as $1.65. Prompt coke shows scarcely any activity, and there are offerings at $1.60, but these cover only occasional lots, not regular supplies. Foundry coke is easier as to prompt lots, there being fairly good brands available at $2.15, while indifferent grades could be had at $2, or possibly a shade less. We quote: Prompt furnace, $1.60; contract furnace, $1.65@1.75; prompt foundry, $2.15@2.50; contract foundry, $2.35@2.50, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 17 at 237,729 tons, a decrease of 8381 tons, and shipments at 236,109 tons, a decrease of 8484 tons.

BUFFALO

The oven output still shows a falling off. Prices at rock bottom, with little prospect of any improvement.

There is no upturn yet to the coke market. Coal dealers are discouraged and are giving coke a wide berth. So many furnaces are idle that the prices are controlled by the consumers, which means that they are at the bottom. All reports from the oven districts agree that the output is not increasing, and in many cases it is falling off. Prices remain on the basis of $4.25 for best 72-hr. Connellsville foundry, with $3.30 for stock coke.

MIDDLE WESTERN

INDIANAPOLIS

A better price for screenings. Operators selling mine-run in place of steam lump.

The only feature in the Indiana coal situation that is changed is a better price for screenings. The minimum price now seems to be 40c., as against 30c. the last several weeks. Operators are not sure about the influences that have brought this about, but they feel that they themselves have been a factor. They managed to induce some railroads and other large buyers to switch from lump to mine-run, and they are apparently satisfied with the change. This, together with a less pressing demand for domestic lump, has reduced the accumulation of slack, with the result that there is less now on the open market, and buyers have had to bid higher for it. It had sold down to 25c., the lowest in the history of the Indiana field. A year ago screenings were selling at 75c. and 80c. Operators are still of the opinion that the Keokuk dam has something to do with the generally lessened demand for coal. The consumption cut off by the great water power has to be sought elsewhere and competition is sharpened. Mining and retail prices are generally unchanged and mines are on half time. Summer weather still prevails.

Retail prices are as follows:

Anthracite, chestnut	$8.25	Raymond, lump	$4.50
Anthracite, stove and egg	8.00	Winifred, lump	4.50
Anthracite, grate	7.75	Hocking Valley, lump	4.50
Pocahontas, forked lump	6.00	Luhrig lump	4.50
Pocahontas, shoveled lump	5.50	Luhrig washed egg	4.75
Pocahontas, mine run	4.50	Cannel	6.00
Pocahontas, nut and slack	3.75	Linton No. 4 lump	3.50
Blossburg	5.50	Linton No. 4 egg	3.50
Jackson (Ohio)	5.25	Sullivan No. 6	3.50
Kanawha, lump	4.50	Indiana washed egg	3.50
Kanawha, egg and nut	4.25	Brazil block	4.50
Pittsgurg, lump	4.50	Connelsville coke	6.00

ST. LOUIS

A declining market. Mild weather and practically no demand. Outlook generally discouraging.

There has been a continually declining market during the past week, both as to prices and demand. An unusually mild month thus far has upset all the expectations of the coal trade, and everything seems to have gone wrong. There is practically no demand in the city for coal in a domestic way, and steam business is off about 50 per cent. In some respects, this is due to a general business depression, and also to the mild weather. It is customary, at this season, to ship a large tonnage to the South for cotton gins, etc., but the movement this year is slow.

The situation is particularly bad in the Standard districts, where screenings have been selling for as low as 10c. and lump for $1. The only relief is cold weather and plenty of it, and even this may not bring the market into the condition it ought to be at this period of the year.

Anthracite still continues in fairly good demand, with nothing moving in the way of smokeless.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump		....	$1.30	$1.05@1.15	$1.15@1.20
3-in. lump		....	1.40		
6-in. lump	$1.50@1.85	....	1.50	1.25@1.35	1.30@1.35
Lump and egg	1.85@2.15	$2.25			1.35
No. 1 nut	1.25@1.40	....		0.75@0.80	
Screenings	0.25@0.40	....	0.80@0.85	0 10@0.20	0.20
Mine-run	1.05@1.10	....		0.75@0.80	
No. 1 washed nut	1.50@1.60	2.25	1.50	....	
No. 2 washed nut	1.20@1.30	....	1.35	....	
No. 3 washed nut	1.05@1.10	....		....	
No. 4 washed nut	1.00@1.05	....		....	
No. 5 washed nut	0.15@0.25	....		....	

KANSAS CITY

Coal has been moving slowly, both for domestic and steam plant use. Winter season is late.

The seasonal movement of coal in Kansas City continues to be postponed, due to the delayed winter. Before the middle of October last year, there had been two weeks of really cold weather, but this year there has not been even a frost. Domestic prices are generally unchanged, as are steam grades also, and unless sufficiently prolonged cold weather comes soon, there will be a break in the market for slack. There are no large stocks of coal on hand with either dealers or consumers. Illinois sales have fallen off markedly from the previous week, and there is considerable coal now threatened with demurrage.

Coal Contracts Pending

Contract No. 2—Norfolk, Va.—The United States Government is in the market for 200 tons of bituminous coal for use in waterway improvement work. Bids opened Oct. 12 were as follows: Pocahontas Fuel Co. (14,850 B.t.u.), $2.63. Castner Curren & Bullitt, (14,600 B.t.u.), loading at city pier: Lump, $3.545; mine-run, $2.545; for loading at Lamberts Point: Lump, $3.545; mine-run, $2.59. New River Coal Co. (14,800 B.t.u.), $2.55. Smokeless Fuel Co. (14,800 B.t.u.), $2.53. C. G. Blake Co. (14,850 B.t.u.), $2.55. Nottingham & Wrenn Co. (14,800 B.t.u.), $2.58. Chesapeake & Ohio Coal & Coke Co. (14,850 B.t.u.), $2.59 trimmed and $2.57 not trimmed. Johns Bros. (14,800 B.t.u.), $2.53. All communications should be addressed to E. Eveleth Winslow, Lieutenant Colonel of Engineers, United States Engineer Office, Norfolk, Virginia.

Contract No. 4—Boston, Mass.—Rhode Island Co. is in the market for 90,000 to 100,000 tons of Pocahontas, New River, Georges Creek, or Somerset run-of-mine. Shipments are to be made in about monthly proportions for a year, and the point of delivery is Providence, R. I. All communications should be addressed to E. H. Raquet, Engineer of Tests, South Station, Boston, Massachusetts.

Contract No. 6—New York—The Connecticut Co. is in the market for 22,000 tons of a good grade, low volatile, low ash, low sulphur bituminous coal for 10 months, Nov. 1, 1914 to Sept. 1, 1915. Shipments are to be as required f.o.b. boats, to be placed by the company at New York loading ports. Bids should be submitted to J. H. Sanford, Purchasing Agent, New Haven, Connecticut.

Contract No. 7—Zylonite, Mass.—The Berkshire Street Railway Co. is in the market for 21,000 tons of a good grade, low volatile, low ash, low sulphur bituminous coal for 10 months, Nov. 1, 1914 to Sept. 1, 1915. Shipments are to be as required and price to be made f.o.b. cars at mines for Tunnel Power plant at Zylonite, Mass., B. & A. R.R. Bids should be submitted to J. H. Sanford, Purchasing Agent, New Haven, Conn.

CONTRACTS LET

Contract No. 5—Boston, Mass.—The New York, New Haven & Hartford R.R. closed a fuel contract this week of about 350,000 tons for delivery at Boston and at Providence with the New England Coal & Coke Co., it is understood, on Davis Coal & Coke Co.'s Elk Garden coal.

FOREIGN

Guayaquil, Ecuador, South America — La Compania de Alumdrado (Lighting Company) is in the market for 3500 tons of gas coal. Prospective bidders should state the specific gravity, weight per cubic foot, and space occupied by one ton of gas coal. Give approximate analysis including moisture, fixed carbon, sulphur and ash, and a commercial analysis showing the gas per ton of coal, gas per cubic foot of coal, illuminating power of the gas in standard sperm candles, value of one cubic foot in grains of sperm, sperm value per ton of coal, coke per ton of coal (good quality), coke per cent. of coal, ash in coke, sulphur eliminated with the volatile products, sulphur in the coke, tar per ton of coal. Quotations should be c.i.f. Guayaquil. Address The Manager, Compania de Alumdrado, Guayaquil, Ecuador, South America.

South America—An American consular officer in that country has transmitted detailed information relative to tenders which will be received, until Nov. 1, for the supply of coal for government steamer service. American coal dealers who are interested should apply to the Bureau of Foreign and Domestic Commerce, mentioning item No. 14,016 for the reserved information.

South America—Supplementing a previous notice, the Bureau of Foreign and Domestic Commerce at Washington states that details regarding a certain inquiry from South America have been forwarded to the department, and that complete information, including blank forms on which to submit bids for supplying coal under the conditions specified can be had on application. All inquiries should mention item No. 14,048, and be addressed to the Bureau of Foreign and Domestic Commerce, at Washington, D. C.

Santiago, Chile, S. A.—Bids are wanted on 300,000 tons of coal a year during the next three years, according to press reports. The coal is to be used on the Chilean Railway. All communications should be addressed to the Department of Materials, Santiago, Chile, S. A.

Latin America — An American minister in Latin America has transmitted, by telegram, information relative to the coal market in his district. Full particulars may be had on application to the Bureau of Foreign and Domestic Commerce and its branch offices, referring to item No. 14,133.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during September and the past four months of the current year in short tons:

	June	July	August	September
Pocahontas Field	1,245,440	1,314,478	1,277,621	1,390,531
Tug River District	244,342	263,240	293,179	295,332
Thacker District	261,248	288,643	286,572	295,776
Kenova District	97,352	100,600	105,724	110,158
Clinch Valley District	156,028	140,751	134,408	158,393
Other N. & W., Territory	2,337	2,735	4,211	4,781
Total N. & W. Fields	2,006,747	2,110,447	2,101,715	2,254,971
Williamson & Pond Creek R.R.	76,822	90,819	91,813	85,053
All other railroads	232,387	301,796	257,280	169,892
Grand total	2,315,956	2,503,062	2,450,808	2,509,916

Distributions of shipments for August and September compare as follows:

	August			September		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas	1,208,245	14,573	1,222,818	1,225,197	16,952	1,242,149
Tug River	289,223	3,956	293,179	292,570	2,762	295,332
Thacker	232,234	9,377	241,611	246,980	9,057	256,037
Kenova	94,494	11,230	105,724	99,941	10,217	110,158
Total	1,824,196	39,136	1,863,332	1,864,688	38,988	1,903,676

Shipments of coke, entirely from the Pocahontas field, amounted to 58,266 tons in August as compared with 18,734 tons in September.

Destination of shipments over this road for September and the first nine months of this year and last year were as follows in short tons:

	September		Nine Months	
Coal	1913	1914	1913	1914
Tidewater, foreign	107,814	331,205	1,236,387	1,587,552
Tidewater, coastwise	295,402	347,571	2,892,968	2,917,784
Domestic	1,911,662	1,828,140	14,323,918	15,474,771
Coke				
Tidewater, foreign		142	27,199	339
Domestic	137,204	58,970	1,204,236	807,104
Total	2,452,082	2,569,028	19,684,708	20,787,550

PENNSYLVANIA R.R.

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for September and nine months of 1913 and 1914, in short tons:

	September		Nine Months	
	1914	1913	1914	1913
Anthracite	996,528	813,394	8,149,935	7,665,020
Bituminous	4,291,425	4,378,037	36,112,774	37,774,323
Coke	736,261	1,127,951	7,603,937	10,859,413
Total	6,024,214	6,319,382	51,866,646	56,298,756

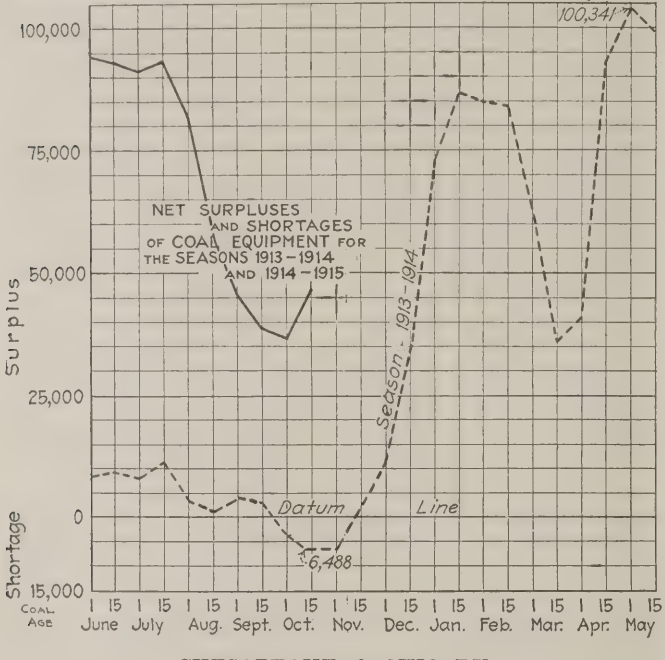
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Oct. 15, as follows:

	Surplus	Shortage	Net*
New England Lines	492	0	**492**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	5,249	20	**5,229**
Ohio; Indiana; Michigan; Western Pennsylvania	20,826	0	**20,826**
West Virginia, Virginia, North & South Carolina	5,819	185	**5,634**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	4,206	0	**4,206**
Iowa, Illinois, Wis., Minn.; North & South Dakota	5,717	0	**5,717**
Montana, Wyoming, Nebraska	584	10	**574**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,703	273	**1,430**
Texas, Louisiana, New Mexico	167	8	**159**
Oregon, Idaho, California, Arizona	2,454	88	**2,366**
Canadian Lines	0	0	**0**
Total	47,217	584	**46,633**

	June 15	July 1	July 15	Aug. 1	Aug. 15	Sept. 1	Sept. 15	Oct. 1
Surplus	93,520	91,280	93,509	82,284	56,560	46,141	39,558	37,996
Shortage	49	430	292	110	496	66	191	772
Net*	**94,763**	**90,850**	**93,217**	**82,174**	**56,064**	**46,075**	**39,367**	**37,224**

*Bold face type indicates a surplus.



CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for August and the two months of the fiscal years 1913 and 1914, in short tons:

	August				Two Months			
Destination	1914	%	1913	%	1914	%	1913	%
Tidewater	339,395	16	319,616	19	601,455	15	558,254	18
East	194,321	9	172,249	10	380,934	10	364,040	12
West	1,438,781	69	1,066,671	64	2,656,962	68	1,935,672	63
Total	1,972,497		1,558,536		3,639,351		2,857,966	
From Connections								
Bituminous	131,720	6	106,989	7	265,217	7	198,262	7
Anthracite	1,866		1,642		2,744		3,213	
Total	2,106,083	100	1,667,167	100	3,907,312	100	3,059,441	100
Coke	21,181		26,723		46,214		56,668	

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during July, August and September of this year and last year:

	July		August		September	
	1914	1913	1914	1913	1914	1913
Coal	2,594,407	2,938,723	2,769,453	3,295,123	2,878,963	3,001,733
Coke	255,650	391,485	242,283	391,999	237,661	387,704
Total	2,850,057	2,330,208	3,011,736	3,687,122	3,116,624	3,389,437

FOREIGN MARKETS

ENGLAND

Business slow and unsatisfactory. War Department taking all the Admiralty coals. The problem of the unemployed.

The London coal market is still moving very slowly. House coals are accumulating, and manufacturing qualities are not selling so freely. Slacks and small nuts have been over-plentiful, and prices are considerably weaker.

The present position of the coal trade is far from satisfactory. The indecisive period of the war is being prolonged beyond expectations, with the result that buyers hesitate to speculate. Shipowners are reluctant to send vessels to the mine-strewn area of the North Sea, and this has created a dearth of tonnage, and in addition to this, freight rates have kept on a high level. The Yorkshire markets are on the quiet side, and in the west a dislocation of traffic adds to the difficulties. The Cardiff position is best described as marking time. The Admiralty continue to take the whole of best Admiralty coals. Trade in Scotland is fair.

An Amsterdam telegram states that it is reported from Essen that negotiations concerning the renewal of the coal combination have come to a complete standstill. The period within which unaffiliated companies might join expired on Oct. 1, but the term has been extended.

The South Wales Miners' Federation express dissatisfaction with the results of the Parliamentary Committee's request for a special congress on the inadequate provision for the families of soldiers and sailors and the need for a state scheme dealing with unemployment. They have decided, failing assent of these bodies, to call on the Miners' Federation Council to summon a national conference of unions.—"The Colliery Guardian."

Oct. 16—Admiralty List coals are in good demand and prices are firmer. Dry coals also meet with a ready sale, but Monmouthshire descriptions are in good supply and values are unimproved. Cardiff small steams still offer cheaply. Quotations are approximately as follows:

Best Welsh steam	$5.04@5.28	Best Monmouthshires	$4.02@4.08
Best seconds	4.56@4.80	Seconds	3.84@3.96
Seconds	4.32@4.44	Best Cardiff small	1.92@1.98
Best dry coals	4.80@5.04	Seconds	1.32@1.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage and for cash payment.

Freights—Chartering is a little busier, there being a better demand for tonnage. Rates are approximately as follows:

Gibraltar	$1.68	Venice, Ancona	$2.88	Singapore	$2.64
Malta	1.68	Alexandria	1.92	Las Palmas	1.68
Marseilles	1.76	Port Said	1.86	St. Vincent	1.80
Algiers	1.56	Aden	2.40	Rio Janeiro	2.88
Genoa, Savona	1.92	Colombo	2.46	Monte Video	2.52
Naples	1.92	Sabang	2.46	Buenos Ayres	2.76

GERMANY

Shortage of miners and production heavily curtailed. Car supply also restricted and irregular. Requirements are still being met, however, and the market is relatively easy.

Reports from the Rhenish-Westphalian coal market show great improvement. It is only a few weeks since the pits not belonging to the syndicate stated that the mining output had sunk to a little more than one-half normal owing to the reduction of about 65% in the operating force. In addition, the irregular, insufficient and, at times, altogether failing transportation service, made frequent holidays necessary. While on the one hand, coal users were clamoring for delivery, the demand for coke had ceased and large stocks were accumulating, even with the greatly diminished production.

Within the last few days conditions have shown a great change for the better. A large demand has appeared since the opening of railway service. Shipments are being made even to the Lower Rhine by rail. All the lump coal continues to be taken for the navy, exclusively so that the demand for this size has been diverted to other grades. The demand for small sizes is very urgent, and the mines are so fully provided with orders that it is impossible to satisfy them, even approximately.

The railways are well supplied and, in some instances, cancellations have been received from this quarter. Gas coals are scarce and it is hard to fill orders promptly. A fair demand for coke has sprung up, and important orders are confidently looked for from the Luxembourg blast furnaces, now that the railway service is about to be resumed in that section. The call for briquettes has slackened. Car conditions leave much to be desired, still only about 50% requirements be alloted. The embargo on exports of coal, coke and briquettes is now restricted to marine sizes. Rhine shipments by boat are subject to indefinite and prolonged delays at loading and discharging points.

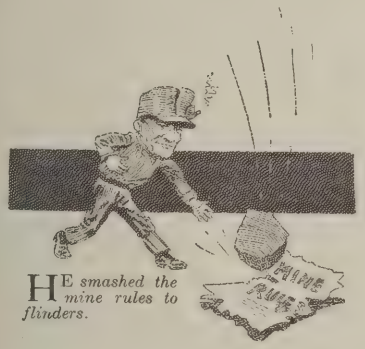
The Coal Syndicate and the Dealers Association claim they are filling all existing contracts without any change in prices but they demand more on new orders or increased quantities. On the other hand, it is said that deliveries on contracts are slow.—Translated from the "Frankfurter Zeitung."

COAL AGE

Vol. 6 NEW YORK, NOVEMBER 7, 1914 No. 19

THE DARE-DEVIL

Written expressly for COAL AGE
By MICHAEL BERNARD



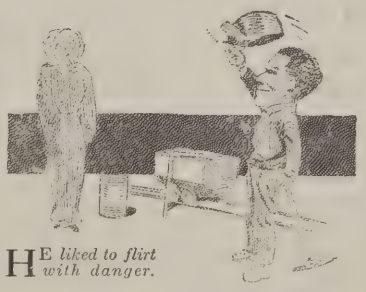
HE *smashed the mine rules to flinders.*

HE regarded with flagrant and mighty contempt
All the rules for his better protection,
And he smashed them to flinders whenever he dreamt
That his acts were not under inspection;
For he felt that a babyish care was displayed
In the way that the laws had been modeled,
And because he had long passed the infantile grade
He despised being pampered and coddled.

He was callous to pain and impassive to hurt,
While to fear he was absolute stranger,
And it added a zest to his labor to flirt
With the witching allurement of danger.
So he pulled out his pipe and he filled up the bowl
For a smoke, when the hankering seized him,
And he rammed down a charge in the depths of a hole
With the end of a drill if it pleased him.

He became very skillful in bouncing a trip,
For it saved him the trouble of tramping;
Setting safety aside, he continued to slip
Coal-dust into the holes he was tamping;
He persisted in keeping and carrying caps
Loosely thrown in the box with his powder;
And the fact that he missed any ugly mishaps
Made his dare-devil spirit grow prouder.

He had bragged to his fellows, again and again,
That his luckiness never forsook him,
But he trifled with fate once too often, and then
The expected result overtook him;
For he lifted a stretcher to hook up a mule
With whose temper he wasn't acquainted
And the angels foregathered to welcome the fool
To the blissful abode of the sainted.



HE *liked to flirt with danger.*

Where Coöperation Is Most Essential

THE THREE WATCHWORDS OF PROGRESSIVE MINING ARE: *Safety First, First Aid and Co-operation. When we consider these slogans in their relative importance, we are reminded of the three Christian virtues, Faith, Hope and Charity, and in like manner we are moved to the conclusion that the greatest of these is co-operation.*

o o o

The great importance of co-operation in first aid and safety first movements is quite apparent—forming as it does the very foundation of these life-preserving methods

We are being constantly reminded, also, how essential to a successful outcome is co-operation between mine superintendent, foreman, fireboss, and even to the man at the face.

This is all very good and true, but such an excellent rule as this should readily work up as well as down, and why shouldn't it be equally as important that the heartiest co-operation exist between the operating and sales departments of our large mining operations?

There is scarcely a mine superintendent today, but who could make some interesting remarks concerning the inconveniences frequently inflicted upon him through lack of harmony between the men "higher up." Furthermore, by reason of the subordinacy of his position to each of these men, he is obliged to change carefully worked out plans of procedure to suit the foibles of one or the other.

An incident of this nature occurred recently in a Southern coal and coke operation, which threatened to disrupt what was apparently a well-organized force of employees.

The sales manager upon receiving several complaints as to the quality of coke being furnished a contract customer, attempted to adjust matters by securing a number of samples of the coke in question; these he sent to the superintendent in charge of coke operations, with a request for an investigation and report.

The superintendent, in turn, submitted the samples to the chemist who informed him that he was under strict orders from the head of the operating department to do no work for the sales departent without written orders from him.

When this information was reported to the sales manager, he became indignant over the curtailment of his authority in this direction and, rather than suffer the humiliation of asking for a permit to have the investigation made, came back with renewed vigor on the defenceless and ever-ready-to-please superintendent, demanding that the quality of the coke be improved.

The superintendent, in an effort to remedy the trouble without the aid of his chemist, used only certain coals for this coke and by so doing, threw completely out of balance the adopted system for charging the ovens, decreasing the yield, increasing the cost and placing himself in general disfavor with the operating manager.

After much parleying the old system was reinstated, the superintendent sternly disciplined and the contract eventually lost.

This may appear to be an extreme case, but it proves that the little green-eyed devils of jealousy and envy are not confined entirely to the underground workings of a coal mine, and that it is just as essential that they be abolished from the general office as from the plant itself, if complete success is to be attained.

One company of the Middle West overcame this difficulty by making the head of their sales department assistant to the head of the operating department. In this way they each realized how dependent the success of their respective departments was one upon the other. Each sought the other's counsel in all new enterprises and crises, and the harmonious effect was felt throughout the whole system.

Let the "get together" spirit prevail from the president's office down to the humblest trapper boy—then watch results.

Improving Colliery Surroundings in Anthracite Region

By Karl B. Lohmann*

SYNOPSIS—There is no good reason why colliery plants should be blots on the surrounding landscape. By the aid of cleaning, painting, placement of paths, and the planting of shrubs and flowers, much can be done to reclaim the appearance of mining communities.

It was not very many years ago when the mountains of the anthracite coal region were clothed in virgin timber and the streams that flowed along their valleys were clear and unpolluted. Our ancestors fished, hunted and lived amidst that undefiled natural scenery. Within the past half century, however, the aspect of the country has changed considerably. Villages, towns, cities have sprung up, and in them or near them the tremendous coal breakers tower in the air, looking out over sulphurous streams and desecrated landscape.

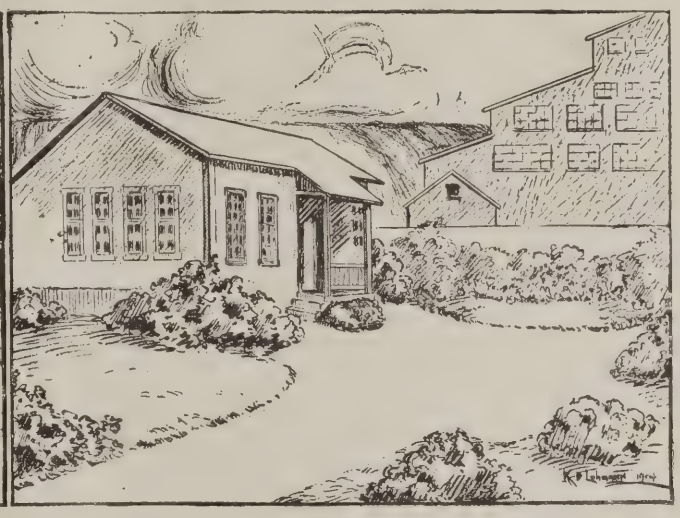
The damage brought about by the introduction of the coal breaker and its workings into the anthracite region is obvious, and the owners cannot help but feel their duty toward the community in the way of some reparation through reclaiming in part, at any rate, the surrounding landscape. This may do at least in the immediate vicinity of the mines.

Voluminous coal dust in connection with mine operation has been of great detriment to the communities, but lately the installment of dust-prevention systems has been a first step in the right direction toward the improvement of breaker surroundings. But in general the colliery yard remains sunbaked, bleak and unsightly.

The question comes up, therefore, how the hard-coal companies may restore unto the landscape and unto their own grounds, beauty and pleasantness of appearance, such as is now being accomplished in other manufacturing industries throughout the country.



Before Improving



After Improving

The Susquehanna River is an example of this condition. As a result of the sulphur issuing from the mines, 50 miles of the most beautiful portion of this river has been bereft for the most part of its game fish. The once charming Lackawanna is another example, and now passes through the city of Scranton as a malodorous stream, and positive menace to the citizens of that municipality.

Not only has the sulphur been destructive, but deposits of coal in the river bottom have helped greatly to cause annual floods at Wilkes-Barre, Penn., that have wrought and still bring with them great destruction of property.

Blots on the Landscape

The landscape also has suffered. Cave-ins have become so common that one scarcely ever hears them talked of anymore. Here and there over the landscape one sees the bleak mountains of culm, which not only offend the eye, but are charged with great carbonic heat that renders it doubly uncomfortable for people in hot weather who live near them. Furthermore, they are easily windswept, at which times they cloud the air with coal dust.

"Ridding-Up" and Painting

In the first place, there must be a general "ridding-up" of the grounds. Débris and all unnecessary refuse naturally must be removed and all of the surroundings of the buildings cleaned and put in order. After that is done, the buildings ought to be whitewashed where practicable, or given some neutral tone of coloring. The former seems most desirable around the mines, even though it would soon fall into disrepute perhaps among highly artistic circles. Whitewash seems to please the eye of the miner, either because it signifies cleanliness, or else beauty of contrast in its whiteness as opposed to the darkness amidst which he labors.

Roads and Paths

After cleaning and painting up, the next step on the breaker grounds is the placement of paths and roads. This is important and is a provision which a large number of companies have unfortunately failed to consider. At first thought it is easy to understand just why they

*Landscape architect, Wilkes-Barre, Penn.

have not. To see hundreds of different men crossing as many different imaginary paths it would seem impossible to provide for them definite ways of travel. But it is not impossible in the least. There are a few commonly traversed areas when one comes right down to the study of it, and if pathways were provided for these, they would contribute not only to the appearance of the colliery yard, the appearance of systematic orderliness, but also to the convenience, comfort and safety of the men.

As an example of the safety provision of paths, one might note the efforts that have been made at the Mineral Springs colliery, of the Lehigh Valley Coal Co., near Parsons, Penn. At that colliery the Lehigh Valley has expended a large amount of money to construct a wall and a path down over an incline just for the purpose of directing the stream of employees across one track instead of several, as before. A great deal could be accomplished in this problem of intelligent path and road construction with colliery yards.

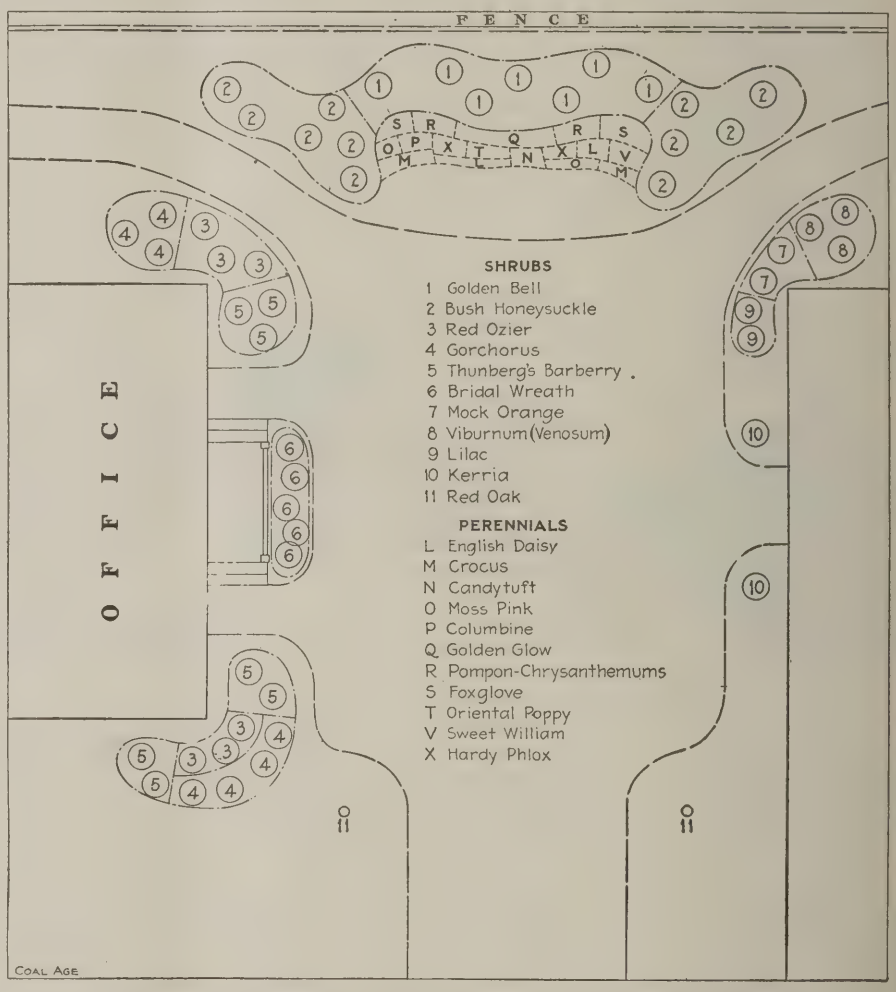
Vegetation Possibilities

One of the most vital things to be done in the surroundings of the mines, the highest and the most important step of all from an æsthetic point at least, is the bringing in of vegetation. This is an undertaking which is now being attempted successfully. Here and there at various collieries, it is true, little patches of lawn and pathetic clumps of flowers have been tried with fear and trembling as if doubting the propriety of the undertaking. The Prospect and the Mineral Springs collieries, belonging to the Lehigh Valley Coal Co., have made the most extensive attempt of any, however, and in their efforts may settle for other collieries the appropriateness of landscape improvement.

"If placed in colliery yards, has the vegetation any chance of growing?" is a natural question that comes to most minds. I have seen little beds of flowers persisting even in the clouds of some of the dustiest breakers. With the new systems of dust prevention, therefore, there is no question whatsoever of the possibility for growing things. It will mean, of course, in many instances the using of a few loads of loam, to be mixed on the grounds with mine manure, all at little expense. It will mean but very little maintenance after once started if proper advice is followed in the choice of plants in general. And it will mean a world of difference in the appearance of all surroundings.

"Why will it mean just this?" someone has asked, and we answer by saying, that to bring vegetation into the colliery yard is to relate the yard to the surrounding landscape, from which it has been so long divorced. That may sound technical and difficult, but it signifies no more than the actual truth.

Furthermore, will not someone wonder if the flowers, shrubs, grass, etc., would be trampled down by the men? At the Prospect Colliery already mentioned, I found that there never had been the slightest trouble of this kind. Instead of trampling down the flowers, the employees have taken a tender pride in them. During idle moments of the day, when the miners were waiting between shifts, they often took care of the flowers and some of them have even brought plants from their own gardens. Also, the men are known to come before the hour of work just to be near these little grass plots and flowers, which form for them a pleasant rendezvous.



General Scheme for Beautifying Colliery Grounds

Planting Shrubs

When bringing in vegetation for planting, the first thing to do is to select the area where it is to be placed. It may be that shrubs will be wanted along the paths, perhaps a couple of trees here or one or two there. It may be that shrubs ought to be placed near the outlying structures. The arrangements of the breaker grounds are such that nature rather than geometrical forms ought to be followed where practical in the working out of the scheme. Let the shrubs hide the foundations of the outside property buildings, let them inclose areas of grass, bound paths, mark entrance-ways, and offer themselves purely for individual or collective beauty.

Granted that areas for vegetation have been chosen, the first step is to prepare the ground of those areas preparatory to the planting. If the soil is of a clay nature, then plowing, harrowing and manuring are necessary. If

the soil is made up of culm principally, then new soil will have to be used. The depth of ground thus needed will vary. For ordinary grass suitable around breaker grounds, not much depth of loam will be necessary, but for the areas where shrubs and flowers are to be placed, at least eighteen inches of good soil should be put in.

The Choice of Plants

After the soil has been put into condition, it is ready for the plants, most of which may be introduced either in the fall or in the spring of the year with equal success. Now, the question comes up about just what sort of vegetation should be used. In one or two of the breakers they have attempted to grow annuals of brightly shining colors. Somehow they seem pleasantly appropriate for the miner who emerges from the darkness. Yet why this kind of plant should always be grown to the entire exclusion of perennials and shrubs in breaker yards is simply a matter of habit and lack of knowledge in the use and possibilities of other materials.

In the first place, annuals, beautiful though they may be, require reseeding every year and their lease on life is comparatively short. Shrubs, for example, have body to them and display their beauties not only in the summer season, but in the winter as well, and present charm of color and of branching habit. Yet shrubs would not be a substitute altogether for annuals by any means. They have their own functions to perform.

Perennials, however, are flowers that offer untold beauties and advantages for use in breaker yards. They do not require reseeding every season like the annuals that are in such general use, but rather they continue to grow annually more and more beautiful and they are in bloom from early spring until late fall if intelligently chosen.

The Planting of Culm Piles

There is one part of the colliery property where vegetation should find valuable use and that is upon culm piles. Except where they are to be removed immediately there is no good reason why they should not be covered with vines and all sorts of plants, and, in some instances, good grass, as in the case of the Mineral Springs Colliery heretofore mentioned.

With little trouble and expense, a thin layer of loam is raked into the side of the culm bank. It is surprising what a small amount of soil is necessary for all kinds of plants to take root immediately. But in addition to the used loam, "pockets," or wooden boxes are filled with good earth and then planted with a few hundred Virginia creepers, black alders, etc., or almost anything else growing nearby in the wild. Moreover, if trees as well as shrubs be planted informally about the base of the culm pile, a magical change will be wrought in every desert mountain of black refuse that is so treated.

Conclusion

Therefore, it seems that by the aid of cleaning, painting, placement of paths and roads, and the planting of trees, shrubs and flowers, much can and has been done to reclaim the appearance of the mines and surroundings with a minimum amount of cost, while incidentally restoring values of abutting property and helping in the uplift of the men.

Here and there at different mines one will discover a mere piece of grass or bunch of flowers carefully nurtured by a circle of miners. Who will fail to answer the call for more grass and more flowers? Who will deny for his community and for his men the best possible surroundings?

The day has arrived when the larger coal companies especially are exerting every effort for the betterment of colliery surroundings, from an ethical as well as practical standpoint. Their action in such direction is noteworthy, and the time is ripe when their broadening operations for improvement will include the feature of practical and æsthetical landscape architecture.

Coroner's Inquest at Mulga Explosion

The report of the coroner's jury regarding the Mulga mine explosion is dated from Birmingham, Ala., Oct. 12, 1914, and is as follows:

Inquest over the remains of Ed King, C. R. Combell, John Zalemski, Bob Dupion, Joe Malcoskie, Wilet Pilcoskie, John Krativick, white; Scott Garret, Warren Whatis, Hamp Swanson, Cory Howard, W. M. Long, Joe Bragdon, Bert Webster, Tom Mitchell and Sam Chatman, colored.

Caused by an Open Door

We, the jury duly impaneled by the coroner of Jefferson County, on the 12th day of October, 1914, to inquire into the cause of death of the above mentioned, who were killed at the Mulga mines, Mulga, Ala., on Oct. 5, 1914, having diligently investigated said cause, and having taken all the testimony obtainable, agree that the deceased came to their deaths by an explosion of gas at Mulga mines, Oct. 5, 1914, which occurred because the trap door in the eighth right heading was broken down and was not replaced for a period of approximately one hour. The air was short-circuited, causing an accumulation of gas in the eighth and ninth right headings and rooms. There were men working in these places with naked lights, and the accumulated gas coming in contact with the flame caused an explosion, which resulted in the death of the aforesaid parties.

Employees Broke Down Door

We find that the trap-door was knocked down by a carload of ties attached to an empty trip in charge of Ed Lee, colored, motorman, and Jackson Rodgers, colored, trip rider. This motorman, Lee, and trip rider, Rodgers, were not the motorman and rider who went into the eighth right heading regularly, but were only placing the carload of ties, which were for use in that entry. The trapper boy at the door on that heading wanted to open it, but the trip rider, Rodgers, told him he was not going through, so the boy need not bother to open the door. But Rodgers must have miscalculated the distance, as we find that the car of ties crashed into the door and broke it down, frame and all, thereby short-circuiting the air and depriving the said eighth and ninth headings of the necessary amount of ventilation to remove the gas which was being produced in said workings.

Company Censured for Failing to Act

Therefore, we, as jurors, consider that as the ventilation of said eighth and ninth headings was cut off and impaired, we condemn the action of the company officials for not taking proper precautionary measures to safeguard the lives of the workmen in said eighth and ninth headings by calling them out from the danger zone in said headings until such time as the circulation of the air was restored and was again such as to make it safe for the men to continue working in said eighth and ninth headings.

Therefore, in view of the foregoing verdict, we, as jurors, recommend that in all mines generating gas, overcasts be put in as soon as practicable, on all headings, and the use of trap-doors be discontinued as far as possible. We also recommend that when the air is short-circuited or the ventilation of any mines impaired so that there is danger to human life, the management call the men in said mines to a place of safety.

We also recommend that in all mines generating gas, the fire boss examine the working places so frequently that no more than three hours may elapse between the times when the place is examined and when the working man goes to work.

JOHN GUTHRIE, M. J. SHENLIN, WILLIAM MUIR, SAM BRODIE, JOE HOSKINS, JAMES LIDDELL. C. L. SPAIN, Coroner of Jefferson County.

Coal Prospecting

By J. F. K. Brown*

SYNOPSIS—The opening of coal measures in a new country or one remote from railroad connections is accomplished only under difficulties. Although the first expense of the project may appear high, it is money well spent to provide abundant supplies of all kinds at the start, so that the work or any part of it may not be "hung up" for lack of some necessary fitting or appliance insignificant in itself.

Herein is discussed only that part of prospecting which deals with the assembling of the plant and accessories necessary to commence operations. What is written and described is out of some years' experience in this class of work, in many out-of-the-way situations.

There are companies who take their prospecting seriously and go into details thoroughly. There are others who have the habit of ordering their men to carry out work miles from any operating base, with second-hand equipment. There are still others who only calculate the cost of the main pieces of equipment needed, forgetting that the sundry items in many cases come to at least half the amount paid for hoist, boiler, compressor, etc., if not to more.

This shows that there are several points which it is important to keep in mind, when such work is being considered. They are mainly never to use for prospecting any second-hand equipment. This should be kept in mind as more particularly referring to pumps. Secondly, insist that the list of material made out by you as necessary, be shipped exactly as you have ordered it, before you leave for the scene of operations. If the concern cannot afford to purchase what is required, or the ordering is hung up by an ignorant office staff, anxious to justify its existence by reducing expenses, then it were better that the work had never started.

The conditions to which the details entered into hereafter apply are considered somewhat exceptional for coal work, but any figures given must be taken as covering only this particular locality, since probably no two prospects are ever sufficiently alike to allow of exact comparisons.

It is, therefore, understood that all the prices given, hereafter, with the exception of figures on timber, that being native grown, are f.o.b. point of purchase. This will enable many young engineers to have a commencing point in their own calculations, and give some idea of the class and amount of material needed, and the expense thereof. The list is fairly complete, but estimated cost can be varied according as to whether bedrock prices, or hardware merchants' figures must be paid.

The area in question was held under an unlimited option, on which, however, a monthly rental of a fairly heavy character was payable, so time meant money. The mineral to be opened was coal, of a thickness at the outcrop of 10 ft., but dipping at an angle at the surface of at least 60 deg. A shaft was sunk on the coal, to be afterward used as a ventilation opening, which shaft was made almost the full height of the seam and of a width of 10 ft., coal being left on the foot wall. The water encountered averaged 100 gal. per minute, but in the spring and fall went as high as 150 gal.

The situation of the proposed mine was 10 long miles from the nearest railway station, with a heavy climb for at least seven miles over woods roads, which in the wet periods were impassable for a heavily loaded wagon. From the station the nearest foundry and machine shop was 10 hours' travel distant. In winter, communication was many times interrupted because of snow storms, up to ten days at a time.

Operations were commenced in the midst of thick timber of small second growth, and at the end of a hot summer. Good timber for mining or building work had to be hauled a distance of from two to five miles. Cordwood was cut on the ground, but coal was used as soon as the surface sinking was completed. The cordwood, cut and delivered at the boilers, cost $3 per cord.

Wages were paid at the following rates per day:

Wages:			
General laborer	$1.50	Machinist	$2.20
Blacksmith	2.50	Firemen	1.75
Carpenter	2.50	Sinkers	2.50
Chief mechanic	3.20	Machine men	3.00
Chief sinker	4.00		

A sinking contractor wanted $12 per foot for the shaft, 8x10 ft.; manway, 3x8 ft.; ladders and landings

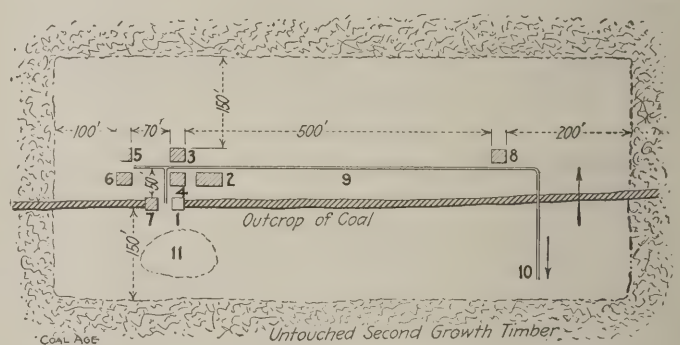


Fig. 1. Plan of Operation and Buildings

1. Shaft. 2. Compressor house. 3. Boiler house. 4. Hoist. 5. Forge. 6. Store. 7. Store (oil). 8. Magazine. 9. Fire lines. 10. Final outlet of pumped water. 11. Dump.

every 30 ft., timbering complete, he to pay timbermen and blacksmith, the company to provide all tools, timber, drills, power and explosives, and other material. The offer was refused, and the work carried out by day labor.

The prices paid for timber were as follows:

Boards	$13 to $14 per M. ft.
Heavy timber	12 to 14 per M. ft.
Shingles	1.75 per 1000
Hauling charges:	
Single buggy and driver	$3.50 per day
Double buggy	4.00 per day
Double team hauling supplies	4.00 per day
Double team with two men	6.00 per day

The weight that could be hauled depended on the shape of the material, and the condition of the roads. There was one period when equipment and fittings were scattered along the roadside for several weeks, jettisoned, owing to a storm. The usual load would approximate 1200 lb. One of the boilers was hauled 16 miles in the dead of winter, having been consigned to the wrong station. It weighed three tons, and the time spent on the road was five

*Sydney, Nova Scotia, Can.

days, during which, progress the first day, was five miles, the second day, one mile, and the third day, one-quarter mile. On this last day 8 horses, half a dozen men, and a block and tackle were required. The cost of this particular item, including the men's meals and board on the road, was $96, which worked out at $2 per ton-mile.

A Careful Plan Was Made

As the work was expected to last some time, the ground was laid out to a plan shown in Fig. 1. The surface sloped from the buildings to the shaft. For a distance of roughly 150 to 200 ft. in all directions, the ground was cleared of all trees and shrubs, and a fire-fighting system laid out, operated from the pump. Two-inch pipes were used and nozzles provided near the blacksmith shop and boiler house, the roofs of which blazed up later on, on a number of occasions.

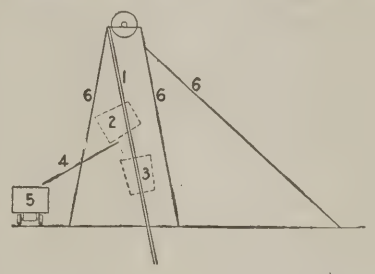


Fig. 2. Diagram of Headframe

1. Guides. 2. Bucket. 3. Bucket. 4. Chute. 5. Car. 6. Headframe timbers.

The buildings were erected at various times, and under all conditions of weather. A number were only finished by degrees, owing to the pressure of other work. Particulars were as follows:

Building	Size	Total Cost	Cost per Sq.Ft.
Compressor	24x17 ft.	$186.95	46c.
Hoist	16x12 ft.	128.12	67c.
Boiler	18x12 ft.	86.40	40c.
Forge	16x12 ft.	79.34	41c.
Store	10x 9 ft.	64.95	72c.

Owing to the dip of the seam being in toward the hill and under the buildings, the headframe was specially designed and placed to allow of hoisting from a slope the grade of which might change. A type of headframe which has been used successfully in the Cobalt district, was decided on, and is shown in Fig. 2.

A special kibble was also designed. The main object to be attained was automatic dumping in a simple fashion from a bucket which, at the same time, could be wound safely from either a vertical or inclined shaft. In the sketch, Fig. 3, the method of doing this is indicated. In hoisting the bucket slides on round timber guides of suitable length, but on coming near the landing place these guides cease, their place being taken by the outside runners, on which the horns of the bucket rest. On these runners, made of hardwood faced with iron strips, the horns move upward until they drop into the notch provided for them. Hoisting then ceases, the hoistman slacks out some rope, when the tub, lying at an angle of 60 deg., and suspended on the horns, which are well below the gravity point of the full bucket, turns sharply over and spills the contents into a chute. When empty the bucket is raised above the swing pieces fastened as shown to the side runners, and on lowering, the horns engage these side pieces, and turning them over, they form a bridge across the notch, over which the bucket slides down the runners and onto the regular guides. The swing pieces are pulled back into position by a wire spring.

This system operated quite satisfactorily, on almost all occasions, but once in a while the coal and dirt would jam in the mouth of the bucket, mainly through insufficient difference having been allowed in the width between the diameter at the bottom of the bucket, and the diameter at the mouth. On dark nights also, or when the wind was driving the steam around the buildings, it was difficult to see distinctly, and sometimes impossible to tell the exact position of the bucket, or when it was properly emptied.

In order to avoid this, the iron strips on the face of the runners were severed in two places with a saw cut, just above the tippling notch, and above the top of the swing pieces. These, as well as an iron rod at the collar of the shaft, were connected to a battery and bell of the single-stroke type. Further, a balance weight was used in the chute, onto which the bucket discharged.

When full, the bucket in turning over was heavy enough to press this down, but when empty, the balance weight forced it up. This was indicated by means of a slide in the engine room. Thus the engineer was made independent of any outside help in telling not only the position of the bucket, but also whether properly emptied or not.

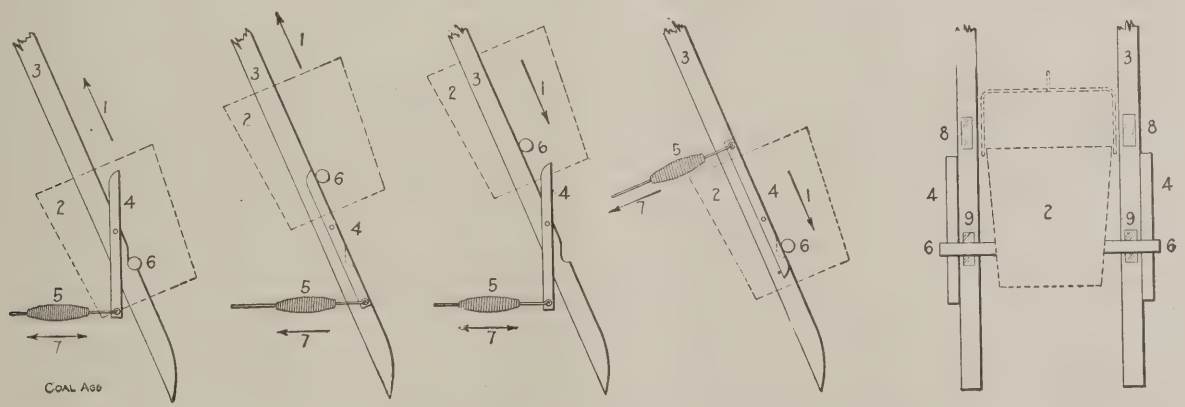


Fig. 3. The Use of Trigger and Covering Piece

1. Arrows indicating direction of bucket travel. 2. Bucket. 3. Trigger. 4. Covering piece. 5. Spring attached to covering piece. 6. Horn of bucket. 7. Arrow indicating direction of tension. 8, 8. Plates connected by wire, which become electrically connected when horns of bucket pass over them, and so indicate position in engine room. 9, 9. Ditto, for position of bucket in turning notch.

The cost of the headframe, including timber, hauling, erection and pulley, amounted to $230.19, distributed as follows:

Material	$82.69
Haulage of material	15.00
Labor	132.50
Total	$230.19

Two Dump Cars Were Built

Two dump cars were built by the carpenter on the ground out of the remains of two originally sent out with the rest of the equipment. The original cars were so heavy and clumsy that a horse was needed to pull them, and furthermore, they were only box cars without any arrangement for dumping. On their arrival they were promptly burnt and out of the wreckage two small, self-dumping, full-circle cars were evolved that proved successful and easy to operate. They cost, including material and labor, a sum of $43 each. This is, of course, more than they would have come to, had the proper car been sent up as ordered.

The plant consisted of two boilers, a hoist, an air compressor, two sinking buckets, two dump cars, one drill with column, two hammer drills and a sinking pump. The remainder of the material possibly comes under the head of supplies.

The boilers were two in number, described in the specifications as follows:

Two steam boilers of the inclined type, with water front, 40 hp., 44 in. diameter, 16 ft. long over all, with suitable dome 22 in. diameter, 27 in. high, firebox 6 ft. long, ⅜ in. thick, shell $\frac{5}{16}$ in., and heads ⅜ in., fitted with 61 tubes 2½ in. diameter, 8 ft. long, No. 12 gage thick, and having the following fittings and fixtures of first-class quality: One 2-in. "Crosby" screwed safety valve, one 2½-in. nipple, one 2½-in. stop valve, one 2½-in. nipple, one "C" "Penberthy" injector 1 in., one check valve 1 in. properly piped and fitted, one blow-down valve 1½ in., with nipples and elbow, one water column fitted and attached to boiler having steam gage, try cocks and drain cocks, tube cleaner and whistle with pipe and valve, wrought-steel front having water space and fitted with steel fire and ash doors, cast-iron grates, bearers, steel smoke box ⅛ in. thick, with lined smoke doors, neck for funnel, and hand cleaning doors with fixtures.

One smoke funnel, 20 in. diameter, 30 ft. long, No. 14 gage thick, with bands on top, guy bands and 150 ft. of guy wire.

Each boiler is to be mounted on suitable axles with iron wheels, having flat iron spokes and broad tires, and is to be provided with a pole and fixtures.

Each boiler is to be carefully built by experienced workmen, for a safe working pressure of 125 lb. per sq.in., and tested with cold-water pressure to 200 lb.

Each boiler to be furnished complete with water gage, water-gage cocks, steam cocks, gage, safety valve, blow-off cock, injector, fire-bars, and stack and tools. The price paid complete at the purchase point to be $725 each, or $1450 for the two boilers.

Boilers for plants in out of the way situations, should be tested before leaving the works, and where two boilers are employed they should be of exactly the same size and capacity, and each powerful enough to give almost the full amount of steam needed. "Plenty of steam power, and to spare" is a good maxim. There is always some little thing that takes more steam than was calculated on, or the water supply goes bad, and pumping from some source a considerable distance away has to be resorted to.

The mine hoist was built for operation by compressed air or steam. It had double cylinders 6½x9 in., also triple drums arranged in tandem, each 16 in. by 20 in. between flanges. Each drum was provided with a band-brake, friction gear and reversing-link motion all operated by levers in a quadrant at rear of frame between the cylinders. The capacity was 4000 lb., hoisted by each drum on a single line at 120 r.p.m. The floor space was 92x46 in., weight 4900 lb.

The price was $610; extra for third drum, $110, making total cost $720.

It is always advisable to have a three-drum hoist. This is contrary to the usual practice, but an extra drum is a very handy rig. One drum is in use hoisting, from the second hangs the pump, and a spare third is extremely useful for holding heavy timbers in position, hauling heavy material on the surface, or holding an extra bucket with tools, drills, etc., in the shaft, when ready to fire.

If at all possible, it is advisable to secure an upright compressor in two small units, not only for the sake of the less weight, but also for the size of the buildings and foundations needed. In the case under consideration however, a Canadian Rand compressor was installed, straight-line, 10-in. high- and 15-in., low-pressure steam cylinders, 10-in. air cylinders, stroke 15½ in., air-pipe 2½ in. to 3-in. main. The steam pipes were, admission 2½ in., exhaust 5 in., steam pressure carried was 40 lb. Ten gallons of cooling water were required per minute. This machine was stated to be of 200 cu.ft. per min. capacity at 100 r.p.m. For transportation, the machine came in six large pieces, the weight of the heaviest being two tons. The price was $3102.

Three Drills Were Employed

A Canadian Rand drill 2½ in. and two "B. A. 26" butterfly flap-valve hammer drills were utilized. These have been priced as follows:

Drill, $250; hammer drills, $105 each, or $210 for the two, making a total of $460.

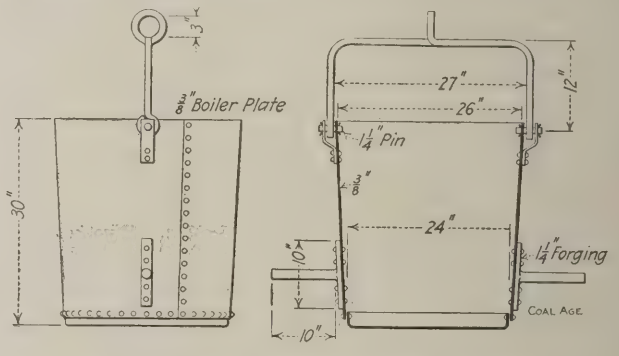


Fig. 4. Details of Sinking Bucket

The principal precaution to be taken with such drills, and especially the hammer drills, is to keep moisture out of the air pipes in winter time. This freezes in the exhaust opening of the drills, the passages of which are not very large. Further the "B. A. 26" are hand-rotated machines, and for the type of sinking being described not well suited. The steels stick in the holes when withdrawing, and the whole operation is slow. A drill, machine rotated, capable of withdrawing its own steel, is much to be preferred.

One oil cup at the shaft collar forms a simple way of oiling any machinery operated by compressed air, but too much oil is just as bad as water. Usually this excess of oil is found coming over from the compressor. Frequently the backwoods engineer believes in oil (castor included) as a sure cure for all engine troubles.

An extra long column for the percussive drill is useful as a spare, especially when sinking a wide shaft. It is well to insist on having the steels intended for the drills, ordered from the makers, and not provided from a store by obstinate storekeepers, with the final necessity of having to have them attended to, or altered by a local blacksmith. It is advisable also to have valves at the top and bottom of the air columns, and in positions which are handy to get at. If there are three air branches at the

bottom, one to each of the drills, valves will be required on each.

At the top of the air main erect some simple form of oil and water separator, such as is shown in Fig. 6, and leave a space around it in which a fire can be built for heating purposes in winter. This is crude work, but it is just as well to be prepared for all sorts of "artful dodges" when in the woods prospecting.

The Proper Type of Pump Is Important

The best type of pump for this work is probably a Cameron sinker, on account of both its simplicity and compactness. In this case, however, a Bawden sinker, size 7, was used and proved satisfactory. It is simpler than the Cameron in having no tappets internally, or outside valve-levers, and is positive in action. On the other hand, it is bulkier, and occupies more space in the shaft where space is a consideration: This pump was 10x5x7 in. and had a capacity of 100 gal. per min., weighed 2285 lb. and cost $250.

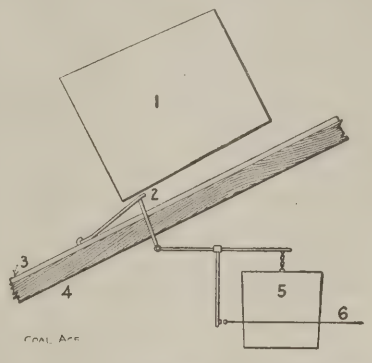


Fig. 5. Diagram of Arrangements to Indicate Full or Empty Bucket

1. Bucket falling over. 2. Projecting catch. 3. Sheet cover on chute. 4. Wooden floor of chute. 5. Counterweight to balance empty bucket. 6. Wire to hoist room.

When working with a sinking pump which is taxed to near its limit, a good plan is to arrange a small track in an inclined shaft, or guides in a vertical shaft, on which the pump can run easily, and hang it to the second hoisting rope. Double the hoisting rope over a "gin" to get the requisite lifting power if this is necessary. As a rule, a pump of this size can be operated readily either by steam or air, though some are better one way than the other.

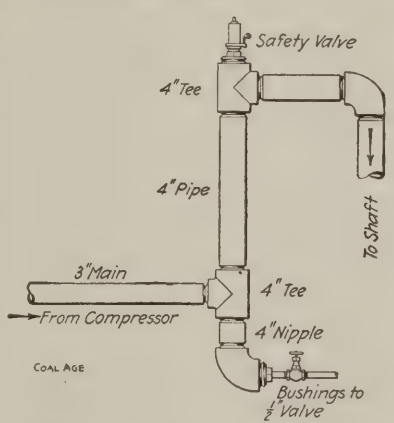


Fig. 6. The Oil Trap Employed

If there is air to spare, it is advisable to use it, as in a shaft, work about a pump thus operated is much to be preferred. Standing on the hot steam chest with rubber boots, fighting with refractory connections is temper-trying work. The remarks made about air freezing in the drills are applicable to the pump. If the freezing is bad, a little paraffin oil in the feed cups works wonders. This should not be overdone.

Babbitt-Covered Plungers Are Advantageous

In sinking in a coal seam, where the water is usually acid, the pump plunger should be built with a babbitt cover, as this is the best material to withstand bad water. Use hose connections, at least as long as a full pipe length on the discharge inlet, and if steam is used on the exhaust pipes, between the mains and the pump. Have valves at the ends of each of these pipe lines on the pump. Use unions which do not need gaskets, on all the connections which require changing frequently, and place these unions on the pipe, so that the ring catches from the top onto the part below.

It is easier to hold the end of a piece of pipe up and screw the ring over it downwards, than it is to raise the pipe, and attempt to screw upwards from the bottom position. Black oil should be used on all pipe connections, it is just as good as red lead or pipe-joint compound, and enables one to uncouple any pipe without trouble, which is especially handy in shaft work. In addition, on steam and exhaust, a drip arrangement should be provided at the pump. Nothing is more annoying than to have to stand on a hot pump and blow the accumulated condensed steam out of these two pipes, and besides there is always the possibility of the hose giving way, due to water pressure.

The use of hose allows the prompt insertion of another length of pipe, which is very useful where water is rising fast and further it gives the hoist man some little latitude as to his exact stopping point in lowering the pump, which it may be, owing to the position of the toothed grip on the side of the drum, is a bit above or below the exact position desired. It is well to leave the pump hanging on the rope attached to second drum. By this means, the pump may be lowered or raised in a minimum of time, and the water may be followed down, foot by foot, without stopping the working of the pump throughout the full length of the hose used.

Supplies have simply been tabulated at the actual prices, that is, catalog prices, less trade discounts:

PUMP FITTINGS

48 ft. water hose, 2 in., at 40c. per ft.	$19.20	
48 ft. steam hose, 1 in., at 43c. per ft.	20.64	
48 ft. exhaust hose, 1½ in., at 52c. per ft.	24.96	
12 ft. suction hose, 2½ in., at $1.75 per ft.	21.00	
1 foot valve, 2½ in.	6.00	
1 strainer, 2½-in. pipe	9.00	
1 valve, 2 in.	2.65	
1 valve, 1½ in.	1.75	
1 valve, 1 in.	.90	
		$106.10

AIR-DRILL FITTINGS

2 lengths 20 ft. of 1-in. air hose, at 50c per ft.	$20.00	
2 lengths 20 ft. of 2-in. air hose, at $1.03 per ft.	41.20	
6 1-in. steels, 12 in. 6 1-in. steels, 18 in. 6 1-in. steels, 24 in. 6 1-in. steels, 30 in. 6 1-in. steels, 36 in. 6 1-in. steels, 42 in. 6 1-in. steels, 48 in.	257¼ lb., at 8¼c. per lb.	21.10
6 ⅞-in. steels, 12 in. 6 ⅞-in. steels, 18 in. 6 ⅞-in. steels, 24 in. 6 ⅞-in. steels, 30 in. 6 ⅞-in. steels, 36 in. 6 ⅞-in. steels, 42 in.	40½ lb., at 8c. per lb.	3.24
1 key and wrench	2.00	
		$87.84

HOISTING REQUIREMENTS

1 pulley, 3 ft. 6 in., cast with blocks for ¾-in. rope	$30.00	
1 coil ¾-in. wire rope, 300 ft., at 15c. per ft.	45.00	
1 coil ¾-in. wire rope, 300 ft., at 15c. per ft.	45.00	
1 set blocks, single $2.00 And double with hooks for block and tackle 4.00		6.00
100 ft. of 1 in. dia. manila rope, at 20c. per lb.	8.00	
2 cast-iron 12-in. pulleys for ¾-in. rope groove, at $10	20.00	
2 self-dumping buckets, at $23	46.00	
2 thimbles for ¾-in. rope, at 14c.	.28	
12 rope clamps, at 40c.	4.80	
1 "gin" block	10.00	
		$215.08

BOILER AND BOILER HOUSE

1 scraper for 4-ft. grate	$5.00	
1 poker	1.50	
2 extra injectors, No. C.C. (Pen.), at $20 each	40.00	
3 doz. gage glasses, 18 in. long, ⅝ in. dia., at 81c. per doz.	2.43	
1 spare pop safety valve, 2 in.	15.00	
		$63.93

EXPLOSIVES

2000 lb. 40 per cent. dynamite, at $13.20 per 100 lb.	$264.00	
1000 No. 8 electric detonators, at $4.08 per 100	40.80	
6000 ft. safety fuse, at $5 per 1000 ft.	30.00	
1000 No. 6 detonators, at $1 per 100	10.00	
1 battery, No. 2	13.50	
1 thaw-pan	7.00	
		$365.30

BLACKSMITH FITTINGS

1 portable forge, "Buffalo" type	$37.00	
1 anvil, 200 lb., at 9c. per lb.	18.00	
1 set tools for anvil: Cross, dolly, sow top, bottom spreaders, top and bottom swages, 1 in. and ⅞ in.	3.00	
1 pair tongs, straight tip, 16 in., at $6 per doz.	.50	
1 pair tongs, curved tip, 16 in., at $8.50 per doz.	.70	
1 pair tongs, pick up, 16 in., at $6 per doz.	.50	
2 striking hammers, ½ lb. and 1 lb., at $12 per doz.	2.00	
2 hand hammers, ½ lb. and 1 lb., at $12 per doz.	2.00	
1 6-in. jaw vise	22.00	
1 pipe vise	14.00	
		$99.70

GENERAL TOOLS

2 sets stocks and dies for pipe ¼ in. up to 4 in.	1 at $28.00 1 at 45.00	
	$73.00	
1 set taps and dies for ¼-in. to 1-in. stock	$12.00 22.00	
	34.00	
1 changeable ratchet for taper shank drills	16.00	
Taper shank drills, 12 sizes, at 50c. each	6.00	
1 set wrenches, 1-in., ¾-in., ⅝-in., ⅞-in., ½-in., ¼-in.	1.00	
2 10-in. Stillson wrenches, at 90c. each	1.80	
2 18-in. Stillson wrenches, at $1.60 each	3.20	
2 24-in. Stillson wrenches, at $2.40 each	4.80	
2 36-in. Stillson wrenches, at $4.80 each	9.60	
2 10-in. monkey wrenches, at $14 per doz.	2.33	
1 doz. cold chisels, 6-in., at 38c. per lb.	.85	
Pipe cutters, No. 1, ⅛ in. to 1¼ in.	3.00	
Pipe cutters, No. 3, 1 in. to 3 in.	6.00	
Pipe cutters, No. 4	14.00	
		$169.58

GENERAL STORES

2 doz. ax heads and handles, at $8 per doz.	$16.00	
2 doz. miners' picks, at $13 per doz.	26.00	
1 doz. clay picks	13.00	
2 doz. round mouth shovels, at $14.50 per doz.	29.00	
3 doz. coal shovels, at $14.50 per doz.	43.50	
2 striking hammers, 5 lb., at 30c. per lb.	3.00	
1 set hand steels, ⅞-in. 1 set hand steels, 12-in. 1 set hand steels, 18-in. 1 set hand steels, 24-in. 1 set hand steels, 30-in.	at 35c. per lb.	4.15
12 pails, at $30 per gross	2.50	
3 doz. stable lanterns, at $10 per doz.	30.00	
5 doz. globes, at $1 per doz.	5.00	
1 bbl. kerosene oil, 40 gal., at 19c. gal.	7.60	
1 bbl. cylinder oil, 40 gal., at 60c. gal.	24.00	
1 bbl. machine oil, 40 gal., at 28c. gal.	11.20	
5 coils marlin	1.25	
2 sq.yd. bluestone packing, ⅛-in., 10 lb. per sq.yd., at 90c. per lb.	18.00	
2 sq.yd. bluestone packing, 1/16-in., 5 lb. per sq.yd., at 80c. per lb.	9.00	
3 boxes spiral packing, ⅝-in.	8.10	
3 boxes spiral packing, 1/16-in.	14.40	
2 boxes flax packing, ⅝-in.	6.00	
2 boxes flax packing, ¾-in.	6.00	
3 doz. ¼-in. valves, at 38c. each	13.68	
½ doz. ⅜-in. valves, at 38c. each	2.28	
½ doz. ½-in. valves, at 50c. each	3.00	
1 doz. ¾-in. valves, at 63c. each	7.56	
1 doz. 1-in. valves, at 90c. each	10.80	
1 doz. 1½-in. valves, at $1.75 each	21.00	
3 doz. 1¼-in. valves, at $1.26 each	45.36	
1 doz. 2-in. valves, at $2.56 each	30.80	
1 doz. 2½-in. valves, at $2.65 each	31.80	
3 doz. 3-in. valves, at $7.20 each	259.20	
3 doz. 4-in. valves, at $9 each	324.00	
	$1047.18	
3 plain engine lubricators, No. 3, at $2.10	$6.30	
3 glass body sight-feed lubricators, 1-pint size, single connection, at $5.60	16.80	
Iron body pressure gage, 5-in. dial	2.75	
	$25.85	
500 ft. 1-in. pipe, at $5.35 per 100 ft.	$26.75	
500 ft. 1½-in. pipe, at $8.60 per 100 ft.	43.00	
60 ft. 1¼-in. pipe, at $7.30 per 100 ft.	4.38	
300 ft. 2-in. pipe, at $11.65 per 100 ft.	34.95	
300 ft. 2½-in. pipe, at $18.50 per 100 ft.	55.50	
100 ft. 3-in. pipe, at $24.50 per 100 ft.	24.50	
100 ft. 4-in. pipe, at $35 per 100 ft.	35.00	
30 ft. ½-in. pipe, at $3.05 per 100 ft.	.92	
20 ft. ⅜-in. pipe, at $2.60 per 100 ft.	.52	
100 ft. ¾-in. pipe, at $3.60 per 100 ft.	3.60	
3 ½-in. unions, black, at 11c. each	.33	
3 doz. 1-in. unions, black, at 16c. each	5.76	
3 doz. 1½-in. unions, black, at 29c. each	10.44	
3 doz. ¾-in. unions, black, at 13c. each	4.68	
3 doz. 2-in. unions, black, at 37c. each	13.32	
3 doz. ⅜-in. unions, black, at 10c. each	3.60	
1 doz. 2½-in. unions, black, at 77c. each	9.24	
6 doz. 4-in. unions, black, at $2.17 each	156.24	
6 doz. 3-in. unions, black, at $1.05 each	75.60	
3 doz. 1-in. tees, at 8c. each	2.88	
1 doz. 1¼-in. tees, at 12c. each	1.44	
3 doz. 1½-in. tees, at 15c. each	5.40	
3 doz. 2-in. tees, at 20c. each	7.20	
6 doz. 2½-in. tees, at 36c. each	25.92	
6 doz. 3-in. tees, at 55c. each	39.60	
6 doz. 4-in. tees, at 87c. each	62.64	
6 doz. ½-in. tees, at 5c. each	3.60	
12 doz. ¾-in. tees, at 6c. each	8.64	
6 doz. ⅜-in. tees, at 4c. each	2.88	
6 ¼-in. elbows, at 3c. each	.18	
6 ⅜-in. elbows, at 3c. each	.18	
1 doz. ¾-in. elbows, at 4c. each	.48	
1 doz. ½-in. elbows, at 3c. each	.36	
3 doz. 1-in. elbows, at 5c. each	1.80	
6 doz. 1¼-in. elbows, at 8c. each	5.76	
3 doz. 1½-in. elbows, at 10c. each	3.60	
3 doz. 2-in. elbows, at 14c. each	5.04	
6 doz. 2½-in. elbows, at 25c. each	18.00	
6 doz. 3-in. elbows, at 37c. each	26.64	
6 doz. 4-in. elbows, at 60c. each	43.20	
6 ¼-in. couplings, at 2c. each	.12	
12 ⅜-in. couplings, at 3c. each	.36	
12 ¾-in. couplings, at 5c. each	.60	
12 ½-in. couplings, at 3c. each	.36	
48 1-in. couplings, at 6c. each	2.88	
48 1¼-in. couplings, at 8c. each	3.84	
48 1½-in. couplings, at 10c. each	4.80	
48 2-in. couplings, at 14c. each	6.72	
24 2½-in. couplings, at 20c. each	4.80	
12 3-in. couplings, at 30c. each	3.60	
12 4-in. couplings, at 50c. each	6.00	
	$807.85	

Bushings:

6, size ¼, at 2c. each	$0.12	
6, size ⅜, at 2c. each	.12	
6, size ½, at 2c. each	.12	
6, size ¾, at 2c. each	.12	
2 doz. 1-in., at 3c. each	.72	
1 doz. 1¼-in., at 3c. each	.36	
2 doz. 1½-in., at 5c. each	1.20	
1 doz. 2-in., at 7c. each	.84	
½ doz. 2½-in., at 10c. each	.60	
3 doz. 3-in., at 15c. each	5.40	
3 doz. 4-in., at 25c. each	9.00	
1 doz. 3½-in., at 20c. each	2.40	
	$21.00	

Nipples:	Close		Long	
6, ¼-in., at 2c.	$0.12	and 3c. each		$0.18
6, ¾-in., at 3c.	.18	and 3c. each		.18
6, ⅜-in., at 2c.	.12	and 3c. each		.18
6, ½-in., at 2c.	.12	and 3c. each		.18
1 doz. 1-in., at 4c.	.48	and 5c. each		.60
1 doz. 1¼-in., at 5c.	.60	and 6c. each		.72
2 doz. 1½-in., at 6c.	1.44	and 8c. each		1.92
2 doz. 2-in., at 8c.	1.92	and 11c. each		2.64
1 doz. 2½-in., at 16c.	1.92	and 24c. each		2.88
½ doz. 3-in., at 19c.	1.14	and 29c. each		1.75
¼ doz. 4-in., at 34c.	1.02	and 48c. each		1.44
	$9.06			$12.67
				9.06
				$21.73

Rails, 2000 ft., 30 lb. to the yard, at $2 per 100 lb.	$400.00
Fishplates, 500 lb., at $2.40 per 100 lb.	12.00
Rail spikes, 2000 lb., at $2.90 per 100 lb.	58.00
3 kegs of 6-in. spikes, at $2.60 per 100 lb.	7.80
3 kegs of 4-in. spikes, at $2.75 per 100 lb.	8.25
5 kegs of 2-in. nails, at $2.90 per 100 lb.	14.50
Track bolts, 300 lb., at $5.25 per 100 lb.	15.75
	$516.30
Total general supplies	$3048.64

The above list may be long and cost much to provide, yet it is to be remembered, that it is much easier and more economical to have all that is likely to be required at hand, than to have to send to some far-off town for some material or article with the consequent loss of time, and money entailed in holding up the whole or any part of the work.

Finally, the total expenditure has been tabulated as follows, from which it appears that the price of the sundry articles comes to at least half the amount spent on what may be termed the plant proper:

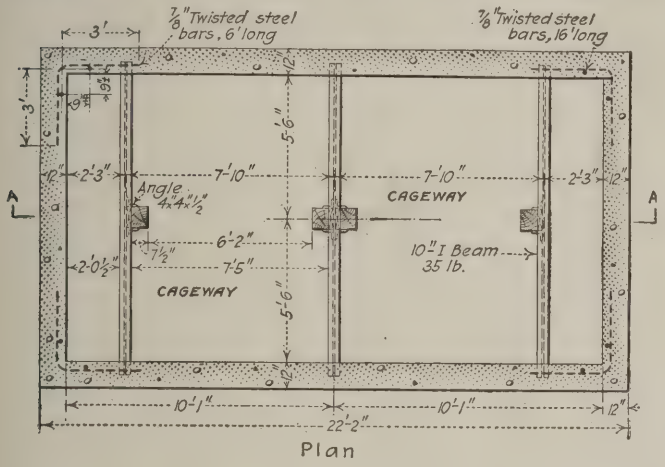
	Boiler	Hoist	Compressor	Head-frame	Pump	Drills	Stores	Total
Material	$63.93	.....	.....	$215.08	$106.10	$87.84	$3680.40	$4,153.35
Equipment	1450.00	$720.00	$3102.00	230.19	250.00	460.00	.....	6,212,19
	$1513.93	$720.00	$3102.00	$445.27	$356.10	$547.84	$3680.40	$10,365.54

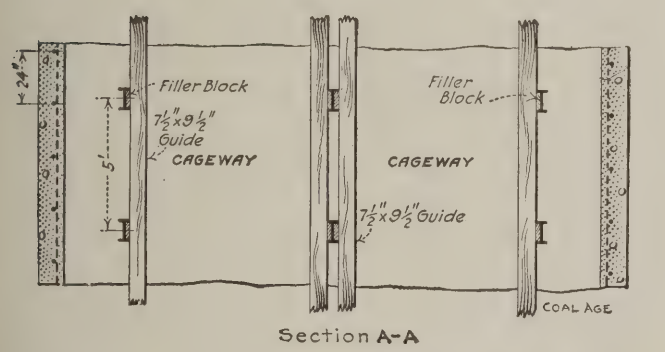
Concrete-Lined Shafts at the Bunsenville Mine

By A. F. Allard*

SYNOPSIS—The machinery and other temporary equipment necessary for the sinking and concreting of two fireproof shafts are enumerated, together with the method of work employed during construction, and the progress made in sinking and placing the concrete shaft walls.

The Bunsen Coal Co., of Danville, Ill., has recently completed the construction of two fireproof concrete-lined shafts at its new Bunsenville mine, situated in Vermilion





FIGS. 1 AND 2. PLAN AND SECTION OF MAIN SHAFT

County, Ill., about three miles northwest of Georgetown. Both the main and auxiliary shafts are of rectangular design, and were sunk at a distance of 500 ft. apart. The entire work was carried on with the coal company's forces.

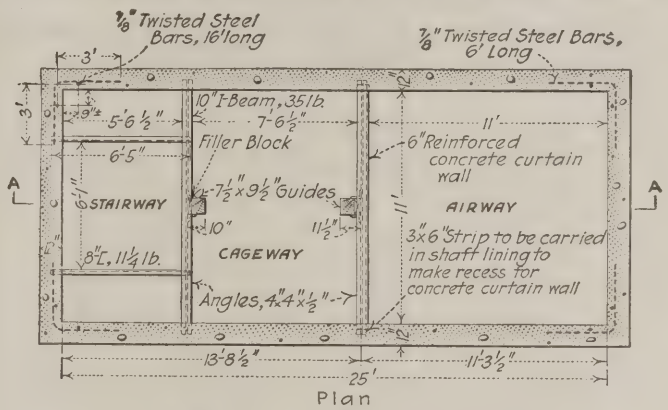
The method adopted in sinking, timbering and lining the shafts with concrete has been entirely successful. The sinking of both shafts to the bottom of the sumps was completed before any of the concrete lining was placed. The shafts were erected in connection with a new coal-mining plant, designed for the development of the unworked territory belonging to the Westville district. An area of 3000 acres of coal has been allotted to this mine, which when in full operation will supply an output of 4000 tons daily.

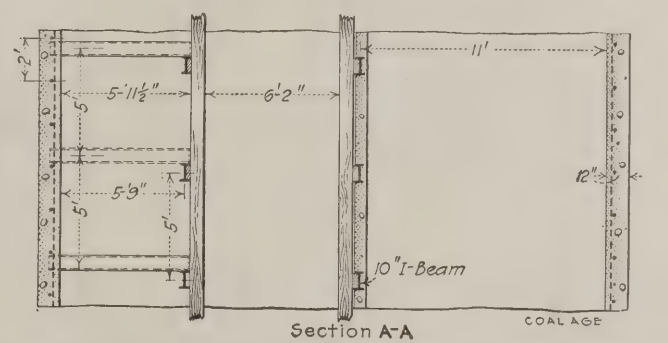
*Chief engineer, Bunsen Coal Co., Danville, Ill.

Description of Shafts

Ground was broken for the main hoisting and auxiliary shafts on May 6, 1914. The main shaft is of rectangular design (see Fig. 1), measuring 20 ft. 2 in. by 11 ft. in the clear between concrete walls; it has a depth of 204 ft. from top of coping to the bottom of the No. 6 or Grape Creek coal seam, and is provided with a sump 21 ft. deep below the coal. This shaft is divided into four compartments, containing two cageways and one pipeway at either end. The clear opening area of 222 sq.ft. comprises 172 sq.ft. for the two cageways and 50 sq.ft. for the two pipeways.

From the top of the coping to a point in the solid rock,





FIGS. 3 AND 4. PLAN AND SECTION OF AUXILIARY OR AIR SHAFT

a distance of 89 ft., the concrete lining is 18 in. thick. From this point to the bottom of shaft the concrete walls have a thickness of 12 in. The walls in both shafts are of plain concrete except the corners, which are reinforced vertically, each with two lines of 7/8 in. by 16 ft. twisted steel bars, back of which are placed 7/8-in. by 6-ft. bars laid horizontally and spaced every 2 ft. for the entire depth of the shaft. No water rings are constructed in either shaft.

The top coping at each shaft has a thickness of 4 ft. at the surface, a width of 6 ft. at the base, and extends to a depth of 8 ft., forming a solid foundation for the support of the structural-steel headframe. The feature of a wide coping provides ample room inside of the coping fence to do repair work on the cages, etc.

The buntons supporting the cage guides in each shaft are all 10-in. I-beams weighing 35 lb. per ft.; they

extend into the concrete sidewalls 6 in., and are spaced 5 ft. center to center for the full depth of the shaft. The guides are all 7½x9½-in. by 30-ft. surfaced yellow pine, fastened at each bunton connection with two 1-in. bolts. White oak filler blocks are inserted between the web of I-beam and back of the guide giving a solid bearing.

Fig. 2 shows a section of the main shaft and the location of the buntons.

The auxiliary shaft is designed for combination hoist and ventilation. The hoist is for the purpose of handling material and the raising and lowering of men. The shaft is of rectangular design (see Fig. 3), measuring 25x11 ft. in the clear between concrete walls, and has a depth of 203 ft. from top of coping to the bottom of coal. The sump has a depth of 12 ft. below the coal. This shaft is divided into three compartments, containing one cageway of same size as the main shaft, one airway and a stairway. The clear opening area of 275 sq.ft. is divided into 86 sq.ft. for the cageway, 121 sq.ft. for an airway and 68 sq.ft. for the stairway. From the top of coping to a point in the solid rock, a distance of 75 ft., the concrete lining is 18 in. thick; from this point to the bottom the walls are 12 in. thick. Fig. 4 shows a section of this shaft, the location of the concrete curtain wall in the airway and the I-beam buntons.

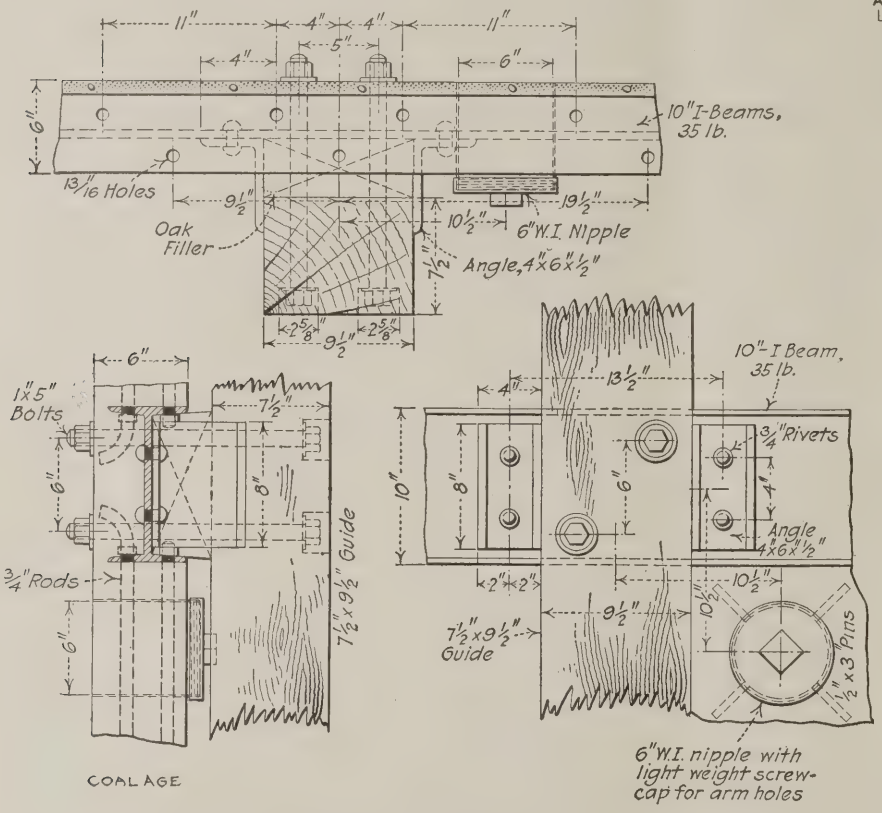


Fig. 5. Detail of Guide Connections to Buntons

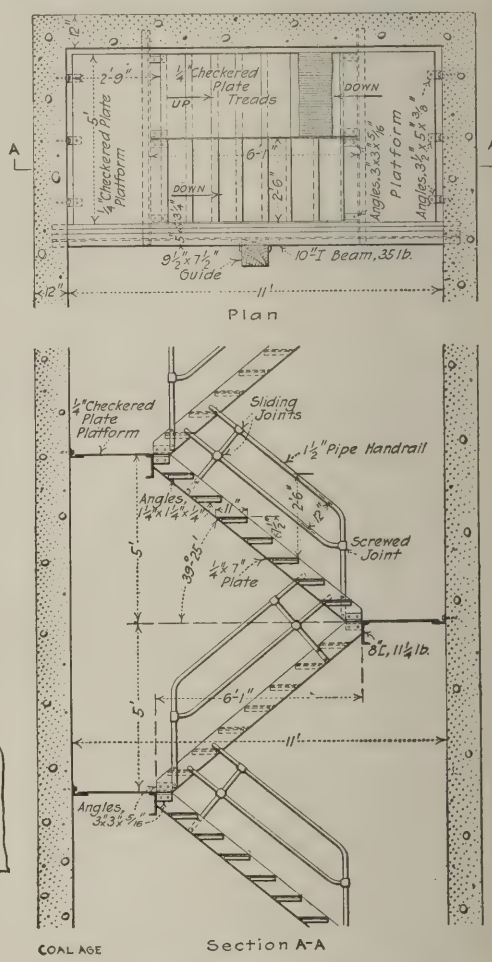


Fig. 6. Plan and Section of Stairway

A Concrete Curtain Wall Is Provided

The reinforced-concrete curtain wall separating the airway from the cage compartment was poured 7 in. thick and extends from top to bottom of the shaft. The reinforcement consists of plain ¾-in. rods placed 9 in. center to center, staggered along the full flange length of the I-beam buntons. These rods are connected to the top and bottom flanges of the I-beams by means of nuts on the threaded ends. At the side of the guide and below each bunton, 6-in. heavy wrought-iron nipples are placed, provided with a plug screw cap for the purpose of arm holes to reach the nuts of the guide bolts at the back of the curtain wall. A space of 1½ in. was left between the back of the guide and the face of the curtain wall to prevent transfer of vibration from the guide to the curtain wall.

Fig. 5 is a detail of the guide connection to the bunton along the curtain wall, and also shows the location of the arm holes. The addition of 4x6-in. angles at the sides of the guide to prevent vibration was omitted.

The steel stairways are of zigzag pattern, and, together with the landings, occupy a space longitudinally in the shaft for a width of 5 ft. 6½ in. Each flight rises on a 39° 25′ angle from the horizontal, and is 8 ft. long. The separate flights, including the landings, are supported on 8-in. channels weighing 11¼ lb. per foot, placed crosswise in the shaft, which in turn are supported at one end on the 10-in. I-beam buntons, while the other end is secured in the concrete end wall and has a bearing of 6 in. The channels are placed 2 ft. 5½ in. from the side walls, and are spaced vertically 5 ft. apart center to center, alternating for each flight.

The stair stringers are ¼x7 in. deep. The treads are ¼x11 in. by 2 ft. 6 in., with checkered surfaces, and are supported on 1½x1½x¼-in. angles riveted to the stringers. The rise between treads is 7½ in. The landing plates are ¼ in. by 2 ft. 9 in. by 5 ft., and are also checkered on the surface. Three lugs of 3½x5x⅜-in.

angle iron are riveted to the landing plate and fastened to the concrete wall by means of 5/8x5-in. expansion bolts well drawn up. The hand railings are made up of two lines of 1½-in. pipe; the uprights are bolted to the stair stringers and connected to each line of railing. The total weight per vertical foot of stairway and landings, not including the channel supports, is 100 lb. The stairway is easy for the men to walk on and is of economical design, as may be seen in Fig. 6, which shows the plan and part elevation.

Wooden Forms Were Employed

The forms used for the concrete lining walls in each shaft were of the company's design, made and put together at the shaft site. A description of those used for the main shaft only will be given. The sides and ends were composed of 1½x10-in. tongued-and-grooved yellow

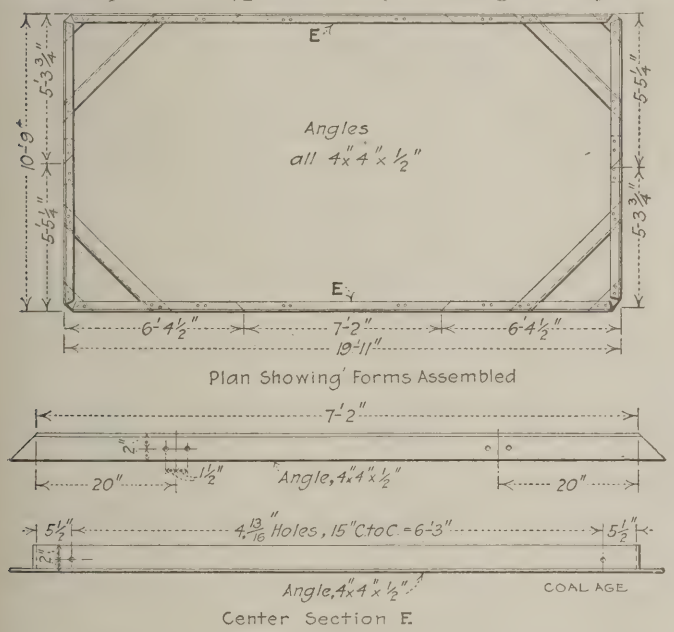


Fig. 7. Steel Frame Used for Stiffening Forms in Main Shaft

pine boards, surfaced on both sides, and cut into lengths making the section 2½ ft. high. Nailing strips 1½x12 in. extended around the top and 1½x4 in. placed at the bottom formed cleats for the several units and held the matched boards securely in place. The top piece extended a distance of 1 in. above the top of the form on the inside for the reception of the next form section.

For stiffening the forms and supporting the concrete until it should set, a steel frame consisting of 4x4x½-in. angles was placed midway of each section and attached to the form boards by means of ¾-in. bolts spaced 13 in. center to center around the entire section. The steel framework was stiffened at the corners with 4x4x½-in. angle bracing; while ⅜-in. splice and gusset plates were used for bolting together the several units composing the frame.

To insure easy removal of the forms and to increase the thickness of the walls, the corner pieces were cut on a 45° angle with a 5-in. bevel face. The vertical edges of each unit, including the forms and angle frames, were also cut on a 45° bevel, while 6x10-in. pockets were made in the top of every other form for the reception of the 10-in. I-beam buntons which are placed vertically 5 ft. center to center. The completed 2½-ft. section, including the steel frame, weighed 2080 lb., and the heaviest unit 400 lb.

Fig. 7 shows the design of the steel frame used for the forms at the main shaft, and Fig. 8 that of the forms for the ventilating shaft. The latter provides for the construction of a reinforced-concrete curtain wall for separating the cageway from the air compartment.

A new feature in the construction of a sump was inaugurated at the bottom of the main shaft. The lining walls and the floor are of concrete 12 in. thick, with a sump well 4 ft. wide, extending the full width of the shaft, placed at the low end to catch all seepage water. This provides ample room for a pump suction line. The sump is of sufficient depth below the cage landing to permit a standard mine car to be run under either of the cage landings. They may here be loaded by gravity with the coal droppings from the dump or mine cars, accumulating in the storage hoppers placed under each landing.

A heavy steel sliding gate is placed at the bottom of each hopper which is operated by means of a hand chain and wheel placed at the side of the sump. When the mine car is filled it may be conveyed by motor through a concrete-lined tunnel which leads from the end of the sump up a sharp incline to the haulage road.

A reinforced-concrete floor extends over the sump to support the cage landers and for additional strength to

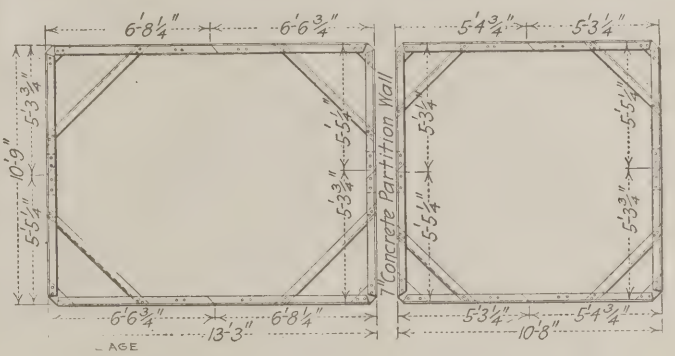


Fig. 8. Steel Frame Used in Forms for Auxiliary Shaft

absorb the shock of the cages striking the bottom landers. Heavy 24-in. I-beams are placed in the concrete floor and extend across the sump and are anchored into the lining walls.

Fig. 9 shows two vertical cross-sections of the sump. This design and the method of handling the waste eliminates the continual labor necessary to clean out by hand a deep sump, which not only is a source of annoyance to the pit boss, but a large expense annually to the coal company.

Arches Are Placed in the Shaft Approaches

The approaches leading to the main shaft bottom from both the loaded and empty sides are of concrete. These are of 18-ft. 2-in. span, having a minimum thickness of 24 in. for the sidewalls and crowns. Each arch extends 12 ft. from the face to the shaft lining. An arch of 8-ft. span having a minimum thickness of 18 in. and extending a distance of 12 ft. from face of the shaft lining will be later erected. This arch will connect with a cross-entry and manway around the shaft bottom. An archway of 4-ft. span will be placed in the sidewalls for entrance to the run-around.

At the intersection of all arches with the shaft lining

wall, steel bars were placed for reinforcement. The centering for the large arches was built of 2-in. plank spaced 17 in. center to center, covered with 1x4-in. boards laid close together. Concreting of all the large arches was brought up at one time coincident with the shaft lining walls. Fig. 10 shows the plan and sections of the arches and the method of placing the reinforcement.

In the ventilating shaft the concrete arch approach leading to the shaft bottom from the caging side is of 10 ft. 4 in. span. The arch leading away from the air compartment is of 17 ft. 6 in. span. Both arches have a minimum thickness of 18 in. for the sidewalls and crowns and extend a distance of 12 ft. from the face of the shaft lining. Fig. 11 shows the arch plan and a section through the airway arch.

Temporary Plant

The plant used for the sinking and construction of the shafts consisted of three 50-hp. Pennsylvania economic boilers, return-tubular type, and one 40-hp. unit of

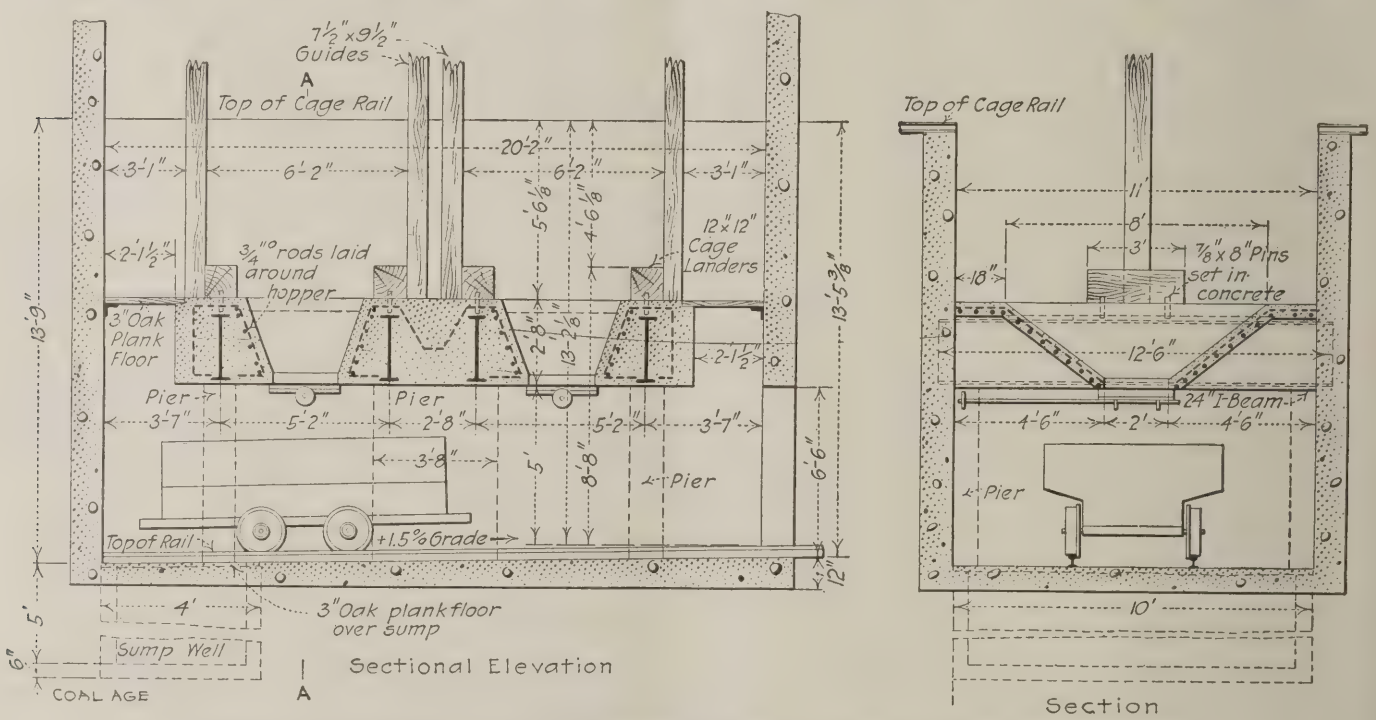


Fig. 9. Longitudinal and Transverse Sections of Sump under Main Shaft

same variety. The boilers were all placed together and located at a point midway between the two shafts. The feed water was supplied by one 6-in. duplex feed pump. All water for boiler purposes was secured from the supply at the Kelly No. 2 mine and conveyed to the plant site through an 8-in. and 6-in. water line. One 10-kw. 110-volt generator was used for lighting purposes. One duplex 8x13-in. geared hoisting engine with single drum, 48 in. in diameter, was placed at the main shaft and one duplex 6¼x10-in. double drum hoisting engine was used at the auxiliary shaft. Both hoisting engines were of friction type with link reversing motion, capable of hoisting at a speed of 400 ft. per minute under a load of 4000 lb. Nonrotating hoisting ropes ¾ in. in diameter were used at each shaft.

The muck and concrete were all handled from the same rope. One 10-hp. portable cubical concrete mixer with 5x7-in. vertical steam engine attached, having a capacity of 11 cu.ft. was placed at the top of each shaft. For handling muck, steel shaft-sinking turnover dump buckets, 36 in. in diameter and 36 in. deep, were used. These were replaced later with 3x3x3-ft. wooden boxes, made of 2-in. pine boards bound together with steel straps and provided with an end gate for dumping.

For taking care of the shaft water, two No. 9 Cameron regular pattern horizontal piston pumps were provided. These, however, were found unnecessary, as the water encountered at no time exceeded 5 gal. per minute. One 7½x5x10-in. piston pump was used at intervals for removing the water at each shaft.

For temporary ventilation required in driving the bottom landings, there will be placed at the main shaft one 2-ft. double-inlet fan, with a capacity of 15,000 cu.ft. per minute, driven by a 7x7-in. vertical engine. At the air shaft the fan will be a 3-ft. double-inlet machine with a capacity of 25,000 cu.ft. per minute, driven by an 8x8-in. vertical engine.

Revolving dump cars of 2 cu.yd. capacity for 36-in. gage track were used for the removing and distributing of the muck taken from the shafts. The concrete for the lining was conveyed from the surface to the point of application in a specially made steel dumping bucket 30 in. in diameter and 50 in. deep, with a capacity of 11 cu.ft., equipped with a steel chute and swinging door for the release of the concrete to the pouring chute. One of these buckets was used at each shaft. Fig. 12 shows the design of bucket used for this work.

Temporary Headframes

The temporary headframes were of wood construction. The one used at the auxiliary shaft occupied a space for the tower of 11x18 ft., and was 41 ft. high. Each of the tower posts and batter legs was built up of two pieces of 6x12-in. yellow pine spliced and bolted together. The tower was supported on mud sills, this foundation being 48 ft. long and divided into three panels, each braced with

4x12-in. diagonals held together at the panel points with 1-in. tie rods.

The dumping floor was placed 14 ft. above the surface, and directly over the hoisting chamber a pair of self-closing doors were placed for protection to the men in the shaft when the muck bucket was dumped. These doors were built of double 2-in. plank well cleated and each leaf secured to the platform with a pair of heavy strap hinges. The doors occupied a space of 6 ft. 8 in. by 9 ft., and were automatically raised and lowered by means of a counterweight extension which was operated by the topman.

Sinking work at each shaft was started with the aid of a wooden shoe, made of 8x12-in. timbers and having a cutting edge on a 45° angle for penetration through the surface soil. The latter was composed of black loam and a wet sand and clay mixture. The shoe timbers were mortised half and half at the corners and stiffened with 6x12-in. cross-pieces dividing the shaft into three chambers. The shoes were forced down by hand with 10-ton screw jacks and landed in each shaft at a depth of 12 ft. below the surface.

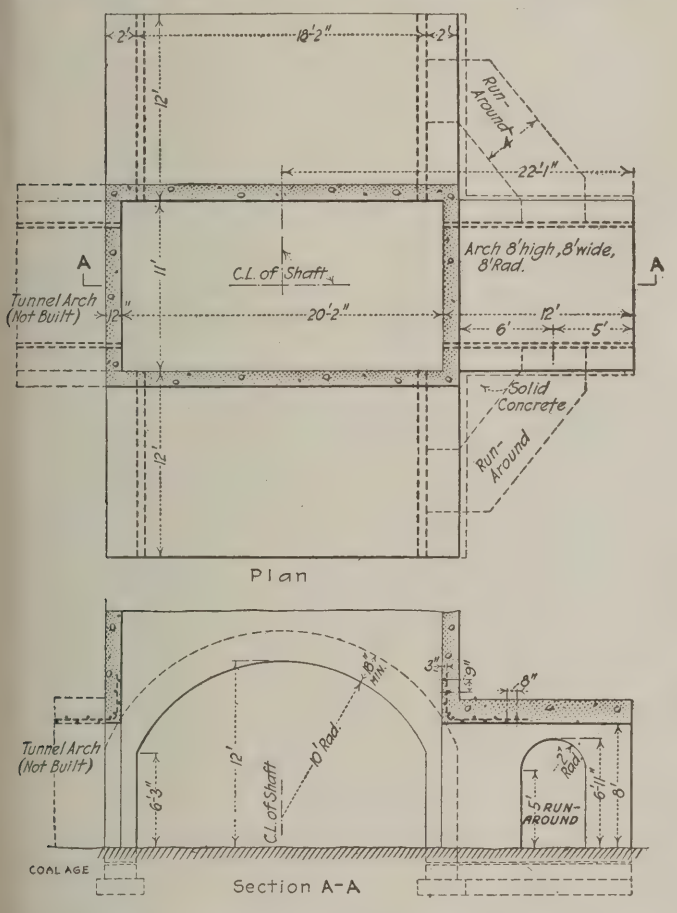


Fig. 10. Plan and Section of Main Shaft Bottom Approach Arches

The top timber set or mud sill anchors at the shaft ends were 8x10 in., and extended back a distance of 25 ft. from the curbing, bolted at intervals into concrete abutments for supporting the total weight of the curbing timbers until rock was reached, a distance of 55 ft. from the surface.

At the auxiliary shaft, in addition to the timber mud sills, a heavy 24-in. I-beam with hog chains attached secured the curbing at each end until solid rock was reached. The timbers were all placed skin to skin and for a distance of 60 ft. below the surface were in one stick for the sides and ends; from this point to the bottom, they were in short lengths, 10 ft. to 16 ft. long, composed of 8x10-in., 6x12-in., 4x12-in. and 2x12-in. sizes. The heavier pieces used were required in the softer strata penetrated. Eight by ten-inch temporary buntons spaced 2 ft. 6 in. apart vertically divided each shaft into three chambers.

Drilling was started when rock was reached. The first set of hitch timbers was placed in the main shaft, a distance of 55 ft., and in the auxiliary shaft 58 ft. below the surface. From these points to the shaft bottom the hitch timbers averaged 16 ft. apart. For shooting sumps and ends in each shaft an average number of 20 holes drilled 6 ft. deep were placed. Forty per cent. "Forcite" gelatin was used for the sinking of both shafts. Sinking and timbering was carried on continuously in three 8-hr. shifts and necessitated the employment of 8 men at the main shaft and 10 men at the air shaft.

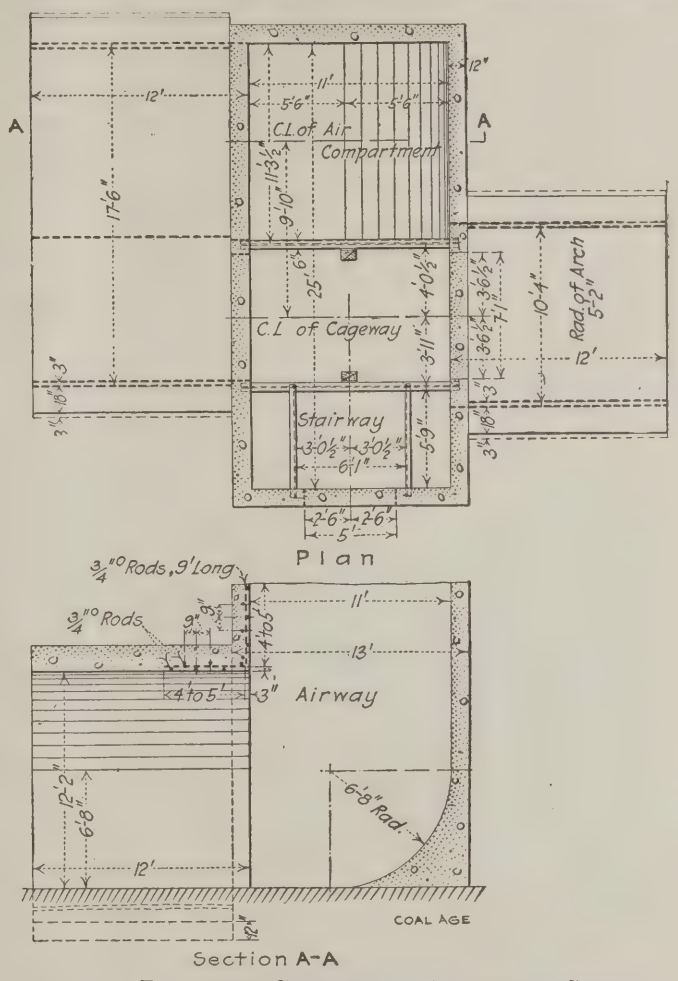


Fig. 11. Plan and Section of Auxiliary Shaft Bottom

The water met with in both shafts was handled by steam jets up to a depth of 60 ft. A 3-ft. 9-in. square box made of 2-in. plank answered for a suction well and was sunk in advance in the middle chamber to keep the water away from the muckers until solid rock was reached.

Method of Placing Concrete Shaft Lining

The method of concreting was carried on in the same manner at each shaft. No concrete was poured until the

bottom of the sump in each shaft was reached. The sump walls, first section of the bottom arches and the shaft lining up to the top of the arch crowns were all poured together. The forms for this portion of the work were erected at one time; 1½x10-in. surfaced boards were used for the lining.

The arch centers were cut from 1½ x10-in. boards spaced 17 in. center to center and covered with 1x4-in. strips for a smooth concrete face. From the top of the arches to the top of coping, special forms previously made in sections 2½ ft. high were used; 50 vertical feet of forms were on hand and used for each shaft, necessitating four changes during the entire process of concreting.

Concrete was placed after every 5 ft. of forms were in position. It was delivered to the scaffold platform and conveyed into the sidewalls from a frame box chute 6 in. deep and 12 in. wide, the mouth of which was, however, 24 in. wide. Chutes of sufficient length reached the side and end walls.

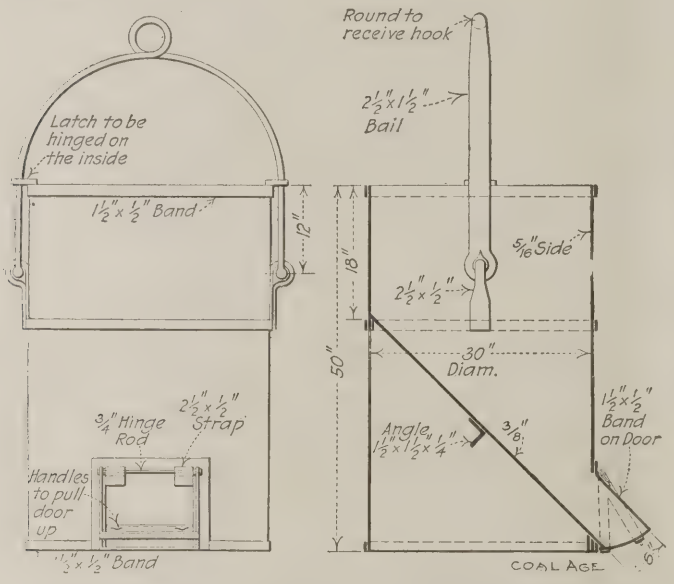


Fig. 12. Special Bucket Employed for Lowering Concrete into the Shafts

At the auxiliary shaft it was necessary to use a floating double-deck scaffold for the placing and removal of the forms in the airway. This scaffold was handled by a rope on the second drum of the hoist engine. No forms were removed from the work under a period of 48 hours. The 8x10-in. buntons supporting the curbing were removed as the concrete lining advanced; these were replaced after each form was in position with 4x6-in. temporary supports for the forms until the concrete had set.

Both lines of 4x6-in. temporary buntons were supported on 1½x4x10-in. blocks attached to 1½x10-in. vertical wall plates cut in 5-ft. lengths. These plates extended back of the forms. Four 1½x2½x10-in. blocks attached to the back of the wall plates cleared the steel angles on the forms and made a substantial support.

Quantities and Materials Used in Permanent Work

In the main shaft the concrete yardage per vertical foot for 12-in. lining walls was 2.5 cu.yd. and 3.8 cu.yd. for walls having a thickness of 18 in. In the auxiliary shaft the 12-in. walls averaged 2.8 cu.yd. per vertical foot and the 18-in. walls 4.3 cu.yd. All of the concrete work was composed of one part cement and five parts of clean Wabash River gravel. Cement for the entire work was the "Universal Brand," manufactured by the Universal Portland Cement Co. All structural steel and reinforcement was furnished by the Illinois Steel Co.

Progress of work at main shaft was as follows: Excavation started May 6, 1914. The bottom of the sump reached July 20, 1914. The total distance sunk was 225 ft. below the top of coping. The sinking operation, including the placing of the timber curbing, occupied a period of 10.7 weeks, which was an average of 21 ft. per week and 84 ft. per month. The greatest progress made in any one week was 27 ft.

Concreting started Aug. 7, 1914, and the top coping was reached Sept. 8, 1914. The concreting included the placing of 15 ft. of 8-ft. span arch for the sump tunnel and 30 ft. of 18-ft. 2-in. span arch for the bottom cage landing approaches from the empty and loaded sides. The entire work done in connection with the concreting of the shaft lining walls occupied a period of 4½ weeks, which was an average of 50 ft. per week.

Excavation started at the auxiliary shaft on May 6, 1914, and the bottom of the sump was reached July 20, 1914. The total distance sunk was 216 ft. below the top of the coping. The sinking operation, including the placing of timber curbing, occupied a period of 10.7 weeks, which was an average of 21.2 ft. per week and 84.8 ft. per month. The greatest progress made in any one week was 31 ft.

Concreting started Aug. 7, 1914, and the top of the coping was reached Sept. 30, 1914. This process included the placing of 15 ft. of a 10-ft. 4-in. span arch at the bottom cage landing and 15 ft. of a 17-ft. 6-in. span arch leading from the bottom of the air compartment. The total work done in connection with concreting the shaft lining and the pouring of the concrete curtain wall occupied a period of 6.7 weeks, which was an average of 32.4 ft. per week and 129.6 ft. per month.

Coming Meetings

The annual meeting of the American Society of Mechanical Engineers will be held in New York City, Dec. 1, 2, 3 and 4, 1914. Calvin W. Rice, secretary, New York City.

The seventeenth annual session of the American Mining Congress will be held at Phoenix, Ariz., Dec. 7, 8, 9, 10 and 11, 1914. J. F. Callbreath, secretary, Denver, Colo.

The winter meeting of the Coal Mining Institute of America will be held Dec. 8 and 9, 1914, at the Fort Pitt Hotel, Pittsburgh, Penn. Charles L. Fay, secretary-treasurer, Wilkes-Barre, Penn.

The American Institute of Mining Engineers will hold its annual meeting in New York City, beginning Feb. 16, 1915. Papers to be presented at this meeting should be in the hands of the secretary of the Institute not later than Nov. 23, 1914, and as much before that date as possible. If a manuscript is received after Nov. 23, the editorial staff will lend its best efforts to having it prepared in time for the meeting, but cannot give assurance that it will be ready in time. Bradley Stoughton, secretary, New York City.

The Kentucky Mining Institute's winter meeting will be held Dec. 4 and 5, 1914, at the Seelback Hotel, Louisville, Ky. On Friday afternoon, at 1:30, there will be an address of welcome by the mayor of Louisville, Honorable John Buschmeyer. This will be followed by presentation of papers. At 7 p.m. there will be a banquet in the Red Room of the hotel, in conjunction with vaudeville. On Saturday at 10 a.m. papers will be presented, and in the afternoon at 1:30 a trip will be made to the Speed Cement Works. In the evening at 8 o'clock a visit to Macauley's Theater where Miss Billy Burke will appear, will terminate the meeting. H. LaViers, Paintsville, Ky., president; Ivan P. Tashof, Lexington, Ky., secretary-treasurer.

Mine Explosion at Royalton, Ill.

Special Correspondence

SYNOPSIS—A gaseous mine, operated with open lights, exploded on Oct. 22, and as a result 51 men were killed. The authorities immediately reversed the fan, and it is believed their promptitude in pursuing this drastic measure saved many lives and jeopardized the chances of escape of few, if any. A shortage of safety lamps retarded the recovery of the mine.

The most disastrous explosion that ever occurred in the coal fields of southern Illinois happened at the North mine of the Franklin Coal & Coke Co., Royalton, Ill., at 7:25 Tuesday morning, Oct. 29. Fifty-one men lost their lives either through the direct force of the explosion or through inhaling the afterdamp which was formed thereby.



Surface Works at Royalton Mine Soon after Explosion Occurred

Royalton is a town entirely occupied by miners in the southern end of Franklin County, near the Williamson County line, and has a population of about 2000 people. There are two mines in the town, both operated by the Franklin Coal & Coke Co., of which J. L. Mitchell, of St. Louis, is president. The seam worked in these mines is No. 6 of the Illinois correlation, and is about 10 ft. thick. Of this, about 2½ to 3 ft. is left up as top coal, the entries and rooms being opened up to a height of about 7 ft., and the top coal drawn from the rooms after they have been driven up their full distance.

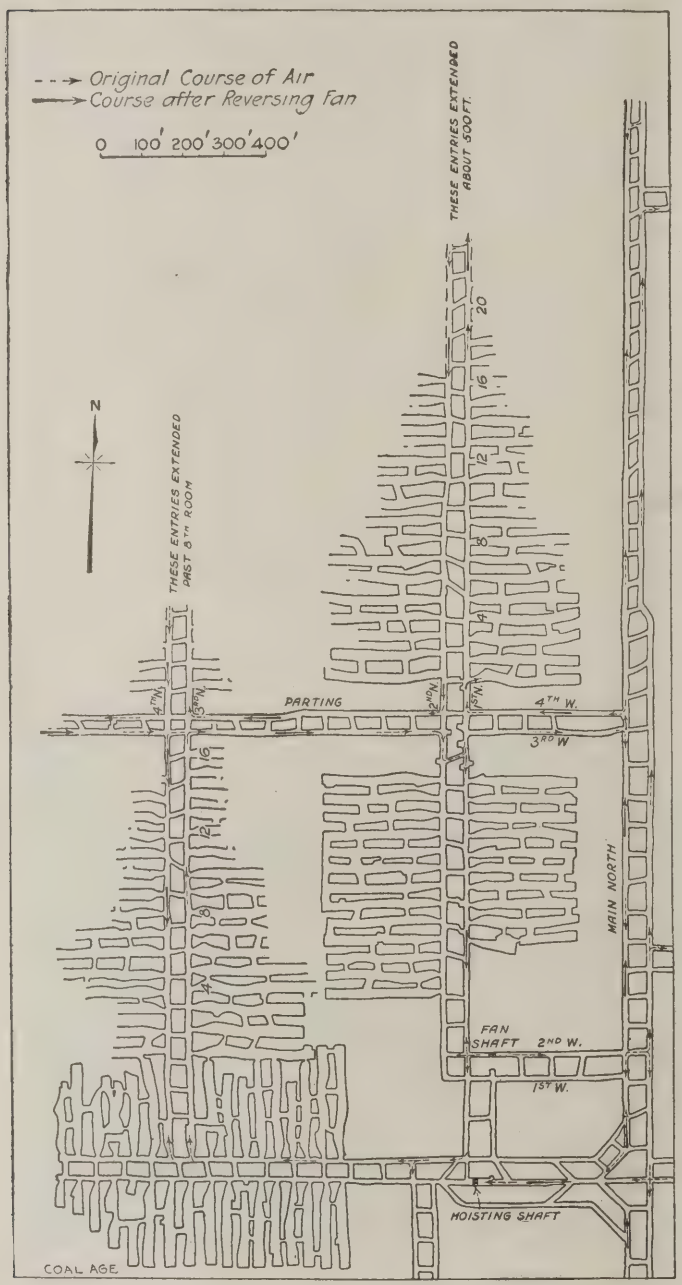
A Gaseous Mine but Well Ventilated

The mining is all done by machines, and the haulage is by mule and electric motor. The mines in this field are regarded as gaseous, the Franklin and Williamson County fields having the most gas of any in the state. The ventilation system at the mine was good, and at no time was it thought necessary to put the mine on safety lamps. The fan is of the Sirocco type, 20 ft. in diameter, and 5 ft. wide, housed in a brick, steel and concrete house. It is guaranteed to deliver 200,000 cu.ft. of air per minute when running at a speed not exceeding 225 r.p.m. The mine has an average output of 3000 tons per day.

The top coal left up as a roof forms an exceptionally strong covering, and no entry timbers are used in the mine. The seam is clean, and there is but little refuse in the gob.

The mine is worked on a panel system, and has four main entries, going respectively to the north, east, south and west. Nearly all the men who worked upon the first three entries mentioned and had arrived at their working places, were not only uninjured, but for some time were unaware that an explosion had occurred.

The explosion happened while the men were still being lowered into the mine, to start the day shift. At the time there were 350 men underground, and about 40 waiting their turn at the head of the shaft. Many of the men inside had not left the shaft bottom when the explosion occurred. There was but a single blast, and from all signs it was evidently caused by gas being ignited.



NORTHWESTERN SECTION OF ROYALTON COLLIERY

There had been no shooting done, so presumably the gas was set on fire by a naked light.

COURSE OF THE EXPLOSION

The explosion evidently occurred in the third or fourth north off the fourth west entry, a distance of about 3000 ft. from the hoisting shaft. At the fourth west, the force of the explosion seemed to split, part going out of the fourth west and part going down the entries to the south. About 400 ft. outbye the fourth north is a parting, on which stood a trip of loaded cars. These were piled together by the force of the explosion, and evidently blocked it from going further in that direction. This blockage forced out the stoppings between the third and fourth west, and probably saved the part of the mine to the east.

The explosive force going down the south entries passed through the rooms on each side of these headings, went through the old workings and out to the hoisting shaft. On the east side of that shaft were two lines of loaded cars, extending for a distance of approximately 200 ft. These stopped the explosive force from going any further in that direction.

NO EVIDENCE OF VIOLENCE AT SURFACE

Neither the shaft, cages nor fan were injured by the explosion, and the only indication on the surface was the blowing of the circuit-breaker in the engine room. James Brown, the manager of the mine, was on the surface at the time, and he immediately ordered the reversal of the air current, the hoisting shaft then becoming the downcast and the fan shaft the upcast. This reversal of the air may have caused the deaths of five or six men in the northwest entries, yet it undoubtedly saved the lives of those on the main north entry and those near the shaft bottom who were not killed by the force of the explosion. The map indicates the direction of the air current as it normally went, and also the direction after the reversal of the fan.

Men who were on the surface when the explosion occurred immediately went below in an effort to rescue their fellow workers, and succeeded in getting out several who were in the neighborhood of the shaft, and on the main north. They also recovered several dead bodies. The stoppings along the main north were substantially built of brick, and were not seriously damaged, so the rescuing forces were able to advance to the point where the third west turns off the main north.

SEVERAL RESCUE PARTIES AT THE SCENE

Calls were sent at once to the Illinois Mine Rescue Station at Benton, to the State Mining Board at Springfield, and to neighboring mines for assistance. On account of the isolated position of Royalton, most of the rescue men were obliged to secure automobiles and make the run of from 12 to 50 miles over the rough country roads. The first crew of helmet men came from the Benton Station, arriving at the mine soon after ten o'clock.

Because of the ruling recently adopted by the Illinois Mine Rescue Commission, authorizing the organization of a corps of five men at each station, these men to be in continual training and to be ready to respond to any call, there were in the Benton crew eight trained men ready for work as soon as they reached the mine.

Following them came a crew of six men from the mines of the Madison Coal Corporation, at Dewmaine, and two helmetmen from the operations of the Saline County Coal Co., at Harrisburg. During the day trained men from all over the southern end of the state appeared at the mine and volunteered for work, and about midnight a crew of helmetmen from Eldorado arrived, having covered the 50 miles in an automobile. This crew appeared just in time to relieve the men who had been working all day.

That men could be so quickly gathered together is a triumph for the management of the Illinois Mine Rescue Commission, and it is to be hoped that other mining states will follow the lead of Illinois in establishing

such mine-rescue stations at suitable central points.

Most of the afternoon was expended in exploration work and in the reëstablishing of the ventilating current. By erecting a brattice about 200 ft. east of the hoisting shaft, and a stopping west of the shaft, most of the air was carried up the main north in the direction indicated by the double-pointed arrows, and thrown into the fourth west by means of a stopping on the main north. Investigation by the helmetmen proved that there was no fire anywhere, and also demonstrated that all the men inside the second north were killed immediately.

One Man Found Alive

The rescue party worked its way up through the rooms on the first north, through the inside crosscut and down the second north. On entering Room 25 on the latter entry, a man was found sitting down, with his carbide lamp burning. He was conscious, but was evidently partially overcome by the gases resulting from the explosion. The feed pipe from one of the apparatus was unscrewed and placed in his mouth, and he revived in a short time and was taken out.

This was the only man found alive, or with any signs of life, beside those rescued immediately after the explosion. That the trip of loaded cars on the parting between the second and third north stopped the force of the explosion from spreading through the mine was evidenced by the fact that the door in the slant crosscut between the first and second north, the fourth from the west entry, was uninjured. Two men found near this door were evidently overcome by the afterdamp, but all the men found from this point in showed unmistakable evidence of having been killed by the direct force of the explosion.

By eight o'clock Tuesday night, fifteen bodies had been taken from the affected area and deposited in places of safety near the bottom. They were not brought up at once, because every effort was being put forth in hunting for possible living men. The entire area affected by the explosion was not explored until nearly six o'clock Wednesday morning, but the work of bringing up the bodies was commenced before midnight, and by morning 47 bodies had been recovered.

This number included all the bodies which were in sight. The possibility of finding more was acknowledged, but the only way in which more could be found was by a thorough cleaning up of the débris. During the next day, four additional bodies were discovered, bringing the total up to 51 killed.



Crowd at Shaft Awaiting Outcome of Rescue Work

Much Assistance Offered

During the night, frequent calls were made for volunteers to assist in building brattice and cleaning up the track, and marked eagerness to help was shown by the mining men gathered around the head of the shaft. Telephone and telegraph calls were received from many points during the day, offering assistance, and the federal mine-rescue car from Vincennes was started on the way. This went as far as DuQuoin, but was stopped there when the



Showing Royalton Headframe, Tipple and Power House

officials in charge were informed that there was plenty of assistance available.

A great handicap in pushing forward the recovery work was the shortage of safety lamps. Several lamps were supplied by the Chicago & Carterville Coal Co., by the Orient mine, and by the Illinois Miners' and Mechanics' Institutes.

Following the rescue work, an extended examination of the mine was made by state and federal officials, among whom were J. W. Paul and H. I. Smith, of the U. S. Bu-



Another View of Royalton Plant after the Accident

reau of Mines, John Bohlander, president of the Illinois Mining Board; Oscar Cartlidge, manager of the Illinois Mine-Rescue Station Commission, who was present during the entire recovery work; State Mine Inspectors Morgan, Reed and McClintock, the first two of whom were present during the work; and County Inspector Laughlin, who assisted in the recovery work. It is too early to give a report of the findings of this body.

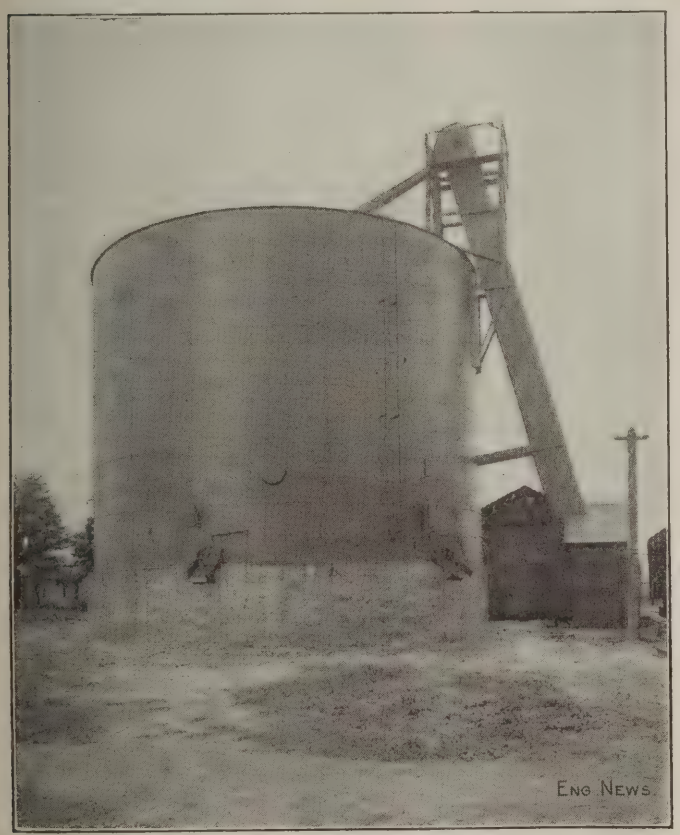
Verdict of Coroner's Jury

The verdict of the coroner's jury was simply "Death by an explosion." No blame was placed on any one for the disaster. The dead were buried in a tract of land donated for the purpose by the Franklin Coal & Coke Co.

The colored rescuemen of the Madison Coal Corporation did excellent work. An illustration in our issue of Oct. 25, 1913, Vol. IV, p. 621, shows this team. Three men shown on the page preceding also did excellent work.

Steel Tank for Coal Storage

The proprietor of a retail coal yard in North East, Penn., stores his stock, except the large lump varieties of coal, in a circular steel bin, fashioned somewhat after the manner of a circular grain bin. The dimensions of



Steel Tank for Coal Storage

the bin are, height and diameter, each about 40 ft. It rests on a brick foundation about 6 ft. high.

The coal which is to be unloaded into the bin is allowed to run from hopper-bottom cars into a pit under the center of the track. A bucket conveyor, inclosed in a chute and propelled by an electric motor, carries it to the top of the bin, where it may be diverted into any one of six compartments.

Note—From "Engineering News."

When delivery is to be made to a retail customer, the driver backs his truck under the gate of the proper compartment. The coal runs from the bin through a screen chute, so that it is cleaned while being loaded.

This method of handling coal is found to be economical and satisfactory for several reasons. The expense for labor is small and the proprietor is independent of that uncertain class of help upon which in ordinary times he must depend. Orders can be gotten out very rapidly when the first cold snap comes and a great many householders suddenly remember that they forgot to order coal. No insurance is carried on the bin shown in the view. The builder is the VonWald Engineering Co., of Buffalo, N. Y.

Recent Legal Decisions

State's Right to Tax Corporate Assets—The Tennessee Coal, Iron and R.R. Co. was organized in Tennessee, but it has general offices in Alabama, which state has by special law granted it all the powers of a domestic corporation. Held that moneys and credits payable at the Alabama offices are subject to taxation in that state. (Alabama Supreme Court, State vs. Tennessee Coal, Iron & R.R. Co., 66 Southeastern Reporter 178.)

Excessive Recovery for Injury to Miner—$3400 was excessive recovery for injury to a mining employee for injury to his leg which did not prove to be serious, where he was able to resume work at higher wages than he had obtained before the accident, and did not incur any expense on account of the accident in excess of $400. (Keller vs. Chicago, Wilmington & Vermillion Coal Co., 184 Illinois Appellate Court Reports 248.)

Proximate Cause of Accidents—In an action for death of a mine trapper and switchman who was killed by being run over by a motor car and a train of coal cars, plaintiff was not entitled to recover on the ground that the operator had failed to comply with the safety requirements of the state mining laws, without showing that such failure was the direct cause of the accident. (Wyzard vs. Vivian Collieries Co., 184 Illinois Appellate Court Reports 199.)

Safety of Mine Doorways—Duty to Contractor's Employees—When operations in a mine are conducted by an independent contractor, and the owner of the mine undertakes to furnish means of ingress and egress for use by employees of the contractor, the owner is required to use the same degree of care to keep such means in reasonably safe condition for their safety, as is required concerning the owner's own employees. So, in such a case, the owner is liable for injury to an employee of the contractor, whose head came in contact with a low frame of a door in the mine, while he was being carried from his work in cars provided by the mine-owner, if, on account of the presence of smoke and steam in the mine, the danger was not obvious. (Pennsylvania Supreme Court, Podona vs. Lehigh Valley Coal Co., 91 Atlantic Reporter, 920.)

Interesting Articles Next Week

The next issue of Coal Age will contain a number of articles that should prove interesting to all coal-mining people. Among other things will be a description of "A Modern Method of Mine Development," illustrated with a detailed working plan. This scheme can be modified to fit most any case of a panel system of mining. The principal object of the method is maximum percentage recovery. Another article will deal with the use of "Ball Bearings on Mine Locomotives" while a third description will cover "The Pittsburgh Coal Field in Western Penn." Other special articles planned for this same issue are, "A Modern English Mine-Rescue Station," "Coal Waste in Mining Plants" and "A Testing Appliance for Coal Washeries." The information contained in any one of these articles may save you a lot of money.

Extracts from a Superintendent's Diary

This morning about nine o'clock, Joe Kosko, who tends the feeder between the run-of-mine chute and the shaking screen at No. 4 tipple suddenly jumped down from his platform and ran back and forth under the tipple yelling at the top of his voice in a most excited manner, "villain! villain! villain!"

Everybody, within hearing and seeing distance, naturally dropped the work in hand and made a bee line for Joe, and they found that he really had justification for all of the excitement he was creating.

Lying there on Joe's platform, in full view of the gathering crowd, were ten sticks of dynamite, which Joe had caught just in time to prevent being fed into the crusher.

After the initial excitement had subsided, the crowd began to offer suggestions as to the motive for the dastardly attempt at assassination, and the possible ways of discovering the offender. Had the camp been agitated by a strike or threatened strike, such a plot could have been explained easily, but we were all at peace.

But on one thing all were agreed and that was that the coward must be discovered, even if it took an army of detectives to accomplish the task, and after the villain was captured he ought to be blown up.

By this time word had traveled out through the camp and a great crowd was beginning to collect about the shaking screen and the crusher.

Joe suddenly found himself very much in the limelight and he was compelled to explain over and over again his part in frustrating the villain.

Of course, each time Joe had to add a little to keep up his own interest in the telling and finally he added as a concluding remark, "He try killy Joe, Joe he shooty that bad mans when he get a hold him."

About a half hour after Joe had astonished the tipple crew, a short insignificant looking Slav, named Mike Petrosky, came up out of the manway and made straight for the dump at the end of the tipple.

He seemed to know exactly what he expected to find, but apparently did not find it on the tipple floor and so went to the edge of the platform and looked down at Joe's platform directly underneath.

This time he had better luck. As soon as he saw the ten sticks of dynamite, he immediately started down the steps making straight for them.

Joe was just saying for the twentieth time, "Joe he shooty that bad mans."

"Those mine," interrupted Mike, pointing to the dynamite.

Quickly a crowd closed in around Mike, Joe and the dynamite.

"Kill him" shouted someone.

But Joe saved the day.

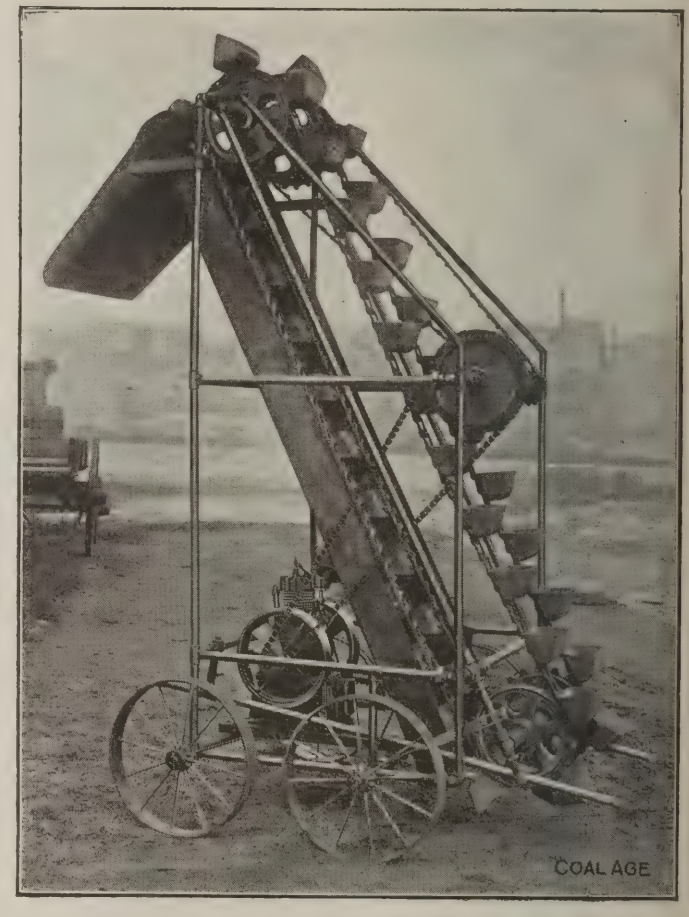
It all shot through his head like a flash. Mike had probably left the dynamite in an empty car in his room over night and in the morning had loaded coal over it without thinking. Now he had come up to claim it, entirely unconscious of the excitement he had stirred up.

And so instead of shooting Mike, Joe found himself trying to protect him until the crowd could be made to understand.

The threatened tragedy ended as comedy.

The Jersey Wagon Loader

In the Jersey loader, there have been developed a few features of great importance to a machine of this character, viz., low first cost and the maximum of convenience in handling. The manufacturers make the claim that where the machine replaces hand labor, it will effect a saving sufficient to pay for itself in 60 to 90 days. This particular apparatus is also designed so that it can be easily handled and moved from point to point in the coal yard by one man—an important consideration in such a machine.



VIEW OF THE JERSEY LOADER

The extreme height of the loader is 10 ft. over all and the weight is 1000 lb. It may be operated by either a 1-hp. gasoline engine or motor, and when working with the former motive power, the manufacturers claim that the actual cost of operation is only 4c. per hour. The machine, under normal conditions, is capable of handling one ton of coal per minute.

The chute which conveys the coal to the point of destination is provided with a removable plate, under which plate there is a screen designed to render it possible to remove all dust while the wagon is being loaded. The chute is also provided with a detachable dust retainer. All the drive parts are ball-bearing. The entire apparatus is so designed that a moderate pressure on the handles serves to bring it in balance on the two wheels, after which it is easily moved about by one man. The handles when not in use, are pushed back out of the way, as shown in the illustration.

The machine is manufactured by the Jersey Wagon Loader Co., 95 Liberty St., New York.

Editorials

The Acetylene Lamp

Only a few years ago the fact that the pouring of water on carbide compounds would generate a flame of unusual brilliancy became known. Now there are few mines not generating firedamp, where the acetylene lamp is not in use. It has the advantage over the oil lamp that it is cleaner, gives more light and is cheaper to operate.

There is a further advantage, extremely important where the danger from fire is imminent. This is that there is no wick to the lamp which, when thrown on one side ablaze, may set timbers or coal on fire. It is also possible to keep a light in a draft in which an oil lamp would go out and with the self-lighters now provided, the lamp can be far more readily ignited in a moderate wind than an oil torch. All of which excellent points have made the acetylene lamp popular.

At our request, George B. Pryde, general superintendent of the Union Pacific Coal Co., has furnished us the following facts as to the cost of burning acetylene and oil lamps. No attempt has been made to compare the candle-power-hours. Such a comparison would be far more favorable to the acetylene lamp than is even that here given. The period on which the estimates are based is a day of 8 hours.

COST OF ACETYLENE AND OIL LIGHTING

Name of Mine	Carbide Lamp	Lard-Oil Lamp
Reliance	$0.015	$0.048
Rock Springs	0.055	0.075
Cumberland	0.035	0.045
Superior	0.034	0.075
Hanna	0.034	0.070
Average	0.0346	0.0626

The estimates are based on a charge of 8⅓c. per lb. for carbide and 65c. to 75c. per gal. for lard oil.

We Are Each But a Part of the Community

Adam Smith, in the introduction to his great work, "Wealth of Nations," calls attention to the fact that because every man in a nation is employed in useful labor does not necessarily indicate that such a nation is prospering nor that its laborers are above being classed as "miserably poor."

To illustrate, he compares the savage tribes of hunters and fishers where every individual must provide for his family, but who are often reduced to starvation as against the ordinary workman in a thriving country where large numbers of people do not labor at all, and yet influence the produce of the whole labor of society to such an extent that the humblest workman may obtain more, as his share, than does the most prosperous member of the savage tribe.

This does not prove that the monopolist, with no love of the common herd in his makeup, who is always trying to boost food prices because he thinks he can get away with it, is a necessary evil any more than it suggests that the I. W. W. radical who is "agin" everyone with a standing on the tax list has any influence on the sum total of human happiness. It ought to suggest, however, without any great stretch of the imagination that the terrible "Coal Baron" who has invested his entire fortune in the coal industry is vitally connected with any future prospects of the workers in his camp even though he does not (literally) earn his bread by the sweat of his brow.

It seems strange that in the bituminous-coal industry where the percentage of profit on capital invested is probably smaller than in any other large industry, the demands of the workers during the past few years have been the most unreasonable. If the leaders of mine labor were of the same opinion about the profits on coal mining as the average city dweller, there might be some justification for their actions, but it is hard to believe that such is the case. There are no secrets about coal-mine cost sheets, and any inhabitant of a mining village who can't figure costs within a few cents must be musty on the multiplication table.

An Adam Smith writing today would not be compelled to fall back on the almost extinct savage tribes to illustrate the futility of all men working; he could illustrate his point quite as satisfactorily with late history of the doings of the unions at Butte, where the mine owner recently was in danger of being entirely eliminated from power and consideration. Certain officials of the miners' organization threatened to kill any labor leader who suggested that the mine owners should be consulted.

Eventually those miners out there who manage to escape bombs and bullets will decide that they are only part of the community.

Colorado, a Land of Promise

The conditions in Colorado are extremely promising. To those who would work and those who won't, the prospects are alike inviting, especially to the latter or to some at least of these. We think most of our readers belong to the former class, so we will show them what opportunities Colorado offers to the worker before we expatiate on its advantage to those who do not desire to toil.

The average daily earnings of the miners of the Victor-American Fuel Co. were, between June 30, 1912, and 1913, $4.69. The average time worked was 234½ days and the average yearly earnings $1100.75. The Colorado Fuel & Iron Co.'s average day wage for the same time was $4.02, the time worked 248½ days and the yearly income $999.36. The Rocky Mountain Fuel Co. paid an average day wage of $4.36, an average annual wage of $1007.01, the men working 231 days.

As the earnings of an average American family (of which two members are employed) are less than eight hundred dollars a year and the Bureau of Census has shown that anthracite miners average about $532 per year and bituminous miners $516, conditions are not unfavorable for workingmen in Colorado. Some, of course, make much more money than others. Thus, four brothers of Italian origin each made $1850 in one year digging coal in Colorado mines. The miners, as an average, received from the Colorado Fuel & Iron Co., 80.9 per cent. of their

earnings in cash, 11.73 per cent. being deducted for purchases at the company stores, 2.25 per cent. for rent and 5.12 per cent. for coal, board, powder and smithing.

But when we compare these figures with some others, we ask our readers not to be indignant, for they are far lower than have been paid by the United Mine Workers to their deserving official heads in Colorado, according to a little booklet, "Facts Concerning the Struggle in Colorado for Industrial Freedom." Frank J. Hayes was paid $4052.92 for nine weeks' salary and $1667.20 for expenses during the same period. Thus, he was recompensed at the rate of $90 per day, or $32,000 a year. John McLennan received $2683.55 and for expenses $1469.55, or $66 in all per day. John R. Lawson received as his nine weeks' salary $1773.40, or $28 per day. Mother Jones, whose sources of income have been a matter of much inquiry, was paid $2668.62, or $42 per day as salary.

We do not know what were the deductions made in these accounts, how much went to buy arms and ammunition, tents and automobiles and all the grim equipment of war. But the pay is princely and clearly establishes Colorado as a land of promise and makes the earnings of the men who work for the corporations look meager beside the pickings to be obtained from serving the union.

However, the rank and file of the men in Colorado receiving pay from the United Mine Workers of America drew only $3 per week and to them that state must have appeared like Nish or Mitrovitza.

Some Damages

Did you hear about Thomas Smith down in Arkansas who sued the Central Coal & Coke Co., for $220,000 damages for injury done him in a mine cave-in? Well, it's a fact, and here is the itemized bill that was filed:

Twenty-five thousand dollars for physical and mental suffering; $25,000 for medical attention and other expenditures; $5000 for loss of earnings to date of trial; $75,000 loss of future earning power; $25,000 loss of pleasures as a husband; $10,000 loss of happiness in additional children; $25,000 for humilating physical condition; $10,000 for fear of impending death; $10,000 loss by means of hunger, want and constant mortification; $10,000 fear of deprivations after trial; $220,000 total claims in suit.

Mr. Smith was employed as a fireboss, and alleges that a foreman of the C. C. & C. Co. sent him in to extinguish a fire that broke out in one of the entries. He attempted to do so, taking a hose with him. While playing a stream of water on the fire, the roof fell, crushing and disabling him. The plaintiff further alleges that it was not his duty to put out fires, as he was employed to inspect for gas.

Mr. Smith probably won't get anything like the absurd amount to which he lays claim, but the mere fact that such claims can be filed for judgment should prove a warning to our coal companies. The time has arrived when accidents simply must be avoided or the ghost of bankruptcy will loom large on the coal operator's horizon.

Workmen's Insurance in Germany

In view of the great interest in the United States concerning workmen's insurance, the results of similar efforts in Germany are illuminating. The Germans passed their first bill for sickness insurance in 1883, and since that time, numerous other acts dealing with the same problem have been added, until in 1911, the basic statutes were extended to widows and orphan's insurance.

From 1885 to 1912, the following amounts were expended in Germany: Care of the sick, $1,404,200,000; accident insurance, $760,800,000; invalid and death insurance, $1,123,200,000. This makes the total insurance payments, $3,288,200,000.

It is evident from the foregoing that when applied to the entire industry of a great nation, accepted forms of workmen's insurance are no light burden on invested capital. Doubly is this true of the coal-mining business where the hazards are so exceptional.

Indemnity and liability insurance are desirable things, and we trust that some fair and equitable form of protection for our miners may be worked out. Coal mining, however, is one form of industry where great judgment must be exercised in solving the problem, for serious accidents happen in our best regulated mines, and only an unusually strong corporation could ever survive the expense it would have to shoulder if some laws now contemplated were to be passed in an unaltered form.

The Matter of Collections

In these days of world war, with the resulting uncertainty and apprehension, many coal corporations of excellent reputation are facing financial problems of great importance to their very existence. Nothing bears more heavily on all industry than a tendency to defer payment of debts. If *A* doesn't pay *B*, then the latter can't pay *C*, and so the thing extends until the wheels somewhere must stop.

It is an elementary rule of busines that profit is made in proportion to the turnover; consequently collections must be made promptly if we expect efficiency and economy in our mining operations. About the only man who will resent your asking for payment of an account past due, is the fellow who proposes to do some financing at your expense.

Prompt payment of accounts is the best kind of insurance, for creditors will extend a helping hand in case of unavoidable emergency to the man who has zealously guarded his reputation when skies were blue.

A company that goes after collections diligently is always the kind of corporation that also looks after each and every operating detail. Careful management, good accounting and prompt collections are invariably found associated with a sound business.

Reinforced-Concrete Construction

In a paper before the Association of Engineers, in London, Henry Adams discussed the risk of spontaneous combustion where a large quantity of coal is stored, and referred to the use of reinforced concrete for the construction of coal bins. He said that structures of creosoted timber may last for 50 years, with increasing expenditure for repairs after the first 15 or 20 years; but in 50 years a reinforced-concrete structure may be in better condition than in the year it was built. It is probable that in the future this will be the only method of construction adopted for the purpose. It seems impossible to conceive of any better material; it has every advantage and no drawback. The strength and toughness of buildings in reinforced concrete increase with age.

Discussion By Readers

The Eskmeals Test of the Verner Counter-Current Theory

Letter No. 11—In response to a personal letter written by a prominent engineer who has been deeply interested in the discussion of the counter-current theory assisting the propagation of a dust explosion in a coal mine, as advanced by John Verner, former state mine inspector in Iowa, Dr. R. V. Wheeler, of the Experimental Station at Eskmeals, writes an interesting letter.

As the letter throws much light on the bearing of the Eskmeals experiment in this discussion, I have obtained permission to present it to the readers of COAL AGE, who have been greatly interested in the question of the *air factor* in a coal-dust explosion.

Doctor Wheeler writes as follows:

"If, as I assume, the article to which you refer is the one written by Mr. Dean, for COAL AGE, describing his visit to Eskmeals, I would say that Mr. Dean asked my permission to publish the results of the experiment that he persuaded me to carry out, and I readily gave my consent. I thought, however, that I made it clear that the experiment did not appeal to me as a test of Mr. Verner's theory *in toto*.

"The experiment made at Mr. Dean's request is described in the *Colliery Guardian*, of Sept. 25, as follows:

> The experiment at Eskmeals was carried out in the small gallery, 3 ft. 3 in. in diameter. A mixed dust was used, containing 70 per cent. coal dust and 30 per cent. incombustible dust (fuller's earth). This was done to slow down the explosion and allow more time for observing the air actions at the mouth of the gallery. Across the mouth of the tube, a board 6 in. square was supported by four coil springs, and from the board a rod 6 ft. long projected out into the open. There was a white mark on the rod, which passed through a stationary upright painted black. The rod moved back and forth as the air movements forced the board outward or inward. Half a pound per linear foot of mixed dust was strewn along the gallery to within 20 ft. of the mouth, and 1½ lb. of black powder, stemmed with 8 in. of dry clay, was fired from the cannon placed 50 ft. from the closed end of the gallery.
>
> A whistle was blown immediately before the shot was fired, and the first action observed was a cloud of dust blown out of the mouth of the gallery. This was caused by what might be called the concussion wave from the cannon; there was no flame in this dust cloud. Then immediately there was an air inrush, then an outrush with little dust, then another inrush, then an outrush with flames, which appeared first at the top of the mouth of the tube. The final movement was an air inrush. The second air inrush was very strong, accompanied by a loud sucking or whistling noise as the air rushed into the tube.

"As regards the observations made on that occasion, they are quite in conformity with what I have frequently observed during similar experiments both in the 3-ft. 3-in. and the 7-ft. 6-in. galleries. For such experiments, *the galleries are closed at one end and open at the other*, and ignition is effected by the firing of a cannon placed 50 ft. from the closed end, pointing toward the open end. The alternate inrush of air and outburst of smoke and dust before the flame reaches the open end are most noticeable when slowly moving inflammations are obtained, such as one gets by using a mixture of 60 per cent. coal and 40 per cent. incombustible dust. I have counted as many as seven outbursts before the appearance of flame at the open end when using such a mixture strewn throughout the 7-ft. 6-in. gallery (800 ft. long).

"The first air movement is the concussion wave from the cannon (which travels with the speed of sound in air at the temperature of the gallery). There is then a pause of maybe a second or two before a rushing noise is heard, and flame can be seen (through small holes in the side of the gallery) traveling with alternate spurts and halts along the gallery. When the flame reaches within 150 or 200 ft. of the open end of the gallery these 'spurts' and 'halts' are manifested by corresponding outbursts of smoke and inrushes of air at the open end. There is an interval sometimes of several seconds between successive spurts of the flame. At length, with one last spurt, the flame issues into the open air, there then follows a rapid inrush of air, which is sufficiently powerful to draw shingle and stones from 20 or 30 ft. in front of the gallery into the gallery.

"The reason for these phenomena is, I think, clear. As I explained to Mr. Dean, the cooling of the products of combustion behind the flame creates a partial vacuum—you must remember that the rear of the gallery is closed; *no such phenomena occur when the gallery is so arranged that air can enter freely behind the flame.*"

AN INTERESTED READER.

Philadelphia, Penn.

Letter No. 12—In the issue of COAL AGE, Oct. 17, p. 623, a certain "Mining Engineer" criticizes the previous article of Samuel Dean, COAL AGE, Aug. 22, p. 294, describing the Eskmeals experiment, which was made by special request and by the courtesy of Doctor Wheeler, at that time in charge of the Experimental Station. Mr. Dean had asked that the experiment be made to prove or disprove the Verner theory of the "counter-current" as assisting the propagation of a coal-dust explosion.

While the criticisms, for the most part, condemn without disproving the statements of Mr. Dean, there are some points worthy of reply. Under the heading "Proving the Inrush Theory," it is stated that Mr. Dean's argument "does not appear at all convincing," because the pressure curve given by Mr. Dean "is meaningless, as it does not show the atmospheric line and give the relative pressures and time intervals, ... starting from the instant when the shot was fired." Objection is also taken to the failure to "separate the effects of the igniting shot and of the explosion proper."

I would ask, What would have been gained had Mr. Dean given this additional information and showed the "atmospheric line" on his diagram and also the "time intervals," starting from the firing of the shot. Would this information have made any clearer the unquestionable fact shown by the experiment that there were *two* inrushes of air before the flame appeared at the mouth of the gallery, and demonstrated the fact shown by the

diagram that *the second inrush of air was much greater than the first.* These were the facts Mr. Dean desired to prove or disprove.

I would ask, again, What would be gained by a more marked "separation" of the effects of the igniting shot and the subsequent dust explosion. These differ only in magnitude, the inrush of air in each case being proportional to the energies of the explosions of the *shot* and of the *dust,* respectively. This difference was clearly shown in the Eskmeals experiment. The first inrush of air was small in comparison with the second inrush due to the explosion of the dust.

In speaking of the wave set up by "any violent vibration," it would seem that the writer held the opinion that the first two inrushes of air, at Eskmeals, were caused, or could have been caused, by the vibratory effect of the *shot.* He gives the following illustration:

> One may, with a paddle, give a violent impulse to water in one end of a water trough, and there will be a return wave of almost the same size, followed by waves to and fro, until friction on the sides has absorbed the energy originally imparted.

This illustration, showing as it does a steadily diminishing vibratory effect, fails to support the contention that the vibration shown by Mr. Dean's diagram resulted from the *shot,* as there was not only an *increasing pressure,* but the second inrush of air into the mine instead of being less was *much greater than the first.*

While the statement that "the use of springs to suspend and hold the board in the middle does not commend itself as being good for scientific observation" may be true, this device furnished the desired visible proof of the *inrush of air* that formed the counter-current. Mr. Dean obtained, besides this *visible* evidence, *audible* proof of the same, as the noise of the air rushing into the gallery was plainly heard by the observers stationed 100 ft. away from the opening.

In this connection, I recall the remarkable experiences of Mr. McAllister, described in COAL AGE, Vol. 2, p. 881, which incidentally furnishes excellent proof of the inrush of the air into a mine, following an explosion. Referring to an explosion that occurred in a newly opened shaft mine, Mr. McAllister states that many of the workmen had left their coats hanging on the shaft timbers, and these were first drawn into the shaft (apparently by the first inrush of air preceding the general explosion of the mine) and almost instantly blown back and left hanging in the sheaves, while timbers and rock were thrown at least 300 ft. into the air by the final blast.

It would appear that to question, as "Mining Engineer" does, the statements of men who have survived an explosion and reported that they had felt the force of an inrush of air while the explosion was still in progress, would seem to serve no good purpose. Such evidence is rarely available and to say of these men that their state of "mental agitation" would render their assertions somewhat doubtful, appears as an attempt to detract from the value of actual evidence bearing on this question.

While admitting that an inrush of air following an explosion is possible, objection is made to this inrush taking place "along the bottom, in the face of an advancing explosion of coal dust," claiming that it is "completely in violation of the fundamental laws of physics." I would ask, What laws of physics are violated? Just here, it might be well to investigate what are the laws governing the compression of one gaseous body at a low temperature, by another gaseous body at a high temperature, under such conditions as exist in the mine. Until this has been made clear, the charge of "violation of the fundamental laws of physics" cannot be sustained.

In concluding his article, "Mining Engineer" asks:

> If, for the moment, we assume there is a "counter-current," where does it lead us? What does it mean? Does it bring us any nearer to the prevention of explosions? It has been hinted that it suggested the cutting off of the supply of air in the mine, and this method has been practiced by shutting down the fan at shotfiring time in some Western states, including Mr. Verner's state, Iowa, and notably in Kansas and Oklahoma, which states are reported to have more explosions from shotfiring than occur in any two other coal-mining states in the country of many times their output. One mine is said to have had three in a single year, and another operation two in one month.
>
> Is that what the theory leads to? If it does not, it should be made clear that it only deals with the internal mechanism of an explosion, is of theoretical interest only, and has no relation to the prevention of such unfortunate occurrences as otherwise the general mining public, which has neither the time nor the means of studying the matter, is liable to be seriously misled.

This is certainly a remarkable statement, coming from a mining engineer, as it indicates a doubt in his mind as to the practical bearing or influence of such an inrush of air to develop a destructive explosion, from an otherwise local occurrence. If there is the danger that the acceptance of the theory of a counter-current, in connection with dust explosions, would lead to mischievous conclusions and practices, it is the more necessary to *disprove* the theory by a thorough investigation of the facts claimed, which has been my desire.

I have faith to believe, however, that eventually the theory of the counter-current will win out and be shown to have a practical value, in respect to the *prevention* of explosions. The theory makes possible the rational explanation of the process by which the explosive combustion of dust is effected in mine workings, and explains, in a most reasonable manner, the propagation of such an explosion throughout the mine.

The study of this theory, in my opinion, will lead to the best means of preventing such explosions. *It may even be hoped that such a study will reveal the manner in which the counter-current itself may be used to arrest the progress of a dust explosion already under way, and thus furnish the desired solution of the dust-explosion problem.*

JOHN VERNER.

Chariton, Iowa.

Letter No. 13—In reading the article by "Mining Engineer," COAL AGE, Oct. 17, p. 623, relating to the Verner theory of the counter-current in respect to mine explosions of coal dust, it does not seem to me that the article, in its entirety, does justice to the theory.

The writer of the article, referring to the description of the Eskmeals explosion test given by Mr. Dean, COAL AGE, Aug. 22, p. 294, states that he does not find, either in that article or in the five reports issued by the British Commission "any avowed support of the theory." If I rightly understand Mr. Verner's view and claims, his proposition is primarily a theory formulated to explain *the cumulative action of a coal-dust explosion,* which, I am pleased to find, throws much light on the fact of such an explosion proving more intense and extensive than an explosion of firedamp in a mine.

It will be remembered by readers of COAL AGE that some time ago, in an excellent article entitled "The Air

Factor in Mine Explosions," Coal Age, Vol. 5, p. 604, Mr. Verner offered some practical suggestions, in regard to the experimental investigation of this theory by the Federal Bureau of Mines. As far as anyone knows, these suggestions were not accepted by the Bureau, nor has any investigation been conducted along the lines indicated in detail by Mr. Verner at that time.

However, in response to the request of Samuel Dean of Delagua, Colorado, who recently visited the Eskmeals Experimental Station, the British Station undertook a simple experiment to prove or disprove the existence of such a counter-current in a dust explosion, with a view to showing the alternate outrush and inrush of air into the experimental gallery following the explosion of the igniting shot, and the later general explosive combustion of the coal dust thereby thrown into suspension in the air. While it is not claimed by anyone that this test was complete or conclusive, it was generally understood to point to the ultimate confirmation of the theory propounded by Mr. Verner.

In his article discussing the Verner theory, "Mining Engineer" regards the suggestion "that there is an inrush of air along the bottom, in the face of an advancing explosion of coal dust, . . . incomprehensible, as it seems to be completely in violation of the fundamental laws of physics." He continues, "How can there be coexistent, a great pressure of expanding gases and in the same area of combustion, a depression or void?"

One would infer from this statement that the writer makes two assumptions: 1. That the counter-current is a continuous progressive factor. 2. That the expanding force of the resulting explosive combustion of the dust is constantly and equally distributed over the entire area of opening through which the explosive wave advances. The fact is seemingly overlooked that the internal propelling force in any explosion decreases constantly as expansion takes place, while the opposing force of resistance due to the compression of the air and gases propelled through the airway increases. Now, if it can be proved that the propelling force is constant and equally distributed over the area, it must be admitted that the weaker resisting forces will be overcome and there can then be no counter-current; but, on the other hand, if one or both of the opposing forces are *not* thus equally distributed over the area, *it is possible for a weaker force to advance in opposition to the stronger expansive forces of the explosion, which fact forms the basis of the counter-current theory.*

In the diagram I submitted as a graphic illustration of the Verner theory, Coal Age, Vol. 5, p. 1059, I tried to show what "Mining Engineer" styles "the chief difficulty apparent in all of the discussions by Verner and Dean." This difficulty, he states, is that "they do not separate the effects of the igniting shot and of the explosion proper." I explained clearly, Vol. 5, p. 1059, that the effect of the exploding shot was to cause a momentary vacuous condition close to the face of the heading where the shot was fired, which was due to the air at this point being swept away by the explosive blast.

Referring to this claim, Messrs. Ashworth, Vol. 6, p. 398, McCune, p. 603, and "Mining Engineer," p. 624, refuse to accept as true the momentary existence of a vacuous condition surrounding the shot, at the face of the heading. Mr. Ashworth admits that a depression might exist "if such a shot were to be fired at a gate-end, on a longwall face." Mr. McCune, assuming that an explosion of powder or coal dust causes an equal pressure in every direction concludes "it is hard to understand" how I would explain the existence of a partial vacuum at the face of the coal surrounding the shot." In reply, allow me to say, it is well understood that if the initial point of the explosion is surrounded by an open space the explosive force will be projected radially in every direction from that initial point. This, however, is not the case in the blast projected from the mouth of a cannon or shot fired at the head of an entry; but the lines of force are projected into the entry, as I have shown in the diagram, except as these lines are deflected by the bounding walls of the heading.

In refuting the claim of a "partial vacuum" at the face of the heading where the shot is fired, "Mining Engineer" cites two instances, which he considers prove a vacuous condition impossible. The first is the Altofts experiment No. 116, in which the flame and gases passed back in the opposite direction to that in which the cannon was pointed "due to the pressure created by the shot in the explosion." The second reference is to an explosion test, made at the U. S. experimental mine, when the cannon was placed outside of a plank stopping in which a hole had been cut to admit the mouth of the cannon. This stopping was at the entrance and the cannon pointed into the mine. When the charge was fired no explosion occurred, but the stopping was blown outward by the force of the shot reacting against it. In my opinion, these instances each show the reactionary effect claimed in the theory of the counter-current. They do not disprove the momentary existence of a vacuous condition immediately surrounding and out of range of the projected blast.

I. C. Parfitt.

Jerome, Penn.

The Foreigner in Mining

Letter No. 8—I want to add a word by way of emphasizing some of the statements made in the many interesting letters that have discussed this important question. I was particularly interested in two of these letters; namely, Letter No. 3, written by Mr. Parfitt, Coal Age, Sept. 12, p. 440; and Letter No. 5, written by Mr. Dixon, Oct. 3, p. 561.

I could not help, like Mr. Dixon, contrasting the tone of Mr. Parfitt's letter with that of Letter No. 4, written by Mr. Hogarth, which appeared on the same page. As Mr. Hogarth states, the larger proportion of this foreign element "are illiterate and come from the lowest classes in their respective countries where they never had a chance." When they first reach this country it must be acknowledged they are very ignorant and, as a result, I am afraid they are often imposed upon and their personal liberties and rights taken from them.

However, it is my observation that these people learn very fast, and I want to say that we could not at the present time get along without them, as Mr. Dixon has already indicated. The man that labors under the belief that they are not progressive is much mistaken, as when given half a chance they invariably make good citizens.

I will admit that, before the different companies started to educate this class of mine workers and to better their living conditions, they did appear to make little improvement; but I will say, with Mr. Hogarth, they greatly

appreciate what is being done for them, as is shown by the way in which they adapt themselves to their changed conditions. This fact is very evident from the general appearance of their yards and houses, which are commonly neat and well kept.

A visit to any first-class mine today reveals the fact that its labor is very largely made up of the foreign element. This is true not only of the mining end, but many of the bosses belong to this class. In my tours of inspection, I have frequently asked mine foremen why they employed Slavs or other foreigners as drivers in the mine. The reply is invariably that "they haul more coal than the boys in this country." This is not to say that Americans *cannot* haul the same coal, but they *do* not.

The spirit of coöperation is often stronger among the foreign element than among the English-speaking miners. It is coming to be the custom now among the foreigners to ask their foremen for days off when they wish to be away. They did not use to do this, which fact also shows a decided improvement as a result of their education.

Another evidence of their advancement is the objection often heard made by them, in respect to occupying any kind of a house that it is proposed to rent them. As a rule, they desire a good house, and many of them will not consent to keep boarders. Where boarders are taken, the number accommodated is much less than formerly. It used to be that from 12 to 16 boarders were crowded into a small house of four or five rooms, but this is not common now. When asked by the superintendent to keep boarders, the reply has been made, "Why do you not keep them yourself; you have a large house." This spirit, Mr. Parfitt would style, "a dominant characteristic" and smart. I also term it "smart," but in a different sense, it being, in my opinion, the result of education.

With Mr. Dixon, I regard the foreigners as the best *machine-runners* and the best loaders, and believe that it is only a question of time when these same foreigners will fill many of the official positions in our mines. For this we can blame no one but ourselves; I want to say again that the time given to the training of these people is not lost, but well spent.

In closing I want to endorse what Mr. Dixon has said that "The foreigner coming to this country judges of its laws and customs by the treatment he receives." The attempts made during the past eight or ten years to educate and better the condition of the foreigner have resulted in making them better men and their children are often hard to distinguish from our own American boys and girls, not only in dress but in manners.

PENNSYLVANIA ENGINEER.

Uniontown, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

GEOMETRY

The principles of geometry form the basis of all measurements, whether of **length, surface,** or **volume.**

Elements—Four elements may be considered as determining **location, distance** and **superficial** or **solid** measurement; they are as follows:

1. A **point** is that which has position only, in space.
2. A **line** is that which has length only.
3. A **surface** is an element of two dimensions.
4. A **solid** is an element of three dimensions.

Postulates—A postulate is a proposition that is so evident that it is accepted as true and needing no proof; as for example,

1. If a **point** moves in space it generates a line. If the movement is in one direction only the line is a **straight line.** If the direction is constantly changing the line is a **curved line.** If the direction changes frequently, at intervals, the line is a **broken line.**

2. If a **line** moves in any direction except that of its length it generates a surface. If the movement is in one direction only a **plane surface** or a **plane** is generated. If the direction is constantly changing a **curved** or **warped surface** is generated.

3. If a **plane surface** of given dimensions moves in any direction except in its own plane it generates a **solid.**

Angles—Angles, in geometry, are classified as plane or solid.

A **plane angle** is formed when two straight lines, having different directions, meet at a common point. The two lines lie, therefore, in the same plane, which is the **plane of the angle.** The **angle** formed is the portion of the plane included between the two lines, or the difference in direction of the lines. The point at which the two lines meet or intersect is the **vertex** of the angle.

A **solid angle** is the space included between two or more intersecting planes. When two planes intersect in a common line, forming a "wedge," the space included between them is the **angle of the wedge.** Three intersecting planes always have one common point, which is the **vertex** of the solid angle bounded by these planes. When more than three planes intersect in a common point that point is the **vertex** of the solid angle thus formed.

Plane and solid angles may be **rectilineal** when bounded by straight lines or planes; **curvilinear** when bounded by curved lines or surfaces; and **mixed** when bounded by both of these.

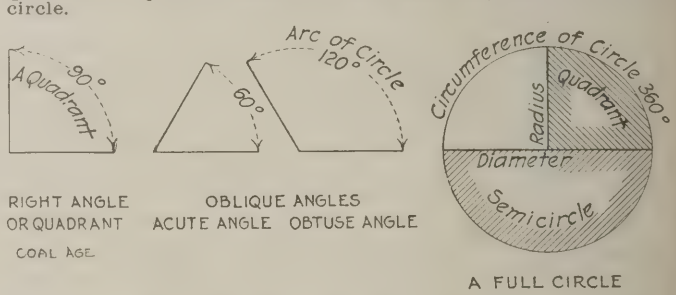
A **right angle** is one formed by the intersection of two straight lines that are perpendicular to each other. When the two intersecting lines are inclined to each other the angle formed is an **oblique angle.**

An **acute angle** is an oblique angle that is less than a right angle.

An **obtuse angle** is an oblique angle that is greater than a right angle.

The Coal Age Pocket Book

Measurement of Angles—Angles are measured by circular units called **degrees, minutes** and **seconds,** which will be better understood in the study of the circle. The accompanying figure shows the right angle, acute angle, obtuse angle and the circle. The circle is divided to show both the **quadrant** or quarter circle and the **semicircle,** which is a half-circle.



It is evident that there are four right angles or quadrants in a full circle; and since there are 360 deg. in the circumference of a circle, there are 360 ÷ 4 = 90 deg. in the arc of a quadrant; or a right angle is 90 deg.

An acute angle is therefore always less and an obtuse angle greater than 90 deg. An angle is thus measured by the **arc** that it subtends, and this arc is expressed in degrees, minutes and seconds.

In practical work it is often convenient to subtract the angle from 90 deg. or from 180 deg. and employ this difference instead of using the given angle. This gives rise to two terms; namely,

1. The **complement** of an angle is 90 deg. minus that angle. Thus, the complement of 60 deg. is 90 — 60 = 30 deg.; and 30 deg. and 60 deg. are therefore said to be "complementary" to each other.

2. The **supplement** of an angle is 180 deg. minus that angle. Thus, the supplement of 145 deg. is 180 — 145 = 35 deg.; and 35 deg. and 145 deg. are therefore "supplementary" angles, in relation to each other.

Geometrical Figures—The figures employed in plane geometry are represented as bounded by straight or curved lines. The bounding line or lines taken together are called the **perimeter** of the figure and the space inclosed is its **area.** The figures of plane geometry are of two general classes.

1. The figures bounded by straight lines are mostly named from the number of their sides. They are the **triangle, quadrilateral, pentagon, hexagon, octagon,** etc., having 3, 4, 5, 6 and 8 sides, respectively.

2. The common figures bounded by curved lines are the **circle** and **ellipse.**

Inquiries of General Interest

Dulong's Formula for Calculating Heat Value of Coal

Will you kindly give what is known as Dulong's coal formula and show its application and practical use for determining the heat value of different coals. Are the results obtained in the use of the formula reliable? And is it much used in practice?

INQUIRER.

Linton, Ind.

In reply to this question, an engineer of standing writes as follows:

"In actual practice, the Dulong formula seems to be almost relegated to the past. Personally, I have never had any use for it outside of college; probably because I have not made an ultimate analysis of coal since leaving college. As is well known, most tables giving the analyses of coals give, besides, their calorific values. For this reason, mining engineers seldom have need to calculate the heating value of a coal from its ultimate analysis, preferring to take the value as given in the table. The formula, however, is of interest for the purpose of checking the heat values given in a table; or for calculating this value, in case the analysis only is given.

What is commonly known as the Dulong formula is the following:

$$h = 146\,C + 620\left(H - \frac{O}{8}\right)$$

In this formula, h equals the heat value, in B.t.u. per pound of coal; C equals percentage of carbon; H, percentage of hydrogen; and O, the percentage of oxygen, as given by the ultimate analysis of the coal. In the formula these percentages are not expressed decimally. When great accuracy is required, it is common to add to the heat value obtained by this formula, 40 B.t.u., for each per cent. of sulphur in the coal, although this is not a part of the original Dulong formula. The results as thus calculated, in the accompanying table, include this addition for the sulphur.

As a matter of curiosity, and believing that it might interest some readers of COAL AGE to compare the heat values given in the table with the values calculated from Dulong's formula, I have selected from Bulletin No. 22, U. S. Bureau of Mines, five samples of coal obtained from mines at long distances apart, each having an approximate calorific value of 10,000 B.t.u. per lb., according to the tables. The samples selected come from Arkansas, Iowa, Kentucky, Missouri and Wyoming. In the table, both the proximate and the ultimate analyses of these coals are given.

It will be noticed that the several analyses show a considerable difference in the percentages of fixed carbon in the different coals, varying from a minimum of 33.76 per cent. to a maximum of 55.22 per cent. The percentages of ash in the different coals also vary considerably; from a minimum of 10.05 per cent. to a maximum of 24.81 per cent. These coals will not only vary in chemical composition, but their outward appearance will be generally quite dissimilar.

Comparing the values calculated by the use of the formula, with the experimental values determined by the Bureau of Mines, it is seen that the former agree fairly well with the latter, the calculated results being sometimes a little high and sometimes a little low as compared with the values determined by experiment.

TABLE SHOWING PROXIMATE AND ULTIMATE ANALYSES OF COALS AND THEIR EXPERIMENTAL AND CALCULATED HEAT VALUES

	Proximate Analysis					Ultimate Analysis					
	Moisture	Volatile	Fixed Carbon	Ash	Sulphur	Hydrogen	Carbon	Nitrogen	Oxygen	B.T.U.	Dulong's Formula
Arkansas....	5.26	14.71	55.22	24.81	1.00	3.91	59.87	1.23	9.18	10,451	10,502
Iowa.....	14.21	33.17	37.46	15.22	4.66	5.50	54.08	1.31	19.23	10,019	10,002
Kentucky....	8.04	32.63	49.28	10.05	2.97	5.33	65.41	1.33	14.91	10,233	11,818
Missouri....	11.50	33.63	38.01	16.86	5.16	5.12	54.79	0.96	17.11	10.179	10,054
Wyoming....	8.93	36.52	33.76	20.79	4.03	4.88	53.33	0.81	16.16	10,001	9,720

N. G. NEAR.

New York City.

Weight of Boiler

What is the weight of a boiler, 6 ft. in diameter, 16 ft. long, with sixty-six 4-in. flues? The steel is ¼ in. thick in the shell and ends and ⅛ in. in the flues.

X.

Peoria, Ill.

The circumference of the boiler shell is $3.1416 \times 6 = 18.85$ ft. Multiplying this circumference by the length of the boiler and the thickness of the shell expressed in feet, which is $^1/_{48}$ ft., the amount of steel in the shell is $18.85 \times 16 \times {}^1/_{48} = 6.28$ cu.ft.

The area of the two ends of the boilers is $2\ (0.7854 \times 6^2) = 56.55$ sq.ft. From this area must be subtracted the area cut out for the sixty-six 4-in. flues, in both ends of the boiler. This area is $2 \times 66 \times 0.7854\ (⅓)^2 = 11.52$ sq.ft. The net area of the two ends is, then, $56.55 - 11.52$ = say 45 sq.ft. Multiplying this by the thickness of the plate, $^1/_{48}$ ft., gives for the amount of steel in the two ends, $45 \times {}^1/_{48} = 0.93$ cu.ft.

The superficial surface of a 4-in. flue, 16 ft. long, is $3.1416 \times ⅓ \times 16 = 16.755$ sq.ft. The amount of steel in 66 of these flues, the metal being ⅛ in. or $^1/_{96}$ ft. in thickness, is $66 \times 16.755 \times {}^1/_{96} = 11.52$ cu.ft.

The total amount of steel in the shell, boiler ends and flues is, then, $6.28 + 0.93 + 11.52 = 18.73$ cu.ft. Then, taking the weight of wrought iron as 485 lb. per cu.ft., the total weight is $18.73 \times 485 \div 2000 = 4.54$ tons.

Examination Questions

Mine Examiners' Examination Held at Springfield, Ill., Oct. 12, 1914

(*Questions Answered by Request*)

Ques.—In longwall workings where there is firedamp, how would you arrange to ventilate the job; and what would you do with abandoned roadways?

Ans.—If the gas is given off in about the same quantity around the entire circle of longwall face, the air current should be split at or near the shaft bottom, into as many separate currents as is practicable; and each of these should be conducted directly to the face. At the face, each air split is again divided into two currents, one passing to the right and the other to the left along the face, till each meets a similar current returning from another section. These two return currents are then conducted through a roadway to the main-return air course.

Where this system is employed the entire longwall face should be divided into four or eight sections, according to the quantity of gas generated in the mine and the length of the face open. The main air current must be of sufficient volume to ventilate each section with a velocity sufficient to sweep away the gases that accumulate.

With *four* ventilating sections, there should be two main intake roads and two main return airways leading to and from the face, respectively. The intake air should be split at the head of the intake roadways and the four currents thus formed should unite and return by the two main return airways to the bottom of the upcast shaft, as just described.

When the face is divided into *eight* sections, there should be four main intake roads to conduct the air currents to the face where each current is divided, as before; and these, again uniting, should return by four separate airways to the bottom of the upcast shaft.

In longwall work, all abandoned roadways should be either filled solid with refuse or ventilated by a sufficient scale of air to keep them clear of gas.

Ques.—Describe the operation of clearing gas out of a working place, and state the precautions necessary to be taken while so doing.

Ans.—The exact method of proceeding can only be determined when the character of the working place is known or specified. However, where the quantity of gas is considerable, all workmen should be withdrawn from the return side before any attempt is made to dislodge the gas; and every approach to the return airways of that section should be safeguarded to prevent anyone from entering the return current unwarned. The work of removing the gas should be conducted from the intake end and the air conducted forward by a brattice, if necessary, to cause it to sweep away the gas that has accumulated. The brattice should be extended gradually as the work proceeds, ample time being allowed for the air to dilute and sweep away the gas. Only safety lamps should be used and these must be carefully watched and guarded from the effects of a possible fall of roof.

Ques.—In an airway passing 20,000 cu.ft. of air per min., the anemometer indicates a velocity of 500 ft. per min., what is the sectional area of the airway?

Ans.—Assuming that the anemometer records the average velocity of the air current, the sectional area of the airway is

$$a = \frac{q}{v} = \frac{20{,}000}{500} = 40 \text{ sq.ft.}$$

Ques.—(a) In a mine ventilated by several splits of air, how would you ascertain if any split was passing more than its share of the air? (b) If you found one split passing more than its share, how would you remedy the defect?

Ans.—(a) The quantity of air that will be required in each split will depend on the number of men employed and the conditions peculiar to that split. A split generating gas may require double the quantity of air in another split where no gas is generated, although the same number of men may be employed in each split. The size of the workings, condition of the stoppings, rise or dip of the roadways, etc., will also modify the quantity of air required. These conditions must determine the proper proportion of air for each split.

(b) Where more air is required in any one split than what is passing in the same, it will be necessary to regulate the air by building regulators in those splits taking more than their proper proportion. By thus obstructing the flow of air in those airways requiring a less quantity, the desired distribution of the air is obtained.

Ques.—With what object have safety lamps been provided with a bonnet or shield?

Ans.—The purpose of the *bonnet* on a safety lamp is to protect the gauze chimney from strong air currents and thus provide greater security in the upper portion of the lamp. A *shield* is often provided on a Davy lamp for the same purpose; namely, to protect the flame of the lamp from a strong air current or a sudden blast of air and prevent, if possible, the flame of the lamp being blown through the gauze.

Ques.—How would you find the area of a circular airway?

Ans.—Multiply the square of the diameter of the airway in feet, by 0.7854; the product obtained will be the sectional area of the airway, in square feet.

Ques.—A current of 3000 cu.ft. of air (and gas) is at the most explosive point; how much fresh air must be added to prevent a cap?

Ans.—Assuming that the given volume contains 9.46 per cent. of gas, the volume of gas in this current is $3000 \times 0.0946 = 283.8$ cu.ft. per min. Now, assuming that a gas cap cannot be detected ordinarily when the gas does not exceed 2 per cent., and taking this volume of gas, therefore, as 2 per cent. of the entire current after the addition of fresh air, the volume of the increased current will be $283.8 \div 0.02 = 14{,}190$ cu.ft. per min. The volume of air that must be added to produce this condition is then $14{,}190 - 3000 = 11{,}190$ cu.ft. per min.

Coal and Coke News

Harrisburg, Penn.

The free schools for miners are now open throughout the anthracite region, of Pennsylvania, and according to the State Department of Public Instruction the indications are that the enrollment, when compiled will show an increase over last year. More mine workers are taking advantage of the courses of instructions which won them nearly a score of mine foremen's certificates and almost a hundred assistant mine foremen's certificates from the state last year as well as many hundreds of promotions from the companies.

The full list of schools, which opened on dates ranging from the middle of October to the present includes those at Nanticoke, Glen Lyon, Wanamie, Alden, Mt. Carmel, West Coal, East Coal, Brady, Sagon, Kulpmont, Exchange, Shickshinny, Nesquehoning, Wiconisco, Lykens, Shamokin, Ellsworth, Centralia, Lost Creek, Mahoney City, Shenandoah, Minersville and Pottsville.

No action has been taken as yet as to repeating last years' appropriation of $140,000 for free vocational schools, part of which was devoted to the re-imbursing of two-thirds of the expenses of such of these schools as qualified for state aid, as the Legislature does not convene until January, but there have been no changes in the provisions of the act of May 1, 1913, under which the appropriation was made.

In the meanwhile the operators are guaranteeing the schools' expenses as heretofore, and helping them in many ways. The widespread interest among the mine workers in these ladders to promotion is evidenced also by the increase in the membership of the institutes new and old which are adjuncts of the schools.

PENNSYLVANIA

Anthracite

Lattimer—No coal was mined or prepared for market in the anthracite coalfield on Oct. 29, the 200,000 or more employees of the various collieries remaining idle to celebrate Mitchell Day. Only such mine employees as firemen, engineers, and pump runners remained on duty, the balance of the wage earners holding parades and mass meetings in commemoration of the victory won in 1900. The men throughout the Hazleton district did not parade but gathered at Lattimer, where they were addressed by local and visiting speakers.

Hazleton—It is said that the greatest tonnage ever produced by any individual hard-coal operator in the history of anthracite was that secured by the G. B. Markle Co., of Jeddo, for the fiscal year ending Oct. 31. Up to that date, this firm had sent somewhat over 1,500,000 tons of fuel to market.

Harrisburg—The Dauphin County Court recently granted a preliminary injunction restraining Chief of Mines, James E. Roderick and the miners' examining board in Schuylkill and Dauphin Counties from conducting examinations. This action was taken because a suit is pending to determine what constitutes practical experience as a miner.

Towanda — Development work on the property of the Loyalsock Coal Mining Co. which has been going on for about two years indicates that the firm will soon be producing coal in paying quantities. A drift has been driven into the mountain 225 ft., and the present working face shows a seam of coal 5 ft. 11 in. thick, free from slate and sulphur. A breaker has been erected equipped with modern machinery, which has a capacity of 400 tons per day.

Avoca—Three men were buried up to their shoulders in an avalanche of culm, large quantities of which were afire while the remainder was heated to burning point on Oct. 28, at the Old Forge Colliery of the Pennsylvania Coal Co. One of the men died and the other two are in a serious condition. They were engaged in removing a part of the bank so that the culm could be conveyed to a washery in a conveyor line. While they were shoveling a part of the bank which had not caught on fire they disturbed the entire side and the burning coal in tons came sliding upon them.

Bituminous

Connellsville—The Connellsville coke trade is still moving downward with no assurance that bottom is in sight. Shipments now aggregate about 214,000 tons weekly, and 2000 additional ovens were recently put out of blast by the furnace interests.

Chicora—The tipple and stables of the Morris Coal Co. near Claytonia were recently destroyed by fire. Quick work on the part of the employees saved the horses and mules from burning. The damage is estimated at $14,000 partially covered by insurance.

Heilwood—The following officials and employees of the Berwind-White Coal Co. have resigned: H. P. Doular, superintendent; Harry Kallaway, assistant superintendent; Drs. Henry and Gourley; mine foremen and assistants, Charles Gonoe, S. Fink, Fred Fenton, Thomas Hogarth and John Shay; master mechanic, William Davis; chief and assistant electricians, Jay Flemming and Ernest Pelkington; mining engineer, Archie Donaldson and others.

Monongahela—One man was burned to death and two others overcome by flames and afterdamp in the Pattison mine of the United Coal Co., opposite Clairton on the Monongahela River recently when they became hemmed in by a fire in the mine. The men from the United States Bureau of Mines Station at Pittsburgh were summoned but the miners were imprisoned for about six hours.

WEST VIRGINIA

Herberton—The Willis Branch Coal Co., recently organized by T. K. Laing, has taken over the coal holdings of the former Herberton Collieries Co., and is preparing to open new operations, abandoning those started by the old company. The vein which will be operated is the same as that being worked by the Long Branch Coal Co.

Charleston—That the State of West Virginia can annually furnish 100,000,000 tons of coal from the 1000 mines now in operation together with the output of about 100 more that are ready to begin work when there is a demand for the product is the opinion of Earle A. Henry, chief of the State Department of Mines. Mr. Henry further believes that the production of the state will be greatly increased within the next year, and is generally optimistic concerning the coal mining industry in spite of the general falling off of orders in all states during the past month or more.

Bluefield—Several thousand feet of moving picture film portraying the Pocahontas coalfield operations in their various and interesting forms, showing the various operations through which the coal passes from the working face of the mine to the railroad car and thence to the loading piers at Newport News, will be a part of the moving picture film of West Virginia to be projected in the state building during the Panama Pacific International Exposition. A large portion of this picture film has already been taken, while the balance will be made in the near future.

ALABAMA

Coleanor—In a local gas explosion of the Coleanor mine, Bibb County, between 6.30 and 7 o'clock, Oct. 31, three men lost their lives, and four more were injured. The explosion occurred just as the men had entered the mine, about 125 having gone in. The mine is operated by the Blocton-Cahaba Coal Co., and little damage was done.

KENTUCKY

Mater—The Elkhorn Coal Co. is increasing its output, as are also the other small operating companies in the eastern Kentucky field. At the same time, some of the mines of the Consolidation Coal Co. and The Elk Horn Fuel Co. in the Jenkins-McRoberts-Burdine-Fleming field have closed down. The coal business, however, holds up pretty well. European war conditions are given as the cause for the dullness.

Somerset—Coal men and property owners in this part of Kentucky are much interested in the reported consummation of a deal by which Eastern capitalists, not named, are said to have taken over 100,000 acres of coal land lying in Pulaski, Rockcastle and Laurel counties and to be preparing to open up an office in Mt. Vernon. This transaction would mean another railroad for Pulaski county and it is asserted that part of the development projects of the purchasers is a railroad which will tap their holdings. It is reported that the survey is to be made at once. Hundreds of acres in the counties named are rich in coal which cannot be reached until railroads are built.

Louisville—Preparations are being made for the annual meeting here on Dec. 4 and 5 of the Kentucky Mine Institute. Prof. Ivan P. Tashop, of the Kentucky State University and secretary of the institute, is at work on the program which has been announced in a tentative form. The institute will convene on Friday afternoon, hear the address of welcome and several technical papers. At night there will be a banquet. More papers will be presented on Saturday morning. That afternoon the Speed cement mills will be visited and at night a theater party is in order. All the sessions of the institute will be at the Seelbach Hotel. A large attendance is looked for.

OHIO

Bellaire — A deal was recently closed by the Lynskey, Lynskey & Lynskey Real Estate Agency, whereby the Mattuci Coal Co. became the owner of the mine and equipment belonging to James Weeks. This property consists of 17 acres of coal, a tipple, and other equipment. This mine is a strictly retail proposition, no coal being shipped at present.

Columbus—According to the officers of the Lorain Coal and Dock Co., of Columbus, the company is not yet ready to make a statement concerning the rumor that one of the mines in the Belmont County field will be dismantled and the equipment moved to the Hocking Valley.

The Supreme Court of the United States has set the time for hearing arguments on the case of the Rail & River Coal Co. against the Ohio Industrial Commission involving the constitutionality of the Ohio anti-screen law for Nov. 30. Assistant Attorney General Laylin recently filed a motion in the supreme court asking for a dismissal or advancement of the case on the docket. The court accordingly advanced it. At first Chief Justice White announced a dismissal but immediately withdrew the dismissal and set it for argument.

Coshocton—John A. McGiffen, a small operator near Coshocton, Ohio, recently advertised for miners preparatory to resuming operations and a large number applied for positions. The mines throughout the Coshocton district have been idle since Apr. 1. It is said a few more of the smaller mines will resume work but the larger operators have not yet signed up.

The recently enacted anti-screen law in Ohio is the basis for an injunction suit filed by Jones Eschliman against the J. H. Somers Coal Co., of Coshocton. Eschliman leased a tract of 200 acres of coal lands to the defendant company on a percentage basis, receiving 12 cents for each ton that went over a 1¼-in. screen. Since the new law was enacted a 2-in. screen has been installed and the owner asks for an injunction restraining the company from using the latter screen.

INDIANA

Sullivan—A suit is being tried here in which a township school board is suing the Vanadalia Coal Co. for $5000 damages for undermining the foundations of a school house. It is furthermore alleged that the coal company had not bought the mining rights under the land owned by the school board.

ILLINOIS

Hallidayboro — The Hallidayboro mine, which has been taken over by Connellsville, Penn., parties, is expected to be put in operation about the 15th of November. S. J. Harry, of Connellsville, will be general manager, and the mine superintendent will be E. M. Miller, recently with the Four States Coal Co. and the Jones interests in West Virginia.

Farmington—The Alden Coal Co. is planning to begin the use of coal mining machines in its new mine No. 8, in the near future. These machines have never been tried before in this immediate vicinity; but it is believed that even in the smaller vein existing here in comparison with the southern Illinois measures where the machines are extensively employed, a considerable saving can be made.

Chicago—David Rosenheim, a Chicago merchant, has joined with the Rev. Hiram Vrooman in bringing forward a plan of industrial coöperation. The intention is to conduct coöperative enterprises on several thousand acres of land already secured. This includes some coal mining property. The establishment of various industries, and possibly the building of a new city are contemplated.

OKLAHOMA

Muskogee—Six hundred miners of the Oklahoma Coal Co., at Henrietta, went on strike recently because the company refused to discharge a foreman whom the men had asked dismissed.

COLORADO

Denver—No date has yet been fixed for the withdrawal of Federal troops from the Colorado coal district, although it is rumored in some quarters that this withdrawal will take place on or about Nov. 15. It is authoritatively stated that although he has received many requests that the mines of Colorado be closed, the President has no present intention of closing the mines of the state.

TRADE CATALOGS

Atlas Engineering Co., Milwaukee, Wis. Catalog. Concrete Mixers. Illustrated, 30 pp., 7x10 in.

The Goodyear Tire & Rubber Co., Akron, Ohio, Balata Belting, 24 pages, 5x8 in., illustrated.

The Goodyear Tire & Rubber Co., Akron, Ohio, Better Steam Hose, 7 pages, 3½x6 in., illustrated.

The Goodyear Tire & Rubber Co., Akron, Ohio, Flat Conveyor Belts, 15 pages, 3½x6 in., illustrated.

Link-Belt Co., Chicago, Ill. Book No. 124. Steel Chains and Sprocket Wheels. Illustrated, 40 pp., 6x9 in.

The Goodyear Tire & Rubber Co., Akron, Ohio, Goodyear Mechanical Rubber Goods, 109 pages, 6x9 in., illustrated.

The Goodyear Tire & Rubber Co., Akron, Ohio, Goodyear Kantkink Flexible Metallic Hose, 11 pages, 4x8½ in., illustrated.

Johnson & Johnson, New Brunswick, N. J. Catalog No. 110. "First Aid" Cabinets for Mines, Shops, etc. Illustrated, 16 pp., 6x8½ in.

Lehigh Car, Wheel & Axle Works, Catasauqua, Penn. Catalog No. 50. "Fuller Quality" Face Hardened Sprocket and Traction Wheels, Chilled Charcoal Iron Castings. Illustrated. 62 pp., 6x9 in.

RECENT COAL AND COKE PATENTS

Grate. J. Reagan, Phila., Penn. 1,112,383. Sept. 29, 1914. Filed July 16, 1913. Serial No. 779,365.

Furnace. J. R. Fortune, Detroit, Mich. 1,113,113. Oct. 6, 1914. Filed Dec. 5, 1911. Serial No. 664,066.

Boiler. J. E. Angell, St. Louis, Mo. 1,114,093. Oct. 20, 1914. Filed Aug. 1, 1910. Serial No. 574,934.

Grate Bar. T. H. Sly, Dunmore, Penn., 1,114,195. Oct. 20, 1914. Filed Dec. 22, 1913. Serial No. 808,193.

Mining Machine. J. A. Brantley, Atkins, Ark. 1,114,439. Oct. 20, 1914. Mar. 15, 1913. Serial No. 754,442.

Boiler Furnace. L. S. Powell, Chicago, Ill. 1,113,482. Oct. 13, 1914. Filed Sept. 20, 1913. Serial No. 790,880.

Coking Process. L. L. Summers, Chicago, Ill. 1,114,065. Oct. 20, 1914. Filed May 13, 1913. Serial No. 767,357.

Water Tube Boiler. A. Ross, London, England. 1,114,650. Oct. 20, 1914. Filed Sept. 12, 1913. Serial No. 789,470.

Coal Grate Damper. J. E. Melton, Senatobia, Miss., 1,113,032. Oct. 6, 1914. Filed Jan. 8, 1914. Serial No. 811,071.

Automatic Stoker. C. D. Young, Pittsburgh, Penn., 1,113,398. Oct. 13, 1914. Filed May 17, 1911. Serial No. 627,830.

Gas Producer Apparatus. J. A. Herrick, Newark, N. J. 1,112,534. Oct. 6, 1914. Filed Dec. 30, 1912. Serial No. 739,290.

Miner's Acetylene Lamp. Y. Ohtsuka, Tokyo, Japan. 1,113,042. Oct. 6, 1914. Filed Feb. 4, 1914. Serial No. 816,640.

Smoke Consumer. W. S. Tucker, Myrtlewood, Ala. 1,113,070. Oct. 6, 1914. Filed Dec. 3, 1913. Serial No. 804,471.

Apparatus for Treating Coals. J. D. Scott, New York, N. Y. 1,115,453. Oct. 27, 1914. Filed Aug. 26, 1910. Serial No. 579,019.

Miner's Acetylene Lamp. J. A. Wester, West Frankfort, Ill. 1,114,208. Oct. 20, 1914. Filed Mar. 24, 1913. Serial No. 756,538.

Mine Car Dumping Apparatus. C. A. Griffith, Pruden, Tenn. 1,111,830. Sept. 29, 1914. Filed May 17, 1909. Serial No. 496,560.

Under-Water Ash Ejector. J. F. Metten, Phila., Penn., 1,112,151. Sept. 29, 1914. Filed Dec. 11, 1911. Serial No. 665,018.

Trip Mechanism for Pit Cars. H. Boltendahl, Uniontown, Penn. 1,115,382. Oct. 27, 1914. Filed Aug. 21, 1914. Serial No. 857,980.

Coal Washer and Ore Concentrator. A. C. Campbell, Asheville, N. C. 1,113,876. Oct. 13, 1914. Filed May 6, 1913. Serial No. 765,277.

Fuel Saver and Smoke Consumer. J. L. Webster, Ottawa, Canada. 1,112,170. Sept. 29, 1914. Filed May 8, 1914. Serial No. 837,211.

Protector for the Heads of Boiler Flues. J. E. Landon, Phila., Penn. 1,112,373. Sept. 29, 1914. Filed May 28, 1913. Serial No. 770,385.

Coal Washing Apparatus. E. G. Burks and N. Haynes, Birmingham, Ala. 1,112,976. Oct. 6, 1914. Filed Oct. 15, 1913. Serial No. 795,302.

Mining Machine. F. L. Sessions, assignor to Jeffrey Mfg. Co., Columbus, Ohio. 1,112,332. Sept. 29, 1914. Filed Mar. 23, 1910. Serial No. 551,068.

Gas Producer. J. H. Hirt, assignor to Allis-Chalmers Mfg. Co., Milwaukee, Wis. 1,114,355. Oct. 20, 1914. Filed Nov. 30, 1908. Serial No. 465,424.

Means for Crushing Coal and Similar Substances. R. W. Lyle, South River, N. J. 1,113,229. Oct. 13, 1914. Filed Dec. 27, 1911. Serial No. 668,051.

Stoker for Furnaces and Boilers of the Underfeed Type. J. McCullough, Glasgow, Scotland. 1,113,569. Oct. 13, 1914. Filed Oct. 12, 1912. Serial No. 725,510.

Locomotive Boiler Furnace. C. B. Moore, assignor to American Arch Co., New York, N. Y. 1,115,230. Oct. 27, 1914. Filed Dec. 18, 1911. Serial No. 666,338.

Gas Producer. E. W. Jeffries and G. H. Islen, assignors tc Morgan Construction Co., Worcester, Mass. 1,112,702. Oct. 6, 1914. Filed Aug. 23, 1909. Serial No. 514,146.

Mechanical Stoker. H. Iserman, assignor to Multiple Grate Bar Endless Chain Stoker Co., a corporation of New York. 1,114,142. Oct. 20, 1914. Filed Sept. 11, 1911. Serial No. 648,747.

PERSONALS

J. F. Callbreath, secretary of the American Mining Congress has gone to Battle Creek, Mich., where he is going to take a few days rest.

A. D. Macfarlane, chief engineer for the receiver of the LaFollette Coal, Iron & Ry. Co. at LaFollette, Tenn., has been made also assistant manager of operation.

J. J. Wolfarsparger until recently superintendent of the Moffat Coal Co. near Oak Creek, Colo., has been appointed superintendent of the Yampa Valley Coal Co., at Oak Creek.

Carl Scholz, of Chicago, president of the American Mining Congress, is arranging to get up a party to attend the Congress during the week of Dec. 7, going to Phœnix, Ariz., in a private car over the Rock Island Lines.

C. J. Norwood, dean of the College of Mines and Metallurgy of the Kentucky State University, has just returned to Lexington from conducting a mining institute at Stone, near the West Virginia line. This was part of the extension and educational work of the college.

C. H. Nesbitt, chief mine inspector of Alabama, is in receipt of a letter from the Society of the Mining Association of the Ruhr District, Germany, dated Oct. 3, which indicates that the mines are working full time in Germany, despite the war. The letter was writen from Essen, near the upper part of the German Rhine.

Fearing that the European war may create a shortage of Christmas toys, Mrs. E. B. Coxe, of Drifton, Penn., whose Christmas benefactions have made her beloved by youngsters for the last 35 years, has already started a census of the 3500 children on the Coxe coal lands in order that proper purchases of presents may be made for the coming Christmas.

Capt. R. S. Oakes, well known river man, who has been with the Monongahela River Consolidated Coal & Coke Co. since the organization of that firm, has severed his connections to accept a position with the West Virginia Pittsburgh Coal Co. The new position makes Capt. Oakes the master of transportation on the Ohio river for the above company. His work will be directed locally from the West Virginia Pittsburgh Coal Co.'s Mine No. 3, formerly known as the Gilchrist mine.

W. S. Thomas, general manager, of the Maderia Hill Coal Mining Co.; John Price, general superintendent, and William Rowland, inside superintendent, had a narrow escape from suffocation at Stanton Colliery, Oct. 30. A shot fired in an old working broke through a pillar. The officials believed that water was rushing through the opening, and went there to investigate. Instead of water the workings were fast filling with white damp, brought down by the fall of rock and coal, and the three men were overcome. They fell in the gangway and would have suffocated in a short time. Workmen attracted to the scene, found the victims and carried them out of the deadly fumes at the risk of their own lives. It took the first-aid corps and two physicians more than three hours to restore the three officials to consciousness.

OBITUARY

Hiram Cobb, chief engineer of the Southern Coal, Coke & Mining Co., and in chargé of its several mines, was killed on Oct. 28, while making an inspection of the Little Oak Mine, belonging to that company, near Belleville, Illinois.

Mr. Cobb was well known throughout southern Illinois as a leading mining engineer. He was 35 years old, and single, and was a resident of Voellinger Place, Belleville.

Alexander Y. Hanna, who was for many years interested in coal operation throughout Pennsylvania, having been connected with several mining companies, died recently in Philadelphia. Mr. Hanna was 51 years of age, being a native of the City of Philadelphia. While engaged actively as a coal operator, he lived in different towns throughout the state, but for the past ten years has made his nome in the city of his birth.

CONSTRUCTION NEWS

Bakerton, Penn.—The Sterling Coal Co. is installing a 10-ton locomotive at the No. 6 mine located at this place.

Rockwood, Penn.—The State Line Coal Co. of this place has recently completed the construction of a new plant at South Rockwood.

Woodward, Ala.—The creosoting plant of the Woodward Iron Co. now under construction, is making good progress and will soon be ready for operation.

Portsmouth, Ohio—Work on the bridge across the Ohio River at Sciotoville has been started. The work is under the direction of the Chesapeake and Ohio Northern R.R. Co. which will build a line connecting Columbus and Portsmouth.

Charleston, W. Va.—A contract has been let by the Big Bend Coal Co., for the construction of 2½ miles of railroad near Matewan in McDowell County. Ryan & Co., of Lexington, Ky., was awarded the railroad construction contract.

Winchester, Ky.—Officials of the Louisville & Nashville R.R. have announced that the Winchester-Irvine extension of the road will probably be in operation by Jan. 1. The bridge over Red River, the most difficult piece of work remaining, is practically completed, and rails are being laid over it. This will be a heavy coal carrying line.

Pittsburgh, Penn.—The Youghiogheny Coal Co. is taking estimates for remodeling its building at 1000 Second Ave. The specifications call for removing the roof, the front wall and the east end wall of the present blacksmith shop, the tearing down of the first 80 ft. of the frame stable, and the construction of a brick shop building complete.

Salt Lake City, Utah—One of the largest pieces of railroad construction work under way in Utah this year will be completed in a few days, and will be put into immediate operation. This road, the Utah Railroad, extends from Panther Junction, 1½ miles east of Castlegate, to Mohrland, Black Hawk and Hiawatha, and was built to serve the coal mines in that district. When completed, it will represent an expenditure of more than $3,000,000. The road will be operated by the Denver & Rio Grande Co. The length of this road in the mining district is about 21 miles, but owing to the roughness of the country unusual difficulties were encountered in the construction of the line, which accounts for the heavy cost per mile.

Williamson, W. Va.—E. L. Bailey, general manager of the Williamson Coal Co., and others expect to develop an extensive tract of valuable coal land located across the state border at Sharondale, in Pike County, Ky. A contract for the construction of a tipple and several houses has already been awarded, and work has begun. This operation will be located on the Pond Creek branch of the Norfolk & Western Ry., and will mine the Burnwell coal measure.

Two large coal operations are being developed on Blackberry Creek, the work on the tipple and houses having already been commenced, and it is expected that by the time the railroad contractors complete their work for the extension of the railway, coal will be available for market from these mines.

The Stone Mountain Coal Corporation of Matewan has made an expenditure of $20,000 on its mine with a view to increasing the output. It is also stated that the United States Coal & Oil Co. will enlarge its tonnage by opening up and developing new mines on Pond Creek.

NEW INCORPORATIONS

Henryetta, Okla.—The Fursman Coal Co. has been incorporated here by W. H. Fursman and others. The capital stock is $5000.

Huntington, Ark.—The Phœnix Mining Co. has been incorporated here, by L. E. Lake, E. G. Lake, A. W. Jasper and C. A. Beggs; capital, $10,000.

Albright, W. Va.—The Realty Coal Land Co. was recently organized with an authorized capital of $75,000. The incorporators are A. R. Malcom, James Grant, James A. Campbell, A. W. M. Cecil, and J. E. Swaim.

West Union, W. Va.—The Jackson Coal Co., owned and controlled by West Virginia men, which recently purchased an estate of 6000 acres of coal land in Illinois has increased its capitalization from $5000 to $750,000.

Rich Hill, Mo.—The Ideal Coal and Mining Co. has filed articles of incorporation, capitalized at $4000, and with the purpose of developing coal fields near Home. Stockholders are Rev. John A. Davis, Dr. A. L. Billings, B. F. Billings, Elmer Whited.

Mount Sterling, Ky.—The Rush Branch Cannel Coal Co. has been organized by Lewis Apperson, J. W. Clay, M. C. Clay, John A. Judy, and R. H. Wynn, of Mount Sterling, R. G. Judy and Frank Allen, of Bath County, and W. S. Taylor, of Winchester. This firm owns a large tract of coal land in Morgan County, and will develop mines on the same at once.

INDUSTRIAL NEWS

Petersburg, Ind.—J. Mackey, owner of the Hartwell mines at Petersburg, Ind., has sold the property to the Mackey Coal Co. for $75,000.

Washington, D. C.—The Supreme Court recently affirmed the decision of the Ohio Supreme Court holding the so-called mine run clause of the coal screen law to be constitutional.

Columbus, Ohio—The State Public Utilities Commission of Ohio has approved the application of the Hocking Valley Ry. Co. to issue $4,000,000 six per cent. one-year notes to be sold at 97¾.

Birmingham, Ala.—Members of the Chamber of Commerce of the United States were the guests of the City of Birmingham recently. The party reached Birmingham at 9 o'clock in the morning, where a special train was waiting which took them for a trip through the coal mining region of the district, as well as to the steel plants, furnaces, etc.

Portland, Ore.—The steam schooner "Rochelle" which was bringing a cargo of about 600 tons of coal from the Puget Sound country to this port last week drifted ashore because a light was out of commission at the entrance to the Columbia River and will be a total loss. This was the "Rochelle's" first voyage in the coal trade between Puget Sound and Portland.

Birmingham, Ala.—One of the most important conventions recently held in this country has just adjourned. The American Iron & Steel Institute, consisting of the foremost steel, iron and coal men in the country, has been in session in Birmingham throughout an entire week, more than 350 persons attending. They visited many of the largest mines in the district, and at one of them had an old time Southern barbecue.

Knoxville, Tenn.—The case of the Electric Corporation versus the LaFollete Coal, Iron & Ry. Co. was continued until the December term of the United States District Court, by Judge Sanford, in a preliminary hearing recently. A decree was, however, handed down ordering the preferred claims of three physicians against the defendant company and allowing the creditors until Dec. 1, in which to file claims not already filed.

Birmingham, Ala.—William A. Veditz, commercial attache of the United States at Paris, and Edwin Thompson, commercial attache of the United States at Berlin, conferred during the past week with the Birmingham Chamber of Commerce relative to exporting Alabama coal to Spain. Spain has been getting her fuel from Belgium, and must turn elsewhere, and it was for this purpose that the meeting was held. Nothing definite has yet been given out as to the results.

Columbus, Ohio—Because of complaints against the rules and regulations governing drilling for oil and gas on coal lands, the Ohio Industrial Commission has named a special committee to investigate and report changes. The special commission consists of D. A. Bartlett, Marietta; J. M. Gerard, Columbus; Lemuel G. Neeley, St. Marys; Harry E. Cameron, Cambridge; William Maloney, Bellaire; Prof. J. A. Bownocker, Ohio State University, and J. M. Roan, chief mine inspector.

Knoxville, Tenn.—Failure of the Tennessee Timber, Coal & Iron Co., of Harriman, Tenn., to meet a note for $40,000 has led to foreclosure proceedings in the Federal Court here. Judge Sanborn appointed Frank H. Enwright, of Harriman, trustee for the company, as receiver. The petition was filed for Allen Forbes, Ashton L. Carr and Charles F. Allen, of Boston, trustees under the mortgage. The property, which includes 18,000 acres of coal and timber land in Morgan County has been advertised for sale.

Philadelphia, Penn.—On Oct. 27, two mortgages aggregating nearly $11,000,000 were satisfied in the courts of Luzerne County, and occasioned some comment because of their size and age. They were both by the Lehigh Coal & Navigation Co., to the Fidelity Insurance, Trust and Safe Co. One was dated Apr. 1, 1864, and was for $5,786,182.92, the other was Nov. 27, 1867, and was for $5,000,000. Both were covered with war stamps of the Civil War period. The first carried $5000 worth of stamps and the other $1000 worth, the mortgages cover land in five counties.

Pittsburgh, Penn.—A strong rumor persists in Pittsburgh that J. V. Thompson, of Uniontown, has exchanged large tracts of his holdings in coal lands for Phipps property in Pittsburgh, the total value on both sides of the deal being said to amount to something like $15,000,00. The Phipps properties reported to have been traded are the Fulton Building, the Bessemer Building, the store building at Penn Ave. and Cecil Way, the Power Building on Duquesne Way, and the warehouses on Penn Ave. between Ninth St. and Garrison Alley. It is reported that the papers in this deal have already been signed.

Columbus, Ohio—F. C. Albrecht, the chief inspector of the Ohio Department of Weights and Measures has made the announcement that he will soon start a state-wide campaign to compel retail coal dealers to give full weights. The campaign will be carried on in a number of the cities of the state, the dates to be kept secret. It is planned to coöperate with the police departments in the various cities. At Springfield last week the police called at all of the retail yards and inspected weights with the result that six arrests were made from the 19 retail yards. It is said by the state sealer that many dealers are giving but 1750 lb. for a supposed ton, but this is generally denied.

St. Louis, Mo.—Application for an increase of 10c. per ton on coal shipments over the Santa Fé and all roads operating south of St. Louis to all points in Southwest territory was recently filed with the Interstate Commerce Commission. The application is one of many that will be filed by Western railroads on various commodities. It is understood this increase on coal is to become effective Dec. 1. The proposed increases of approximately 16 per cent. in rail and lake rates on knit goods from New York and other points and trunk line territory to Chicago, St. Louis and Minneapolis were recently granted by the Commission to the New York Central Lines, and a number of other railroads, together with some other important decisions concerning railroads lying immediately south of the Great Lakes.

Cincinnati, Ohio—The third foreclosure suit which has been filed against the Cincinnati, Hamilton & Dayton R.R. Co. within the past few months was brought in the United States district court here on, Oct. 28, by the Central Trust Co. of New York and Augustus L. Mason, as trustee, against the company named, with several others, and Judson Harmon and Rufus B. Smith, receivers of the railroad company. The bill alleges default in the payment of interest to the amount of $79,050, on bonds for $3,162,000 issued by the Indiana, Decatur & Western Ry., which was absorbed by the Cincinnati, Indianapolis & Western Ry. and that road in turn by the Cincinnati, Hamilton & Dayton. The court is asked to appoint receivers, but the present receivers will probably be retained, as a matter of course.

Coal Trade Reviews

General Review

Anthracite production heavy last month but market is still dragging. Spot demand for bituminous has entirely disappeared and heavy concessions are the rule. Lake trade still further curtailed but Middle Western situation improved.

As a result of the continued mild weather, anthracite consumers are becoming indifferent about accumulating further stocks, and the companies are pushing hard for business. The short cold snap of last week stimulated buying for the moment, but all sizes are now in free supply, and orders generally scarce. Evidence of the poor business in the Northwest is seen in the light Lake shipments, which are fully 25% behind last season. In spite of the slowing up toward the close of last month, the production was unexpectedly large but a continuance of the mild weather will undoubtedly result in a heavy decline in shipments, operation having been somewhat curtailed through the current week.

Circular prices on the Hampton Roads coals in the coastwise trade are purely nominal, all spot business being subject to such active competition that heavy concessions are now the rule. Some coal loaded on contract is being refused and is exceedingly difficult to move. The local spot demand has practically disappeared, and there is absolutely no life to the contract market. There has also been a gradual but well defined slowing up in the export business.

Further curtailment in the steel industry is noted in the Pittsburgh district, while some of the mines shipping the Lake markets are already beginning to close down and the end of the current month will see many of these idle. One compensating feature of the light Lake trade, however, is that the tonnage has been gradually tapering off for several months so that the trade will not be subjected to the customary shock of an abrupt cessation of shipments. The short cold snap of last week caused a run of domestic orders, but it was not of sufficient duration to affect the general situation, and had also been discounted to a certain extent. The general heaviness in all lines of industry, particularly iron and steel, together with the further restriction in the Lake trade, due to the congestion at the Upper Lake ports, are the predominating features in the current market. The real test of the trade will occur in about two weeks when the Lake shipping closes down entirely.

The Southern market has touched the lowest point for several years, both as regards prices and demand, but the operators have adopted rigid curtailment policies and have the situation well in hand. The Middle Western trade through October was a big disappointment, the tonnage showing a heavy decline particularly at some points such as Chicago, where it is estimated at 60% normal. However, close observers see indications of a change for the better in the very near future. Many furnaces have now started up for the winter's run and there have been some heavy orders for war supplies placed in the Middle West, which will stimulate manufacturing.

ATLANTIC SEABOARD

BOSTON

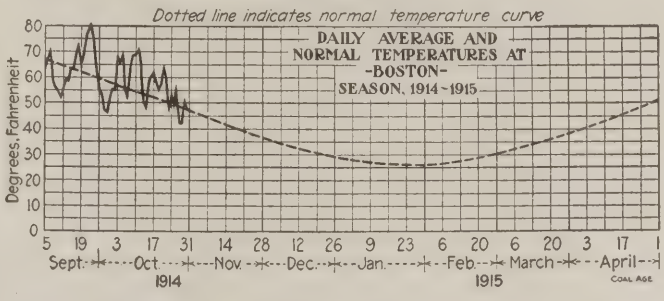
No longer any pretence of quoting $2.85 for Pocahontas and New River. No demand, spot or contract, and outlook decidedly poor. Large purchase of Dominion coal for the local market. Distress offerings of Pennsylvania steam grades. Water freights at low level and anthracite dull.

Bituminous—Apparently none of the Hampton Roads shippers is now adhering to the $2.85 f.o.b. price and if there were any spot market worth mentioning there would be a scramble to see who could sell at the lowest figure. As it is the low prices made lately have only shown that buyers are utterly unresponsive. The amount of spot business is practically nil and when coal now standing at the piers is absorbed it is probable, with so rigid a curtailment in force, that the volume at the Virginia ports will be the smallest at any time this year. There is no life to the demand for contract fuel either and it is generally felt that there will be no stir in the steam coal trade until settled cold weather.

Low quotations have been made generally, as low even as $2.50 f.o.b. Hampton Roads, in the effort to place distress coal. Some low delivered prices have also been named but so far the only apparent result has been to induce two or three corporations recently in the market, to postpone purchases.

Prices at Providence and Boston for delivery to interior points are merely nominal at the season figures; there is no inquiry and shippers with unsold cargoes on their hands have a hard row to hoe.

The steam varieties from the Pennsylvania districts are developing weak spots here and there. Consignees disappointed in the failure of contractors to accept coal put on the rails for them, find it extremely hard to dispose of accumulations. There have been several such instances the past week and cuts of 15@25c. have not been sufficient to induce buying. The last shipments are being put under way now for points up the Maine rivers and soon there will not be even that small demand to help out the market. All-rail the situation is about as stagnant as at tidewater.



Water Freights are the lowest in several months. Charters on fair sized vessels can be closed easily at 60@65c., and one or two have been made at 55c., Hampton Roads to Boston. Two more steam colliers have been tied up pending improved conditions.

Georges Creek at Baltimore and Philadelphia is also in too plentiful supply but the shippers apparently realize nothing can be gained by forcing and no concessions are heard.

Anthracite—Light business continues and room for new stocks is being made only very slowly. All the companies are now in position to make prompt deliveries and from one or two sources there is complaint over the dearth of orders. Shipments to Maine ports are well in advance of the average and there are only scattering cargoes to go forward in November.

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.85@1.45	$1.20@1.55	$1.67@1.77	
Philadelphia*.....	2.10@2.70	2.40@2.75	2.92@3.02	
New York*.....	2.40@3.10	2.75@3.10	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.50@2 75
Boston†.....	.....	.....	.....	3.50@3 78
Providence†.....	.....	.....	.....	3.35@3 73

* F.o.b. †On cars.

NEW YORK

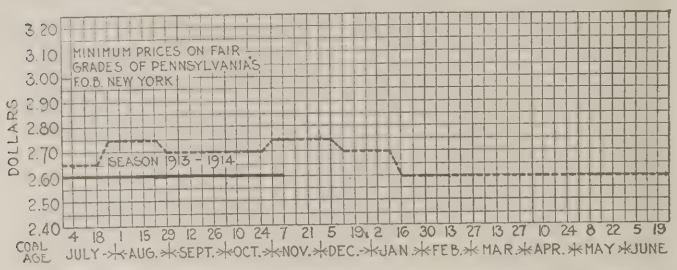
Pennsylvania R.R. declares an embargo against South Amboy. Some low prices noted on bituminous. Anthracite trade generally soft, but irregular, and with an excellent undertone.

Bituminous—The Pennsylvania R.R. last week placed an embargo on all shipments to South Amboy. It was reported that there were somewhat over 5000 loaded cars en route from the mines to this port. This reflects the present condition of the bituminous market in New York.

The call for bunker coal has not been so heavy during the past week, and the demand from industrial consumers has showed a tendency to decrease. It would seem, however, in spite of the apparent surplus running to this market, that the majority of the coal has a destination, as there is not much tendency toward moving the tonnage at really low prices. There have been one or two lots offered at South Amboy during the past week at low figures, one quotation being down to $2 on board.

This embargo by the Pennsylvania R.R. is the first for some time, which indicates reluctance on the part of the

operator to consign coal to this market when not sold, and shows that there is a more conservative trend; costly experience has proved the futility of attempting to push tonnage on a market that will not absorb it. While there is no basis on which to warrant expectations of greatly improved conditions, the movement of an accumulation at Tidewater is usually followed by a temporary reaction, which should have a good influence. The winter season also invariably calls for increased consumption, so that it is reasonable to hope for somewhat improved conditions in the bituminous trade during the next month. The market is now quotable as follows: West Virginia steam, $2.50@2.60; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.



Anthracite—The past week finds a rather peculiar condition in the anthracite trade. One of the large companies has been forced to suspend operations for a week on account of the overstocked conditions, while another of the other representative companies worked continuously, even operating on election day.

There is no doubt that the more seasonable weather has in many respects stimulated the trade and prevented a more or less serious condition. The orders in hand up to this time have not been in great volume, but the appearance of cold weather, with the reports of snow and winter conditions in more northern territories, has increased the demand perceptibly.

The situation on stove sizes has become considerably easier, although it is still in the heaviest demand. Egg has improved considerably and chestnut is moving in good shape. Conditions in the steam sizes have improved a trifle in the past week, but they are still long. Stocks with the producing companies are quite heavy generally, but with anything like reasonable weather conditions, these should be reduced and the current workings of all the collieries taken care of.

The New York hard-coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.65@5.10	$5.05	$4.60@5.05
Egg	5.35	5.10@5.35	5.30	4.90@5.30
Stove	5.35	5.35	5 30	5.30
Chestnut	5.60	5.50@5.60	5.55	5.30@5.55
Pea	3.55	3 45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.25@2.75
Rice	2.30	2.10@2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.70@1.80	1.75	1.40@1.75

BALTIMORE

Anthracite the strongest feature of a listless market. Soft coals fail to improve. Export tonnage has gradually dropped off.

Frost, ice and general wintry weather proved a boon to the hard-coal trade last week and considerable orders were reported. Many of these are from customers who are usually stocked at this time, and the promise for a fairly early fall business seems excellent. Collections are said to be easier.

Not much is to be said in favor of the soft-coal trade. Prices continue poor and demand has almost disappeared. Small orders are developing here and there, but for the most part at unsatisfactory prices and there is not much in the trade for the operator. Pennsylvania coals sell variously at from 90c@$1 for less desirable grades, to $1.15@1.40 for best qualities. West Virginia three-quarter and steam coals, and western Maryland steam fuels are selling at from 80 to 90 cents.

Export tonnage is not so large as in September. There has been a gradual but certain lessening of the movement although there is still about 2500 to 3000 tons per day being shipped.

PHILADELPHIA

Unseasonable weather conditions still discourage anthracite trade. Consumers well stocked and improvement dependent on colder weather. Bituminous market continues to lag, with no pressure for supplies.

Anthracite—The past week has seen a retrograde movement as far as the anthracite trade is concerned. The more seasonable weather of the week previous, has been followed by almost summer temperatures, and as a result, the expected depletion of supplies did not materialize to the extent expected. Consumers seem loath to take on any additional stocks until conditions warrant it, and the dealers are playing close in the matter of buying and seem to be covered in all the sizes that are likely to be called for. Notwithstanding the depression, there is considerable coal moving. The companies are pushing hard for business, but apparently without much effect. Most of the mines were closed on Tuesday, Election Day, and some for additional periods, the average working time being four days weekly.

Prices are being fairly well maintained, except on chestnut and the small sizes. The former can be purchased at anywhere from 25 to 50c. off the present circular, and pea has moved back again, to the old basis of $2.25, or even less. Egg and stove seem to be moving off, at circular prices in most cases with none going into stock.

In the face of the exceedingly low prices prevailing for bituminous, there seems to be a disposition on the part of many of the industrial establishments to substitute this fuel, either wholly or in part, for the more expensive anthracite steam sizes. It is understood that many requisitions have been curtailed, and it is this condition which is undoubtedly causing the surplus of the small sizes in the market.

Prices at Tidewater rule about as follows:

	Circular	Individual
Broken	$4.75	$4.75
Egg	5.00	5.00
Stove	5.00	5.10
Chestnut	5.25	4.90 @ 5.10

Bituminous—No new conditions have been developed in the soft-coal trade during the past week. Adverse comments are the rule rather than the exception, and there does not seem to be any indication of improvement in the near future.

HAMPTON ROADS

Fair shipments both foreign and coastwise. No change in prices. Some little demand for high volatile.

Shipments from Tidewater during the week have been fair. Export cargoes have moved to Rio de Janeiro, Genoa and Para, with one large cargo for Manila. Coastwise shipments have been made to Boston, Providence, Portland, Everett, Bangor and one or two other New England ports. As information is no longer given out at the Custom House as to destination of foreign vessels it is almost an impossibility to obtain these data. It is understood that information as to clearances will be withheld for thirty days, which should give steamers ample time to reach their destination before the general public learns where they cleared for.

Coal remaining in the railroad yards is still above normal with a fair quantity moving to the Seaboard. A large fleet of vessels is expected during the first few days of November which should reduce the accumulation down to perhaps a little below the normal supply. Prices on all grades are unchanged although it is expected that the retail circular prices on domestic coals will be advanced shortly.

It is believed that the total dumpings for the month of October will be somewhat above those for the same period last year. It is already clear that the Chesapeake & Ohio will be considerably ahead of their last year's figures, although it is not believed their dumpings will be as heavy as they were for the month of September.

COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Edgar H. Vance		Philadelphia or Baltimore	San Francisco	1523	
Chas. H. Klinck	British	Philadelphia	Biddeford	444	$0.95
		Baltimore or Virginia	Philippine Islands	6500	7.50
Phineas W. Sprague		Newport News	Jucaro	709	
Frederic A. Duggan		Philadelphia	Cay Francis	981	
Blanche H. King		Philadelphia	Porto Rico	1021	
Emily I. White		Philadelphia	Saco	296	1.00
Edgar W. Murdock		Baltimore	Two ports Porto Rico	1215	
William Booth		Philadelphia	Calais	435	

Note—Steamers are indicated by **bold face** type, all others being schooners.

OCEAN FREIGHTS

A steamer was chartered last week to take about 6500 tons from Baltimore to the Philippine Islands, at $7.50 per ton; the last charter for similar business effected in June was at $3.41. Freight market conditions are practically the same as covered by our last report, with Trans-Atlantic freight rates advancing more rapidly than to other destinations.

We quote coal freights by steamer from New York as follows:

To	Rate	To	Rate	To	Rate
Havana	$1.60@1.75	Kingston	$2.00@2.25†	Tampico	$1.85@2.00
Cardenas or Sagua	2.15@2.25	Curacao	1.75@1.85	Rio	3.96@4.20
Cienfuegos	1.90@2.00	Santiago	2.20@2.35	Buenos Ayres**	3.84@3.96
Port of Spain, Trinidad	2.25*	Guantanamo	2.25@2.35	Valparaiso	4.32@4.80
St. Lucia	2.15@2.25	Demerara	3.60*	Mediterranean	4.32@4.80
St. Thomas	2.00*	Bermuda	2.25*		
Barbados	2.25*	Vera Cruz	1.80@2.00		

* About. † Small boats to Kingston $2.20@2.40. ** Or La Plata.
W. W. Battie & Co.'s Coal Trade Freight Report.

LAKE MARKETS

PITTSBURGH

Only about a fortnight of light shipments left to the Lake trade, but prices being already liquidated and no shock to the market is anticipated. Mining operation at about 50% of capacity, and prices irregular, $1.15 for mine-run being usually shaded.

Scarcely a fortnight of Lake shipments is now left the coal trade, and even the present movement is at a light rate. A few mines have already closed and by the end of the month there will probably be a large number idle. There is one favorable factor in the situation; Lake shipments have been tapering off for weeks and the market will not suffer the shock it usually experiences at the close of a good season, when the demand stops suddenly instead of gradually.

The market has been weak and irregular right along, prices being dictated not by demand, but by the cost of production, and no serious decline in prices, from the present low level, can be expected. Mining operations in the Pittsburgh district this week are at an average not much above 50% of capacity. Manufacturing demand has experienced some further decrease. The steel industry, for instance, is hardly operating at more than 40% of capacity, against about 45% a week ago and somewhat above 50% at the beginning of October. Retail demand on the other hand has increased moderately, with fairly cool weather.

Prices are very irregular, mine-run being sold more often at under $1.15 than at that figure, while slack has been firming up considerably, sales being made in the past week at 60c. or better. Nothing is heard yet as to new circular prices. Last season's prices were: Slack, 90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Mines working on minimum schedules but production is still excessive. No price improvement until coal on track is much reduced. Anthracite Lake shipments 25% behind last year's record.

Bituminous—It is generally reported that there is not quite as much bituminous on track as a week ago, but it is still above normal. There is too much being produced in spite of the continued complaint that the mines are running about as slow as they ever have done. There are also certain outside operators who are using this market as an overflow, offering their coal at what would be the cost of production to most mines. There is too much coal on track generally for prices to improve.

It is reported that slack is doing a little better as is to be expected at this time of the year. There is now very little slack made in connection with the Lake trade and there will soon be less. On the other hand there will soon be more of the sizes to sell and if the consumption does not improve, the surplus will be quite as large as ever. As a rule the increased consumption has been sufficient to take care of the entire late-fall surplus, but there is some doubt of this now.

Bituminous prices show no change. Quotations remain on the basis of $2.80 for best Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine run and $2.15 for slack. Allegheny Valley prices rule 25c. lower for sizes. There is an increased demand for smokeless for general city use, to help comply with smoke ordinances, but prices are about the same as for other bituminous grades.

Anthracite—The end of the month found local dealers rather slow in ordering supplies, but the touch of colder weather early in the week brought in more business than formerly. The weather has been much against the coal trade and the difficulty is not over yet. There is still a shortage of stove and chestnut and a surplus of egg, which much embarasses the shippers, who are often obliged to insist on a certain amount of egg with orders for other sizes. Independent anthracite is moving freely, most shippers finding that they can get supplies much more readily than formerly. It sells at circular prices yet, which is evidence that there is a good general supply.

Lake shipments of anthracite continue active, the amount for the week being 122,400 tons and for the month of October, 538,250 tons as against 564,160 tons for the same month last season, a falling off of less than 26,000 tons. The shipments for the season to November are 3,695,131 tons, against 4,495,096 tons to the same date last year. Some of the companies are preparing to continue on into November without much abatement.

COLUMBUS

Colder weather has stimulated the domestic trade but not sufficient to make much of an impression. Steam business still quiet and some dullness is reported in Lake trade.

The weather conditions in Ohio improved somewhat last week and there was a better run of domestic orders, but the lower temperatures were of short duration. However, a better tone was given to the market and more optimism is apparent in coal circles generally. Steam business is still dull and there is also a falling off in Lake tonnage.

Congestion on the docks of the Upper Lake ports has become more acute and this is affecting the Lake tonnage, especially at docks where the interior movement has not gained much headway. But it is expected that conditions will improve before the close of navigation and a larger Lake movement will take place.

Domestic trade, which was temporarily stimulated by the colder weather is again quiet. Prices are generally well maintained in retail lines as few of the dealers are inclined to make concessions. Dealers' stocks are still large and buying is on a small scale. Preference is still shown for the better grades such as West Virginia splints and Pocahontas.

Steam business is the dullest in months. Manufacturing is quiet because of the European war and there is little hope for immediate improvement. Contracts are being renewed at about the same figures which prevailed the previous season. Buying on the open market is one of the striking features of the steam trade.

Production continues sharply curtailed. In the Hocking Valley the output is estimated at about 60% of the average and Crooksville, Cambridge and Massillon the same. In Jackson less than 50% of the normal tonnage is produced. In the Pomeroy Bend field the output is estimated at 75% of usual.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Re-screened lump	$1.60	$1.70	...
Inch and a quarter	1.50	1.50	$1.40
Three-quarter inch	1.40	1.40	1.35
Nut	1.15	1.30	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.35	0.40	0.35
Coarse slack	0.25	0.30	0.25

TOLEDO

Domestic trade is slightly stiffer but steam coals are causing a great deal of anxiety. Lake movement sluggish.

Prices remain unchanged in Toledo but domestic business has picked up considerably since the cold weather began. Steam coal is causing the greatest worry as there is much difficulty in moving this grade and there is considerable on demurrage. Domestic coal is in much better shape, there being none on track in this vicinity. The Lake movement is rather sluggish but still keeping up.

No. 8 operators have practically decided that their mines will not be opened this fall even if the difficulties with the miners are adjusted, as there is no market for the coal. Local dealers generally are optimistic. Domestic is selling closer to the list and fine coal is showing some signs of increased strength.

CLEVELAND

Some new steam orders coming in and the trade is steady. Closing of Lake shipping will severely test the market.

Despite only moderately cool weather, the coal market has held all that it gained a week ago. Fine coal is selling at about the same figures that it did a week ago, but a noticeable improvement has taken place in contract business. A number of companies that have been out of the market for several weeks have placed orders for from two to five cars a day for delivery over this week. Some of these orders began to arrive the middle of last week, and it was feared that they would be only temporary, but they are proving more substantial and some other orders have been booked for delivery over the current month.

The demand is principally for nut and slack, with a few scattered orders for mine-run and the three-quarter sizes. The domestic market is somewhat firmer, the retail trade taking a little coal to replenish stocks drawn upon last week. One weak spot in the market is consignment coal of the larger sizes.

The real test of the market will come in about two weeks. The Lake shipments will then be over to all intents and the all-rail trade will have to support the business. Already the mines are reducing production, and in some instances are offering fine coal only so fast as orders are received for three-quarter. This is the case in the Goshen, Cambridge and Hocking fields. There are more properties working in Bergholz territory and Massillon. Pocahontas is stronger, but the improvement is purely in the firmness with which operators are holding to current quotations.

Anthracite is being received as fast as needed, and the demand is somewhat improved, as with other domestic coals.

Quotations for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.75	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.75	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1½ in.	.....	$2.40	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$1.95@2.00	$1.95@2.00
Mine run	2.75	2.25	1.95	1.85@1.90	1.90
Slack	2.40	1.65@1.70	1.65	1.65	1.65

CINCINNATI

Cold snap stimulates the domestic market, but the increase was not especially heavy. Continued weakness of the steam market hampers the trade considerably.

The first half of last week saw the coldest weather of the season, the temperature going below freezing several nights in succession. Domestic consumers, as expected, started a rush to the dealers for belated supplies, and this created a flurry which was reflected to some extent among the operators. However, this buying movement had been anticipated and already discounted to a certain extent so the effect at the mines was not such as to afford any considerable relief. The chief difficulty still lies in the extreme dullness of the steam market. Iron and steel and allied trades, continue very inactive and other industries also have little to do.

Operators are finding themselves shut off from deliveries on contract, and the spot demand being quite negligible, there is practically no place to put steam coal. The Lake demand, has practically ended, after a fairly good movement; this has made the situation worse both by diverting the coal which formerly moved in that trade, and by rendering the transportation facilities, which have been good all season, still better.

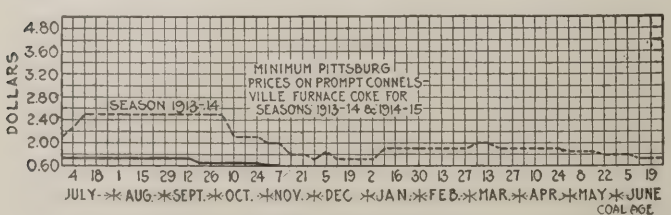
COKE

CONNELLSVILLE

Negotiations for early delivery dropped, but some inquiry appearing for next year. Prices steady. Shipments 60% of the best average rate of the year.

Negotiations that were on for November furnace coke in one or two instances have been suspended, it being found the coke will not be needed. Some inquiry has developed, however, for next year, one consumer inquiring as to a six-month contract and another as to a contract for the whole year. Except for odd lots of prompt coke sometimes sacrificed, the prompt furnace coke market is quite steady at a minimum of $1.60, but foundry coke shows somewhat more irregularity. On the whole, transactions are extremely light, but prices are relatively well maintained, and we quote: Prompt furnace, $1.60; contract furnace, $1.75; prompt foundry, $2.15@2.50; contract foundry, $2.35@2.50, for best grades, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 23 at 229,519 tons, a decrease of 8210 tons, and shipments at 214,132 tons, a decrease of 21,977 tons. The shipments were at about 60% of the best average rate reached this year, from the middle of February to the middle of April.



BUFFALO

No increase of activity and tonnage is very light.

The state of the coke trade is unchanged. The movement continues light and prices do not improve. There is some promise of more strength to the iron trade, but it will have to occur before coke will move normally. This territory has quite a good many idle furnaces, none of which promises to start up right away. Prices rule on the basis of $4.25 for best Connellsville foundry and $3.30 for stock coke.

CLEVELAND

The coke trade is very light and prices are still on the low plane they have been on for several weeks. Byproduct coke is being sold at $4.10, delivered here, although some are talking 5c. higher.

BIRMINGHAM

No business whatever is being done in furnace coke, and foundry coke is moving in small lots, with no indications of early improvement.

CHICAGO

Coke is quoted at: Byproduct, $4.75@4.95; Connellsville, $4.55@4.90; Wise County 72-hr. (select), $4.55; gas coke, $4.25; furnace coke, $4.50@4.65.

SOUTHERN

BIRMINGHAM

Both steam and lump coal quiet, though lump shows some slight improvement.

The poor demand for steam coal continues, but there is little excess on the market, due to the fact that the operators are mining only the tonnage for which they have orders. Lump coal shows some improvement on account of the recent cold weather, and shipments for last month will be slightly larger than for September.

The majority of the mines are running only three and four days a week, and the indications are that this will be the rule during November, for even should the cold weather create a demand for lump coal, the steam grades would be hard to dispose of under present conditions. Blacksmith coal is in a satisfactory condition.

LOUISVILLE

Market has touched the lowest point for several years. Cool weather creates some stir in domestic lines but does not relieve the pressure.

Steam coals are probably lower than ever before in this part of the country. The domestic coals are active and the retail trade is exceedingly brisk, due to the belated arrival of some cool weather. The retailers are contending with the usual rush brought on by the first cold snap.

Inquiries as to coal for export have developed little if anything as yet and there has been little change in industrial conditions. Most of the mines are working, but few of them are on full time. Here and there an effective selling organization is keeping certain mines normally busy for the season, but such mines are the exception. Prices are hardly quotable. Some of the eastern Kentucky coals are selling at from $1.40 to $1.60 for block coal, f.o.b. mines.

MIDDLE WESTERN

CHICAGO

Short cold snap increases demand for domestic coals. Not much improvement in the call for steam fuels. Anthracite trade quiet. Market for screenings slightly improved. October tonnage only about 60% normal.

The demand for domestic sizes from the Indiana and Illinois mines has been a little better as a result of colder weather in the early part of the week. The last few days, however, have again been warm and sunny.

Screenings are somewhat stronger owing to the curtailed production of lump coal but will no doubt again be weaker when the demand for lump increases.

There seems to be a slight improvement in the steam trade. Some close observers believe this is due to better running time on the part of manufacturers of clothing, leather, motor trucks, automobiles, and other commodities for which the European warring powers have placed heavy orders in this city.

The market is now a weather proposition pure and simple. The cold weather of few days ago stimulated the demand for all sizes. It is well established that dealers in the country have not stocked anything like the usual amount of coal. The

dealers in the Central West now show a disposition to confine sales to a cash basis and their customers will not buy under this condition until they are obliged to do so by the cold weather. Householders generally have not put in supplies.

West Virginia coals are listless, and splint, smithing and the gas fuels show no improvement. Kentucky grades are being offered freely at prices ranging from 25 to 35c. below usual market quotations with few sales.

A slight increase has been noticed in the demand for anthracite during the last three days, but the effects of the continued warm weather have not yet been overcome. Some dealers in Chicago, Indiana and Illinois have received more anthracite than in former years, in anticipation of being able to dispose of it at advantageous prices later. So far weather conditions have not afforded them much encouragement.

There is an abundance of splint coal on the docks which is awaiting cold weather for a sale.

There was a better tone in the market for Franklin County coals, due to the influence of the cold wave in the early part of the week, but the effect was mostly sentimental. Indiana operators are endeavoring to market their coals at home instead of shipping them to Chicago to be sacrificed at the prices prevailing here.

October shows a considerable falling off in the tonnage as compared with previous years, being considered only about 60% normal.

Prevailing prices are as follows:

	Franklin Co.	Springfield	Carterville	Sullivan	Clinton[1]
Lump	$1.75	$1.75	$1.75	.....	$1.75
4-in. lump	.....	.....	.....	$1.60@1.75	.....
Steam lump	.....	.....	.....	.....	1.20
2½-in. lump	.....	.....	.....	1.50	.....
1¼-in. lump	.....	.....	.....	1.35	.....
Mine-run	.....	.....	.....	.....	1.10
Egg	1.75	.....	.....	.....	.....
6x3-in. egg	.....	1.50	1.75	.....	.....
No. 1 washed egg	.....	.....	1.75		
No. 2 washed egg	.....	.....	1.75		
Nut	.....	1.40	.....	.....	.....
No. 1 nut	1.75	.....	.....	.....	.....
Screenings	0.50@0.75	0.50@0.75	.....	0.40@0.75	0.35@0.60

[1] These prices are for Nos. 3 and 5 coal; No. 4 coal averages 10c. higher.

Hocking Valley 1¼-in. lump, $1.40@1.50; mine-run, $1.25.

New River & Pocahontas lump and egg, $2.25; mine-run, $1.35.

Somerset Smokeless lump and egg, $2@2.25; mine-run, $1.25@1.40.

INDIANAPOLIS

Screenings have made a further improvement. October trade not up to average, but operators look forward to better results in November. Railroad buying slightly improved.

The feature in the Indiana coal industry is the betterment in the market for slack. For several weeks, this grade was selling largely at 30c. but it is now commanding 50c., with some companies getting 60c. Operators believe the advance must now continue until the price gets up to normal, around 80c. The change was mainly forced by the operators themselves; they reached a point where they had to either advance other grades or bring slack up to a fair value and they concentrated their efforts on the latter.

A few frosty nights have made themselves felt in the trade and there has been general lighting of furnaces for the winter run. The mines are making slightly better time. October was not up to its average and the trade is looking for the deficiency to be made up this month, which is one of the best of the year, as a rule. October was so unusually mild that householders could not be induced to stock heavily and a cold November will cause a rush at the yards.

The railroad purchases are a little better, as considerable grain has been moving. Retail prices are unchanged.

ST. LOUIS

October has been a big disappointment to the trade but there are now indications of a slight improvement.

October was such a disappointment that the trade now hardly expects to have any more good business this season. The market continued weakening throughout the month, though at the beginning there was a tendency to pick up some.

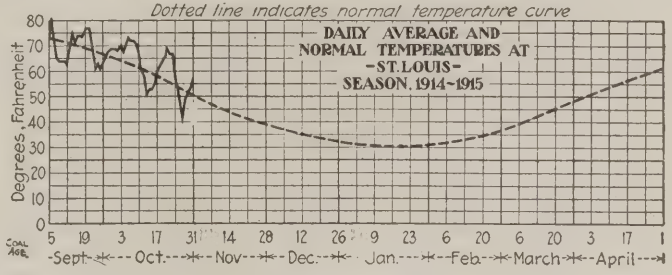
The demand is slightly better and the most noticeable thing is the fact that steam coals are in better call and the price is improving. This of course pertains only to the high grade field where conditions are somewhat peculiar.

The washed market is picking up some, and in a general way conditions have improved with the first few days in November. In the Standard district it is the same old story of selling coal for less than the cost of production. Little encouragement is held out for a betterment in the immediate future although the demand will continue to grow for domestic grades.

Anthracite is slowing up, and limited quantities of smokeless are on hand at East St. Louis under demurrage.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.30	$1.05@1.15	$1.15@1.20
3-in. lump	.....	....	1.40	.....	.....
6-in. lump	$1.40@1.60	....	1.50	1.30@1.40	1.30@1.35
Lump and egg	1.85@2.15	$2.25	.....	.....	1.35
No. 1 nut	1.30@1.45	....	.....	0.75@0.80	.....
Screenings	0.25@0.40	....	0.80@0.85	0.15@0.25	0.20
Mine-run	1.05@1.10	....	.....	0.75@0.80	.....
No. 1 washed nut	1.50@1.60	2.25	1.50	....	.....
No. 2 washed nut	1.30@1.40	....	1.35	....	.....
No. 3 washed nut	1.10@1.15	....	.....	....	.....
No. 4 washed nut	1.00@1.05	....	.....	....	.....
No. 5 washed nut	0.20@0.25	....	.....	....	.....



KANSAS CITY

An attempt to advance prices is expected early in November. Business has been slow.

The coal trade has been unusually quiet this fall. The first really cold weather occurred last week, and the dealers had a taste of actual business. Dealers generally say that an effort will be made to raise prices early in the month, but there are many who believe that quotations will not actually go up until cold weather sets in.

At present coal is reported a drug on the market; wholesalers have cars on demurrage, and all retailers are overstocked. Small-town dealers in Missouri and Kansas have heavy supplies. The market for slack is heavy, selling as low as $1.15 at the mines, and $1.85 wholesale at Kansas City. Illinois coal has gone all to pieces, selling through the West at $1.50 plus freight.

SAN FRANCISCO

Prices fair and the market is moderately active.

The local coal market is quite active, and dealers are taking on heavy stocks in anticipation of a good season. The summer was cool, resulting in a good trade and a maintenance of fair prices. Bituminous coals are selling to the dealers at from $7.50 to $8 per ton. Due to the opening of the Panama Canal, blacksmith and Pennsylvania coals coming into this market have shown a reduction of $3 per ton in price.

Coal Contracts Pending

Contract No. 2—Norfolk, Va.—The United States Government is in the market for 200 tons of bituminous coal for use in waterway improvement work. Bids opened Oct. 12 were as follows: Pocahontas Fuel Co. (14,850 B.t.u.), $2.63. Castner Curran & Bullitt (14,600 B.t.u.), loading at city pier: Lump, $3.545; mine-run, $2.545; for loading at Lamberts Point: Lump, $3.545; mine-run, $2.59. New River Coal Co. (14,800 B.t.u.), $2.55. Smokeless Fuel Co. (14,800 B.t.u.), $2.53. C. G. Blake Co. (14,850 B.t.u.), $2.55. Nottingham & Wrenn Co. (14,800 B.t.u.), $2.58. Chesapeake & Ohio Coal & Coke Co. (14,850 B.t.u.), $2.59 trimmed and $2.57 not trimmed. Johns Bros. (14,800 B.t.u.), $2.53. All communications should be addressed to E. Eveleth Winslow, Lieutenant Colonel of Engineers, U. S. Engineer Office, Norfolk, Virginia.

Contract No. 4—Boston, Mass.—Rhode Island Co. is in the market for 90,000 to 100,000 tons of Pocahontas, New River, Georges Creek, or Somerset run-of-mine. Shipments are to be made in about monthly proportions for a year, and the point of delivery is Providence, R. I. All communications should be addressed to E. H. Raquet, Engineer of Tests, South Station, Boston, Massachusetts.

Contract No. 6—New York—The Connecticut Co. is in the market for 22,000 tons of a good grade, low volatile, low ash, low sulphur bituminous coal for 10 months, Nov. 1, 1914 to Sept. 1, 1915. Shipments are to be as required f.o.b. boats, to be placed by the company at New York loading ports. Bids should be submitted to J. H. Sanford, Purchasing Agent, New Haven, Connecticut.

Contract No. 7—Zylonite, Mass.—The Berkshire Street Railway Co. is in the market for 21,000 tons of a good grade, low volatile, low ash, low sulphur bituminous coal for 10 months, Nov. 1, 1914 to Sept. 1, 1915. Shipments are to be as required and price to be made f.o.b. cars at mines for Tunnel Power plant at Zylonite, Mass., B. & A. R.R. Bids should be submitted to J. H. Sanford, Purchasing Agent, New Haven, Connecticut.

Contract No. 8—Portland, Ore.—Proposals for furnishing and delivering about 5000 tons of bituminous coal for use on the Dalles-Celilo Canal construction work will be received at the U. S. Engineers' Office, Portland, Ore., until 11 a.m., Nov. 27, and then publicly opened. All communications should be addressed to Major of Engineers, Jay J. Morrow, U. S. Engineers' Office, Portland, Oregon.

CONTRACTS LET

Contract No. 5—Boston, Mass.—The New York, New Haven & Hartford R.R. has closed a contract for about 350,000 tons. Half of the order was placed for Cape Breton Island coal and the remainder for West Virginia locomotive fuel.

FOREIGN

Guayaquil, Ecuador, South America—La Compania de Alumdrado (Lighting Company) is in the market for 3500 tons of gas coal. Prospective bidders should state the specific gravity, weight per cubic foot, and space occupied by one ton of gas coal. Give approximate analysis including moisture, fixed carbon, sulphur and ash, and a commercial analysis showing the gas per ton of coal, gas per cubic foot of coal, illuminating power of the gas in standard sperm candles, value of one cubic foot in grains of sperm, sperm value per ton of coal, coke per ton of coal (good quality), coke per cent. of coal, ash in coke, sulphur eliminated with the volatile products, sulphur in the coke, tar per ton of coal. Quotations should be c.i.f. Guayaquil. Address The Manager, Compania de Alumdrado, Guayaquil, Ecuador, South America.

South America—An American consular officer in that country has transmitted detailed information relative to tenders which will be received, until Nov. 1, for the supply of coal for government steamer service. American coal dealers who are interested should apply to the Bureau of Foreign and Domestic Commerce, mentioning item No. 14,016 for the reserved information.

South America—Supplementing a previous notice, the Bureau of Foreign and Domestic Commerce at Washington states that details regarding a certain inquiry from South America have been forwarded to the department, and that complete information, including blank forms on which to submit bids for supplying coal under the conditions specified can be had on application. All inquiries should mention item No. 14,048, and be addressed to the Bureau of Foreign and Domestic Commerce, at Washington, D. C.

Santiago, Chile, S. A.—Bids are wanted on 300,000 tons of coal a year during the next three years, according to press reports. The coal is to be used on the Chilean Railway. All communications should be addressed to the Department of Materials, Santiago, Chile, S. A.

Latin America—An American minister in Latin America has transmitted, by telegram, information relative to the coal market in his district. Full particulars may be had on application to the Bureau of Foreign and Domestic Commerce and its branch offices, referring to item No. 14,133.

COAL FREIGHT DECISIONS

Investigation and Suspension Docket No. 344—Coal rates from Oak Hills, Colo.

Proposed joint rates of the Denver & Salt Lake R.R. Co. and Chicago, Rock Island & Pacific Ry. Co., for the transportation of bituminous coal from Oak Hills, Colo., to destinations.

I. C. C. No. 6317—Pittsburgh & Southwestern Coal Co. vs. Wabash-Pittsburgh Terminal Ry. Co.

Combination carload rates on bituminous coal from points on the Wabash-Pittsburgh Terminal Ry. in Pennsylvania to destinations in other states on and reached via the Pittsburgh & Lake Erie R.R. and the Baltimore & Ohio R.R. found to be unreasonable and unduly prejudiced to complainants to the extent that they exceed by more than 10c. per ton joint carload rates on bituminous coal for hauls to same destinations from mines on the West Side Belt. Defendants required to establish joint rates from points on the Wabash-Pittsburgh Terminal Ry. which shall not exceed by more than 10c. per ton the rates to same destinations from points on the West Side Belt R.R.

I. C. C. No. 5604—Weatherford Chamber of Commerce vs. Missouri, Kansas & Texas Ry.

Existing carload rates of $2.50 per ton on lump coal and $1.70 per ton on slack coal from mines in Oklanoma and western Arkansas to Weatherford, Tex., held unjust and discriminatory, and rates not to exceed $2.25 per ton on lump and $1.65 on slack coal established.

FOREIGN MARKETS

GREAT BRITAIN

Market fairly active. Shortage of vessel tonnage causes heavy accumulation of export coal. War relief measures.

The London coal market is fairly brisk, especially for the better qualities of household fuel. The colder weather has stimulated the demand, but the enormous arrivals of Yorkshire and Lancashire coal (usually absorbed in the export trade) have kept prices low.

Scarcity of tonnage, due to the unwillingness of shipowners to risk their ships in the mined area of the North Sea, continues to act as a deterrent to trade, though, perhaps, to a lesser degree than last week. Financial difficulties are gradually being overcome, and war risk rates have eased slightly in consequence of increasing confidence in our overseas trade.

Coal exports have been prohibited by the Australian Commonwealth.

The Miners' Federation of Great Britain have postponed their annual conference owing to the war, but there is to be a conference to elect officials and discuss necessary details on Oct. 27 in London.

A circular has been issued by the Government Committee on the Prevention and Relief of Distress, drawing the attention of the local representative committees acting for the City of London and the Metropolitan area, to the offer made by Sir Arthur Markham and certain coal merchants to deliver coal to the needy at stipulated maximum prices.—"The Colliery Guardian."

GERMANY

Supplies less plentiful. Byproduct plants working full in order to provide benzol. Mines operating at a loss.

It is becoming more and more evident, with the approach of winter, that the German householder will have a hard time in securing his coal. The car shortage has improved until the transportation facilities have reached about 66% normal and the Syndicate deliveries are now 50% normal for coal and 25% for coke, but there are no indications that these figures will be bettered. All the lump and steam sizes are taken at once for the navy and the railways and the industries engaged in producing war materials.

Deliveries drag in gas-making coals, in spite of the pressing demand, as the pits cannot increase their production because of the shortage of miners. The operators are also forced to coke more coal than the demand justifies in order to furnish benzol, a byproduct of great military importance just now. At the request of the Coal Syndicate, the minister of commerce has issued a circular to all the chambers of commerce in the empire, strongly recommending the increased use of coke for domestic purposes, and the minister of railways has contracted for 100,000 tons of coke at a reduction of 85c. per ton. Although the coke prices have not been advanced, it is thought that they are still too high and that a material reduction should be made to ease the situation.

In spite of higher coal prices, the operators will be more than satisfied if they are able to meet the greatly increased expense account with nothing more serious than a loss of profits. Undoubtedly, many will have to work at a serious loss.—Translated from the "Frankfurter Zeitung."

GREECE

During the year 1912 there were imported into Greece 482,768 short tons of coal, of which Great Britain supplied 354,996 tons, Germany 115,035, the rest coming from Turkey, Belgium, and the Netherlands. The total imports for 1911 were 639,822 short tons. The estimated figures for 1913 show a rapid recovery from last year, the imports into the port of Piraeus for the 12 months being 665,000 tons, including steam and gas coal, patent fuel, etc. Of this amount Germany sent about 100,000 tons, the remainder coming from England. Of the above amount perhaps 450,000 tons were taken out of the country as bunker coal. Coaling stations in the Islands of Zea and Syra received 140,000 tons, most of which was later supplied to ships calling for coal. "Daily Consular and Trade Reports."

COAL AGE

Vol. 6 NEW YORK, NOVEMBER 14, 1914 No. 20

TO FORMULATE and transmit instructions is but 25 per cent. of the whole job. The big undertaking is to get things done according to schedule.

Every business carries a certain dead-load in the form of salaries paid men who do nothing more than follow up affairs to see that employees obey orders. The comptroller, auditor and treasurer must be alert to see that those who are intrusted with the company cash handle it safely. No set of rules can do this; only eternal vigilance counts. In the case of a coal mine, the operating head must make his workings safe and keep them so. This also requires ceaseless vigilance.

> What can I do to save some of the time and money I am spending in following up instructions to see that they are carried out and that the mine is run as I have directed?

The above thought is most persistent in the minds of coal mining executives.

If the letter files of thousands of coal-mine executives could be exhibited, they would be found full of excuses to the "big boss" for failure to carry out his instructions.

It's an old story to most mining men that a large percentage of accidents are preventable. It is equally true that much time is consumed in writing letters, making visits and following up things generally. This is the kind of executive work that hundreds and thousands of men, in all kinds of business, are doing every day. There is much of it that should be eliminated.

Most executives themselves are entirely responsible for the condition that requires an expenditure of 75 per cent. of their time in getting things done.

Do a little introspective work and be honest with yourself. Probably you will find you have never been willing to trust any man under you to do a job all by himself, but persisted in showing him every detail all the way through. You killed initiative, stifled enthusiasm and injured self-confidence on the part of your subordinate. He has learned to wait for you to come along before even starting a job, because he has been taught to feel he can't start the work in the right way.

Don't be an executive of this kind; give your men a chance. Restore their confidence, and they will do wonders for you. While they're accomplishing the work in hand, your time will be free to plan bigger and better things.

Mine officials reading this don't need to be told that it is difficult to acquire foremen and department heads who quickly and satisfactorily carry out instructions. The remedy is a simple one—get men who will. It won't be necessary to make more than one or two changes before the others wake up.

There are two things particularly that coal mine officials cannot afford to do:

1. Acquire knowledge of how to operate a plant successfully by experience alone. The tuition of experience is far too dear and the dividends are rarely paid out of earnings.

2. They cannot afford to keep on giving 75 per cent. of their time to an undertaking in order to get it done. This plan won't insure dividends of the right sort either.

A Modern Method of Mine Development

By Ernest L. Bailey*

SYNOPSIS—Description of a proved plan that may be modified to fit most any case of a panel system of mining. The principal object of the method outlined is the attainment of a maximum percentage recovery.

The question of prime importance to the intending coal-mine operator is "Will it pay?"

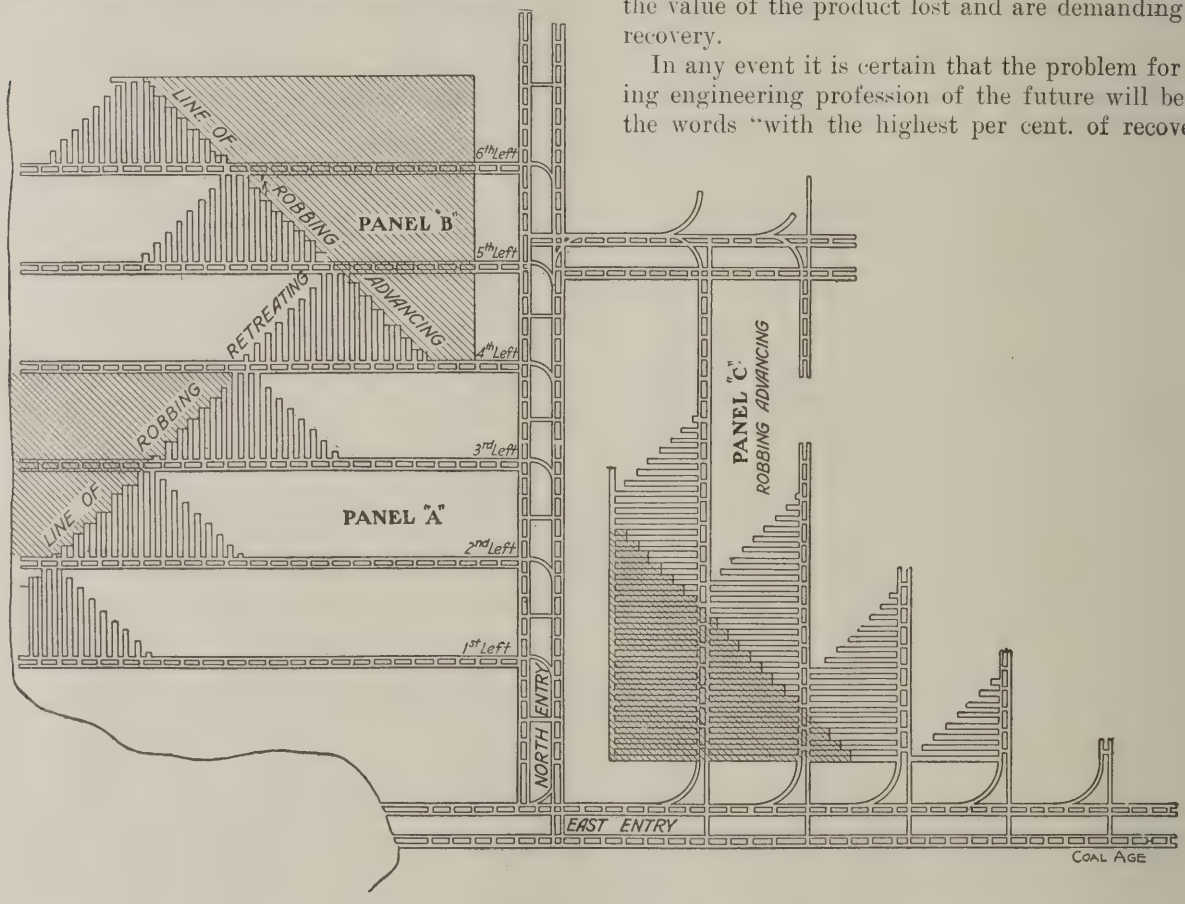
Of the many elements to be considered before a conclusion is reached the three most important are, quality of product, cost of extraction and ultimate recovery.

While the quality of product is largely dependent upon nature and the various processes of cleaning and preparation, the amount and quality of lump produced are, nevertheless, vitally affected by the plan of mining.

No mine should be opened without a carefully projected plan of development. Conditions may arise which will render it inexpedient to rigidly follow this plan, but if due care is exercised in obtaining the engineering data, and the proper knowledge and forethought are brought to play in the formulation of the plan, the general ideas, except in isolated cases, may be carried to completion.

It will hardly be questioned that in most of the coal fields of the United States, too little attention has been paid in the past to ultimate recovery, but with the aroused interest in conservation it seems not improbable that legislation looking to the adoption of a minimum allowable recovery will be enacted in the not far distant future. But should this not occur, the owners are awakening to the value of the product lost and are demanding a higher recovery.

In any event it is certain that the problem for the mining engineering profession of the future will be to write the words "with the highest per cent. of recovery" into the time-honored slogan of "maximum output at minimum cost."



Suggested Plan of Mine Development

Probably the most important factor entering into the cost of production and percentage of total recovery is the human factor. It is doubtful if in any other field of industry an investment will yield a profit or a loss more directly in proportion to the ability—or lack of ability—of the man in charge.

Method of Mining Affects Cost

Aside from the human factor the greatest influence on cost and recovery is exerted by the plan of mining.

It is in the hope of aiding to a solution of this problem or at least in stimulating an interest, that the model plan shown here is submitted.

This plan presupposes machine mining and electric haulage, also that entry work, where required, will be double shifted.

The Underground Layout

The rooms are 400 ft. long and are spaced at 50-ft. centers. They are driven 24 ft. wide leaving a 26-ft.

*Mining engineer, Crumpler, W. Va.

pillar. These rooms are designed for a single track and are limited to 24 ft. in width in the belief, based on personal observation, that this is the maximum width that affords economical shoveling.

Not more than three rooms on any one entry should be driven to completion in advance of the robbing and the line of the faces of the rooms should make an angle with the entry of approximately 40 degrees.

The width of rooms and of pillars is equalized with a 2-ft. margin in favor of the pillars to counterbalance their more rapid recovery. The pillars are mined by machines and drawn by the pocket and stump method. All cross-entries are driven 12 ft. wide on 36-ft. centers, leaving a 24-ft. chain pillar which allows crosscuts to be made without laying a special turnout in the track.

Main entries are driven in pairs on same centers as cross-entries with a 100-ft. chain pillar between each pair. The crosscuts in the main chain pillar are spaced at from 200 to 400 ft. at the discretion of the engineer. This method has the dual object of facilitating ventilation and reducing the cost of stoppings as the stoppings in the short cuts are of a temporary nature and may be of canvas or boards while only the main crosscuts require permanent stoppings.

The robbing of panel *A* is not to start until the robbing of panel *B* has been completed, and room development is to be retarded except an occasional two rooms on Third Left as is required for haulage purposes. The mine should be divided into sections of robbing which would limit the maximum break line to not more than 2000 ft. in length.

Careful Supervision Is Necessary

For the successful execution of this plan strict supervision and careful engineering are absolutely essential. The rooms, as well as entries, should be driven on sights set by the engineer and extended at intervals not exceeding 200 feet.

Each section of robbing and rooms should be placed in charge of a competent section foreman whose duty it is to see that the line of the room faces, as well as the breakline of the pillars, is kept at the desired angle with the entry. This is not difficult with machine mining as it is only necessary to see that each working place receives the same number of cuts. This plan as outlined has the disadvantage of a somewhat more expensive haulage than the ordinary panel method.

Advantages of the System

The advantages claimed for it are as follows: (1) Higher per cent. of recovery and better quality of product due to the fact that no portion of the developed work stands but a short time before pillars are drawn. Roof settlement to an effective extent does not occur on the pillars beyond the line of break, thus allowing a cleaner extraction and yielding a greater amount of lump; (2) reduced cost of production due to the high degree of concentration of the working places; (3) the largest output in the shortest time consistent with safety and mining economies.

The most distressing feature of a model plan is that it will rarely fit any particular instance. It is my opinion, however, that modifications of the above plan may be used in the development of any mine that permits of the panel system.

In the special case for which it was designed, the east entries dip about 1½ per cent. and will eventually have natural drainage.

It might not be amiss to state that experience has gradually forced me to believe that the general horror of dip workings—with an ultimate natural drainage—while probably justifiable enough in the days of the hand pump and water car, is something of a bogey in the days of the electric pump.

Mining Fatalities in West Virginia during September

The list of fatalities in the coal mines of West Virginia during the month of September has just been issued by Earl A. Henry, chief of the department of mines, and shows that thirty miners lost their lives in the state that month, a decrease of two from the records of the previous month.

The list also shows that falls of coal and slate were responsible for sixteen of the deaths, while nine were attributable to mine cars, three to motors, one to electrocution, and one to a railroad car at the tipple.

A British View of Our Export Trade

There can be no doubt that the temporary dislocation of our own foreign business as a result of the war appeared likely to offer our trans-Atlantic competitors opportunities, but they have so far not materialized. Some additional orders for markets in which, as a rule, British coal reigns supreme, have no doubt been taken. Substantial contracts have been booked for Italy, it is reported, and an attempt has been made to invade the Mediterranean generally, while renewed attention is also being bestowed upon South America.

American efforts to sell coal to Europe have never met with much success as yet owing to the heavy ocean freight rate, due partly to unalterable geographical reasons and partly to the difficulty of securing a return cargo. This latter difficulty has been overcome in some cases, but not with sufficient regularity to encourage a permanent trade of any great importance. It must be acknowledged that the export of coal from the United States to Europe rose from 255,000 tons in 1911 to 476,000 tons in 1913; but the strike here in 1912 probably had much to do with the increase, and now, of course, abnormal circumstances are again operating in favor of the Americans. It seems very doubtful whether much of this business will remain when normal conditions are restored, for the reasons to which we have referred already, and even if the total tonnage for 1913 were doubled this year, it would yet remain insignificant compared with our own Continental coal trade.

More success perhaps may attend American efforts to capture the South American markets. So far as the Pacific Coast is concerned, of course, the opening of the Panama Canal has put American exporters in a more advantageous position. It has also to be remembered that so far as Chile is concerned, the nitrate trade with Germany is at an end, and the consequent decrease in the available quantity of return cargo is likely to check our coal trade with the republic, which in 1913 amounted to nearly 600,000 tons.

The Canal, however, will afford the Americans no assistance in the Atlantic states, with which our largest trade is done. It was thought in the United States that our coal shipping trade would be so paralyzed by the war that we should have to virtually abandon the markets in question. Our American friends soon saw they had made a mistake; but it is probable that in view of the handicap imposed upon us by the war they may be able to do more business with the southern republics, and to retain some of it. D. A. Thomas is reported to have said before the war that he feared the United States more than Germany as a competitor of the United Kingdom in the foreign coal trade. Germany is out of the question during the war, while we are hampered to some extent, although not for long we hope, and no doubt the Americans will make the most of the opportunity.—"Iron and Coal Trades Review" (London, England).

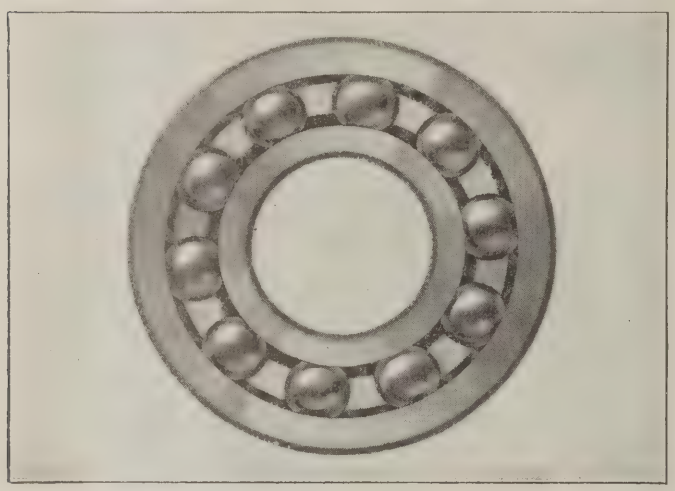
Ball Bearings on Mine Locomotives

By Frederic H. Poor*

SYNOPSIS—The chief reasons for the adoption of ball bearings, particularly on mine locomotives, are here set forth. Contrary to a more or less popular conception, ball bearings require lubrication.

At a time when many types of coal-mining equipment, particularly locomotives, are being fitted with ball bearings, it might be well to inquire exactly what are the causes for this departure from the well known and thoroughly tested type of bearing lined with babbitt or bronze.

At first sight it might appear strange that the subject of motor commutation should have any influence upon



A Heavy-Duty Bearing Used on Mine-Locomotive Motors

the type of bearing employed. Good commutation is, however, directly dependent upon the accuracy and fineness of setting of motor bearings, regardless of their type. To secure the best results motor armatures must revolve smoothly and concentrically with the pole faces. Furthermore, particularly in coal mining, the revolving parts must be kept free from oil which tends to accumulate dust, thus forming a carbonizing compound which endangers the commutation and is extremely liable to cause "flash overs."

In this respect, the compact bearing heads employed in ball-bearing units and the effectual sealing of the lubricant chambers have proved of inestimable value. Protected from the lubricant, the commutators retain their finish and the brushes are kept free from accumulations of a conducting dust or smut on the lead edges.

Another factor which strongly affects commutation is the maintenance of the air gap. Plain bearings are subjected to a continuous rubbing action which causes wear on the bearing surfaces, frequently allowing the shaft to settle out of the true center of the magnetic field, thus necessitating frequent gaging of the air gap and inspection and possible replacement or renewal of the bearing linings.

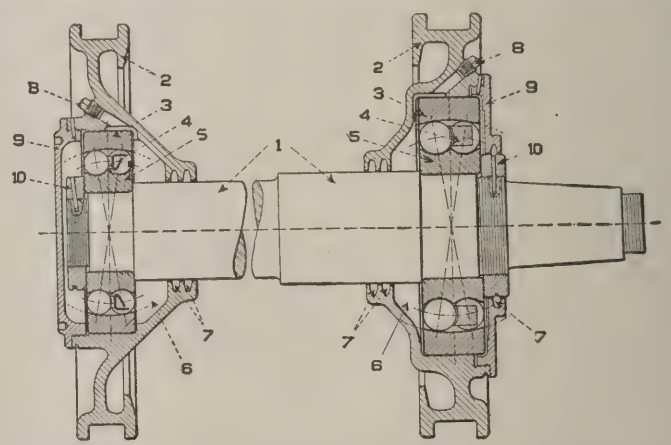
On ball-bearing machines this wear is practically eliminated. Hardened-steel balls roll on hardened races. Rolling is thus substituted for rubbing, and practically continuous accuracy secured. Self-alignment in ball bearings allows them to accept the sudden impulses of load without binding, and insures the best possible load distribution with a minimum pressure per ball.

As an illustration of the results secured with ball bearings, in September, 1914, an inspection of a ball bearing removed from the pinion end of a mining locomotive was made after two years of continual service. During this time the locomotive had traveled approximately 60,000 miles. The bearing showed no appreciable wear, and was immediately returned to service.

Instead of repeated attention to bearings as is required in plain-bearing machines, a weekly filling of the grease cups and an occasional inspection insures long life and the elimination of bearing troubles where ball bearings are employed.

Ball Bearings Must Be Lubricated

The reasons for lubricating ball bearings are two: First, to preserve the highly finished surface of the balls and races from the destructive action of moisture, air and mine gases. Second, to reduce the small amount of friction which exists in such a bearing. In addition to performing these main functions, the grease in the lubricant chamber and sealing grooves helps to protect the bearings against the intrusion of foreign matter from without.



Sectional Drawing of Motor Heads Employing S. K. F. Ball Bearings

1. Armature shaft
2. Motor bearing head
3. Outer bearing race
4. Balls and retainer
5. Inner bearing race
6. Lubricant chamber
7. Grooves to seal lubricant chamber
8. Grease feed pipe
9. Outside housing cap
10. Lock nut to hold inner race on shaft

While it is true that the coefficient of friction for ball bearings is extremely small (approximating 0.0012), this consideration should not lead to the belief that such bearings may be successfully operated dry. Ball bearings *must* be lubricated, and a high grade of grease should be employed and care taken to see that it is chemically neutral in order to avoid possible corrosion of the balls and races by either acid or alkaline compounds contained in the grease.

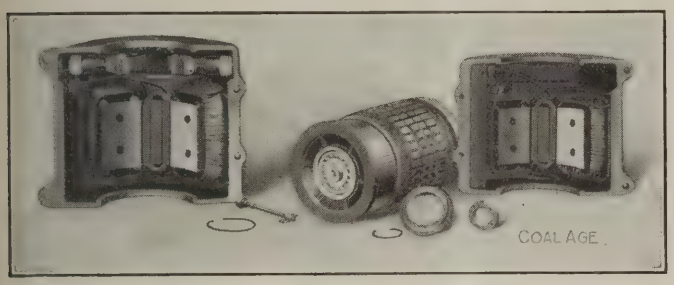
*S. K. F. Ball Bearing Co., New York.

A ball bearing and its mounting are extremely compact and free from rotating oil rings, wicks or waste packing chambers.

Due to their comparative freedom from wear, ball bearings prevent motor armatures from rubbing on the pole pieces. The maintenance of centers insures greater life to the gears, since the latter are held continuously in proper mesh and a higher gear efficiency obtained.

The proper mounting of these bearings requires a tight fit for the inner ball race on the shaft in order that the two may revolve as an integral unit. The outer ball race, on the other hand, should have a "piston" fit in the casing. Such a fit allows the outer race to slowly creep around, thus gradually distributing the bearing load over the complete ball path of the outer race.

The casing containing the bearing should provide a liberal lubricant chamber, which by an extremely simple construction may be sealed against the leakage of the



View of Disassembled Mine-Locomotive Motor

lubricant from within, or the intrusion of water, grit, or other abrasive substances from without.

The advantages of the ball bearing as applied to mine-locomotive motors may be summed up as follows: Freedom from repairs, a material reduction in the amount of lubricant required, long intervals between inspections, good commutation, and decreased wear on the gearing. What is probably more important so far as coal mining is concerned, the locomotives are more dependable and are more nearly constantly in commission instead of being in the repair shop.

Don'ts for Safety Inspectors

1. Don't forget that you are under the direction of the mine foreman.
2. Don't fail to make a daily report, showing what places you have inspected and what has been done in the interest of the safety of the employees.
3. Don't fail to examine and test with a bar the roof, ribs and face of each working place, and also test for gas every time you enter same.
4. Don't forget in your travels to note every condition that may lead to an accident, and report to foreman, noting on your report when such conditions are remedied.
5. Don't fail to examine timbering, and if dangerous, instruct miners to set timber without delay; see that orders are complied with and report same to mine foreman or assistant mine foreman immediately.
6. Don't fail to examine roof and timbers along main haulage roads and travelingways, and report at once any retimbering necessary to be done.
7. Don't fail to examine all safety devices, such as trip alarms, safety blocks at the top of shafts, slopes, planes, etc., reporting to the mine foreman or assistant mine foreman immediately any needed repairs.
8. Don't fail to caution all miners to be careful while trimming down the face after firing a blast.
9. Don't fail to report all abandoned workings and entrances to all dangerous places that should be fenced off, and the sign, "Danger, Keep Out," placed thereon in a conspicuous place.
10. Don't fail to report any person or persons who neglect to notify men in the immediate vicinity when they are about to fire a blast.
11. Don't fail to impress on the miners the importance of sounding the roof and testing for gas in the morning before commencing work, and before and after firing each blast during the day.
12. Don't fail to report to foreman any miners who fire two holes at the same time.
13. Don't allow any person to carry dynamite and caps at the same time, except when taking same into face to be used, and report any violation to the foreman.
14. Don't fail to stop any persons from leaving fuse, caps and exploders in the same box with dynamite, and report any violation.
15. Don't fail to stop any employee from making holes in dynamite with a file or cut spike, in order to insert cap, and report any violation.
16. Don't fail to caution miners who cap fuses with their teeth, and report violations to foreman. A crimping tool should be used.
17. Don't fail to warn the miners that using dynamite and black powder in the same hole is prohibited.
18. Don't permit miners to leave keg of powder on road or alongside of same. Insist that they replace it in box kept for that purpose, and report any violation to foreman.
19. Don't allow tamping to be done with iron or steel bar or needle. If men are not using wooden bars, report at once to foreman.
20. Don't permit miners to leave the wires attached to electric battery. They should be disconnected after the shot is fired. Report violations.
21. Don't fail to report all miners who use a blasting barrel instead of a fuse. They insert a cap in the barrel and explode the same with a squib. This is a dangerous practice.
22. Don't fail to warn miners that they must not leave safety lamps at their tool box. They should have them at their working face.
23. Don't permit any persons when placing relief timber to remove the old sets before placing the new, and be sure they lag, also sprag, where necessary.
24. Don't permit persons to leave lumber, boards or timbers with projecting nails lying loose in any place. Such nails must be removed or bent down close.
25. Don't fail to report all slopes and planes that do not have safety holes.
26. Don't fail to report all door frames and other structures that are erected too close to rail.
27. Don't fail to report all unguarded trolley wires that men are compelled to pass under.
28. Don't fail to report all frogs and switches that are not properly blocked.
29. Don't fail to have the passageways kept clear of obstructions.
30. Don't fail to caution brakemen or others not to stand between the rails and attempt to board locomotive or cars while same are in motion.
31. Don't allow any person to ride on cars unless their duties require it. Report all such violations to mine foreman or assistant.
32. Don't wait for the general inspector to point out dangerous conditions.
33. Don't forget that one of your principal duties is to caution employees of dangerous practices.
34. Don't fail to stop and report any employees who carry a naked lamp in districts where locked safety lamps are used, or in any other section where naked lights are prohibited.
35. Don't forget that we expect you to help us educate the employees to take care of themselves, and this can be done best by personal attention and instruction.
36. Don't forget that thorough and efficient examinations and inspections before accidents bring better results than the same work after an accident.

Note—From Susquehanna Coal Co.'s Book of Instructions.

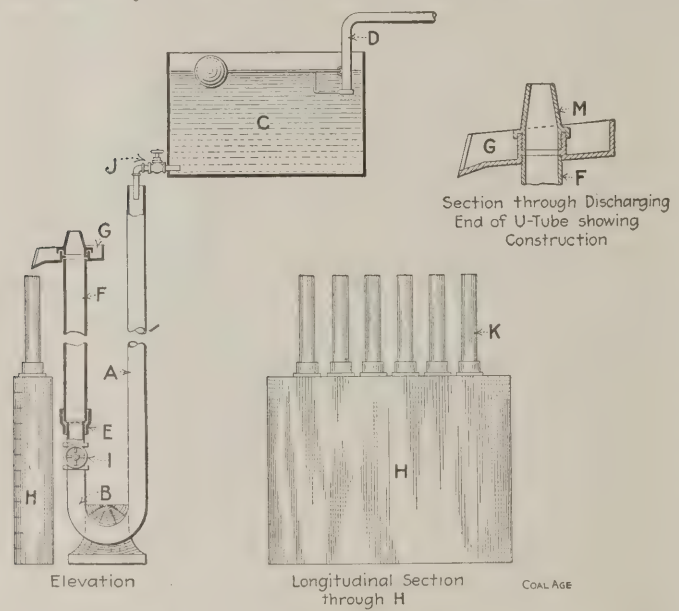
Montana's Coal Production

Montana, according to the U. S. Geological Survey, is essentially a metal-producing state. The values of its copper, gold, silver, zinc and lead represented in 1913 over 89 per cent. of its total mineral production. It is one of the most important Rocky mountain states in the production of coal. This production increased from 3,048,495 tons, valued at $5,558,195 in 1912, to 3,240,973 tons, valued at $5,653,539 in 1913.

Testing Appliance for Coal Washeries

The development of a testing apparatus adapted to determine the percentage of waste in a sample at any stage of the treatment of coal in a washery is due perhaps to L. D. Ford, who has recently given an account of its construction. The same instrument may be used to determine the data necessary for the plotting of the curves of washability of any coal in terms of the percentage of ash content or of the velocity of upward current necessary to hold given sizes in suspension.

The fundamental principle involved in the construction and operation of this instrument is that in virtue of which coal and mineral particles have for their various sizes corresponding velocities of upward current which will just hold them in suspension. Referring to the figure: A head of water *C* is kept constant in its container by the automatic inlet regulator *D*. The valve *J* controls the delivery of water into the downgoing side of a U-



Apparatus for Determining Waste of Coal in a Washery

tube. The upgoing side *B* is interrupted by the valve *I* and the connecting piece *E*.

The upper portion *F* is of glass, and is terminated above by a cup *G* and the metal nozzle *M*. A graduated reservoir *H* is provided with a number of inlet tubes *K*. The cup *G* may deliver to any one or all of these tubes. The nozzle is tapered on the interior in order to add to the velocity of a current passing through the instrument. A piece of gauze is placed in the connecting piece *E*, the mesh of which is finer than the mineral to be tested. Also, similar gauze is used at the bottom of the tubes *K*. The foregoing arrangements have in view the provision of an upward current in *F* of uniform velocity.

Upon opening *J*, a current of water will flow through the U-tube and discharge into the reservoir. The velocity in *F* may be calculated by noting the total quantity of water discharged into *H* in an observed interval of time and taking the cross-section of *F* into account. In order to avoid repeated calculations, a curve may be constructed once for all, showing the variations in velocity corresponding to variations in the position of the valve *J*. It will be convenient to have a circular scale attached to this valve in order to note its position with accuracy.

Eliminating the Question of Velocity

Another curve may be made which will show the variations in velocity compared with the variations in size of particles held in suspension in the glass tube. These particles should be free from refuse. Instead of making two curves, we may dispense with velocity altogether and construct a single curve comparing variations in valve position with variations in size of particles. We should thus eliminate all calculations on velocity.

Suppose now we wish to test a sample of coal or other mineral taken from a washery. The sample is supposed to contain particles of uniform size. We put it in the tube *F* and start the current. The valve *J* should now be opened to a point just a little beyond the point shown by the curve to correspond with the size of the mineral particles in the sample. The good material will now be driven out, the residue in *F* remaining on the gauze. This when dried and weighed may be compared either with the total weight before testing or with the weight of the particles driven out, caught in one of the tubes *K*, and similarly treated.

We may construct a curve of washability as follows: The sample, containing miscellaneous sizes, is put into the tube *F* and the current turned on gradually until the smallest particles are just floated off. We then observe the position of the valve *J*. The particles are collected in one of the tubes *K*. By opening *J* further and further, we may get a series of positions of the valve corresponding with a series of sizes. We collect these various sizes in separate tubes, and dry, weigh and calcine the contents of the tubes separately. A curve of washability may now be constructed charting the sizes and either the valve positions or the actual velocities.

Coal Production of the Transvaal

Although the gold-mining industry is of preëminent importance in the Transvaal, says the *Daily Consular and Trade Reports,* it has other valuable mineral deposits, including diamonds, coal and base metals, in the mining of which gratifying progress was shown during the past year. The purchases of coal mined in the Transvaal showed an increase from 4,751,850 tons in 1912 to 5,225,036 in 1913. An export trade for coal now having been established, there is every reason to believe that the Transvaal coal industry will continue to expand.

The total stores consumed by the mines of the Transvaal during 1913 amounted to $56,503,913, compared with $54,183,080 in 1912, an increase of $2,320,833. The purchases of machinery and machine tools and electrical machinery alone, which are practically all imported, amounted to $4,399,783. To show the predominance of the Transvaal over other Provinces of the Union as a customer for mine supplies, it is only necessary to state that of the total stores consumed by the mines of the entire Union of South Africa in 1913, amounting to $64,755,084, the Transvaal consumption was about seven times that of all other Provinces combined.

The Pittsburgh Coal Field in Western Pennsylvania

By H. A. Kuhn*

SYNOPSIS—The writer states that the Youghiogheny gas-coal field, which lies roughly between Marianna and Irwin, has a prospective life only one-seventh as long as the anthracite field. The exhaustion of the natural gas around Pittsburgh and the securing of freight rates for coke comparing favorably with those for coal together secure for Pittsburgh the prospect that fuel will not be largely shipped to other points for coking purposes, but will be coked at home. The southern Illinois coking-coal field does not seem a dangerous competitor of Pittsburgh.

The Pittsburgh coal field in western Pennsylvania is conceded to be the most important in the world. To measure its value it is necessary to understand the extent of its service to the various industries of the country. Probably 90 per cent. of the pig iron manufactured in the United States up to the present time has been made by using coke manufactured from the Pittsburgh coal seam in western Pennsylvania. This coal field is the foundation on which the city of Pittsburgh rests. It has caused the great growth of the iron industry in that district.

Pittsburgh would not be the natural center for iron and steel manufacture if it were not for its fuel. As it is, the ore is brought 1100 miles for treatment and the manufacturer is placed by the location of the industry at the mercy of the railroads.

The Outside Market of Pittsburgh

The illuminating-gas interests have shown an equal preference for Pittsburgh coal and 20 to 25 per cent. of the fuel used on railroads in the United States comes from this field. The Pittsburgh coal field is unquestionably the center of the industrial population of the United States, for in addition to the industries of the district and those closely adjoining, it has tributary to it all the cities and industries along the Great Lakes. Furthermore, practically all Canada, with the exception of the extreme western and eastern ends, is supplied with coal from this district. It furnishes the industries and population of points many hundreds of miles west of Duluth and Superior.

This coal is floated down the Ohio and Mississippi Rivers, supplying the towns *en route*, and is delivered in New Orleans, a distance of 2200 miles, for approximately 80 to 90c. per ton transportation cost. It is delivered on the docks of Superior and Duluth at a cost of transportation 50c. a ton less than the cost of transporting the same coal from Pittsburgh to a local consumer in Philadelphia. With other Appalachian coals it has large markets east and along the seaboard, especially for by-product-coke making and the illuminating-gas industry.

It is considered the leading railroad fuel because when consumed in a locomotive of any given size, it will haul more cars than any other coal in the world. Tests made at Altoona by the motive-power department of the Pennsylvania Railroad Co. show that Pittsburgh gas coal evaporates as much as 18.9 lb. of water per square foot of heating surface. It is stated that the lower-volatile coals, with a theoretically higher heat value per pound of fuel, do not evaporate more than 12 or 13 lb. of water for the same unit area of heating surface. For this reason this important railroad has adopted this coal as its standard fuel. By its use with the same crew and engine a maximum number of cars may be hauled.

Pittsburgh Coal from Pittsburgh District Supplies 28 Per Cent. of U. S. Production

These statements explain in part the enormous production of coal from this field and seam, which was, in 1913, approximately 100,000,000 tons. The Ohio production from the same seam was about 20,000,000 and that of West Virginia 10,000,000 tons. Thus a total tonnage of approximately 130,000,000 tons is produced from the Pittsburgh seam in this field. This is a large proportion of the total output of the United States, which was 470,000,000 tons in the same year.

Of the 170,000,000 tons of bituminous coal produced in Pennsylvania approximately 100,000,000 tons comes from the Pittsburgh seam. Fayette and Westmoreland Counties with only a small acreage left of unmined coal are now producing approximately 60,000,000 tons of coal annually; Allegheny and Washington counties produce about 20,000,000 tons each; Greene County has only recently started as a producer of coal but its capacity is now 2,000,000 tons a year.

The Regularity of the Coal Bed

The geology of the Pittsburgh coal measure is so well understood that it is not worth while discussing this field from that standpoint. Some practical features, however, which relate to its geology are interesting. The main feature of this seam from a geological standpoint is its persistency and integrity over the area which it covers. Though the coal may not have been opened on any given area, nevertheless those who are familiar with each zone or subdistrict (and the slow but uniform change from one basin to the next) can state unreservedly how thick the bed is within a small percentage, how much sulphur it will probably contain and about how many tons per acre may be recovered.

Thousands of miles of entries have been driven through this coal field in mining operations of the district and even where it is not being mined thousands of oil wells and gas wells have been drilled through it; from the records thus obtained several facts have been deduced which are worthy of comment.

The plant life which formed this field of coal was extremely luxuriant, increasing in depth or density toward the east. The purest and largest part of this coal field has been lost through corrosion. This seam in the Georges Creek field near Cumberland, Md., measures as

*President, Pittsburgh-Westmoreland Coal Co., Fulton Bldg., Pittsburgh, Penn.

Note—Article submitted to the American Institute of Mining Engineers at the Pittsburgh meeting, Oct. 9, 1914.

much as 16 ft. in thickness, whereas on its western outcrop in Ohio it is only about 3½ to 4 ft. thick. In the northwestern end of Allegheny County in western Pennsylvania near the state line the main or working bench of coal measures about 4½ ft. and the roof coal is 2½ to 3 ft. thick, the working bed being separated from the roof strata by what is known as the "draw slate" of the district, which averages from 8 to 14 in.

In the Connellsville field the coal at places attains a thickness of 8 ft. and on the southern boundary of Greene County near the Monongahela River it measures 9 to 10 ft. in thickness. In the southern extension of this seam in West Virginia the roof coal and main or working bed of the Pittsburgh district become practically one solid

The Fuel of the Gas-Coal Basin

The coal containing the least impurities from this seam in the Pittsburgh district is mined from what is known as the "gas-coal basin," which lies between the Pinhook-Murraysville anticlinal on the west and the Waynesburg-Saltsburg anticlinal on the east. The working bed of coal in this basin is on an average about 6 ft. thick. Above this bed and separated from it by the draw slate, 2 to 4 ft. of roof coal is found. The main working bed in this basin as prepared for market contains about 6 per cent. of noncombustible matter, and in some cases less than this, and the average coal contains not over 1 per cent. of sulphur. Coal in the Connellsville basin is equally pure, but because more of the seam is mined in that field

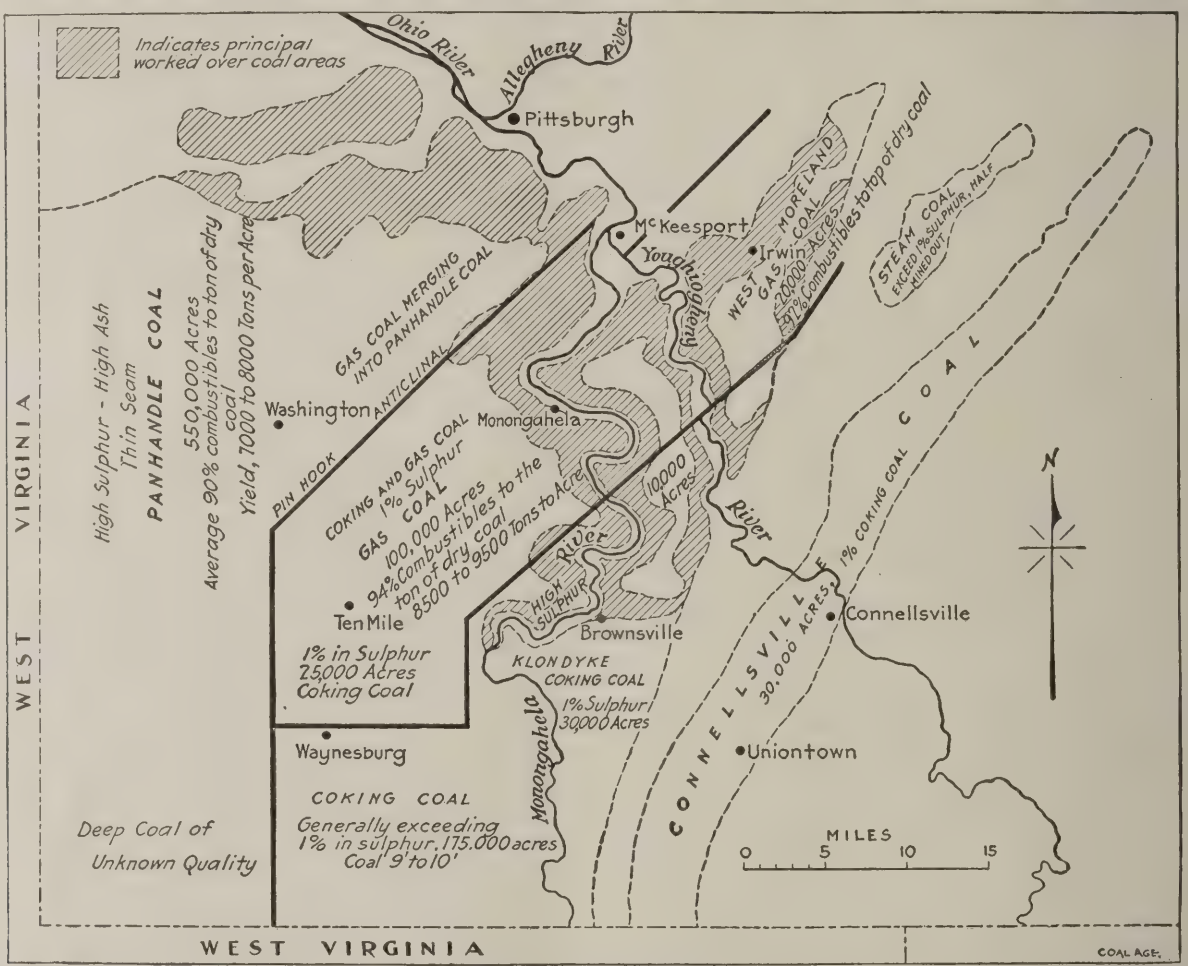


Fig. 1. Showing Number of Acres Unmined and Number of Tons of Recoverable Coal per Acre, Also Divisions of Quality

bench of coal with only thin laminations of slate marking the divisions which are so noticeable in the northern part of the field.

It may be said from an inspection of the geological map and from a knowledge of the quality of the coal that not only was the plant growth that formed this fuel much more luxuriant in the eastern end but that the coal was deposited with less impurities and under quieter conditions. The coal thins going west, but maintains its extreme purity as far westward as the Pinhook anticlinal running southwest from Pittsburgh through Allegheny and Washington counties. West of that anticlinal the change is gradual, the coal becoming more impure, higher in ash and sulphur with progress westward. The working bed or bench also becomes thinner.

the ash is usually higher than in the coal produced in the gas-coal field, the sulphur being about the same. In recent years it has been discovered that the lower or southwestern portion of the gas-coal zone makes a standard coke, the difference between it and that from Connellsville coal is that the former, because of its hardness, has to be crushed before it is put into the coke ovens, unless only the slack coal is used. This greater hardness is, however, an advantage in its sale as the lump coal is sold at the mine for shipment at a normal price of $1.40 per ton, which is equivalent to a price for coke (including its cost of manufacture based on beehive-oven practice) of $2.50 per ton on the car at the oven wharf.

The Pittsburgh coal field in western Pennsylvania west of the Monongahela River and within the state lines com-

prises about 850,000 acres of unmined coal today. In order to understand the available tonnage per acre in this field of coal and the values in various parts of the coal field it is necessary to subdivide it into zones of quality and thickness. To comprehend its value fully it is necessary to subdivide it further into zones differentiating production cost, this further division having relation to the cost of mining and of transportation. The thickness of the coal in the various parts of the field determines the available tons per acre, which in turn becomes a factor in the valuation of the land. To measure the value of the properties in the different subdivisions or zones, all the factors, quality, tons of recoverable coal to

OVENS AND ACREAGE IN 1912 IN CONNELLSVILLE FIELD

	Number of Ovens		
	Tax List	Connellsville "Courier"	Acres
Old Basin	22,985	20,361	32,461
Klondike	12,784	12,377	33,029
Total	35,769	32,738	65,490

OVENS GOING OUT OF BLAST IN CONNELLSVILLE FIELD, DUE TO EXHAUSTED ACREAGE

	Old Basin	Klondike	Total
In next 3 years	5,393	1,310	6,703
In next 5 years	7,097	2,052	9,149
In next 10 years	11,940	3,814	15,744
In next 15 years	14,529	5,270	19,799
In next 17 years	17,491	6,130	23,621

After 17 years there will be, of all the ovens shown, 5494 in the Old Basin and 5881 acres of coal land unex-

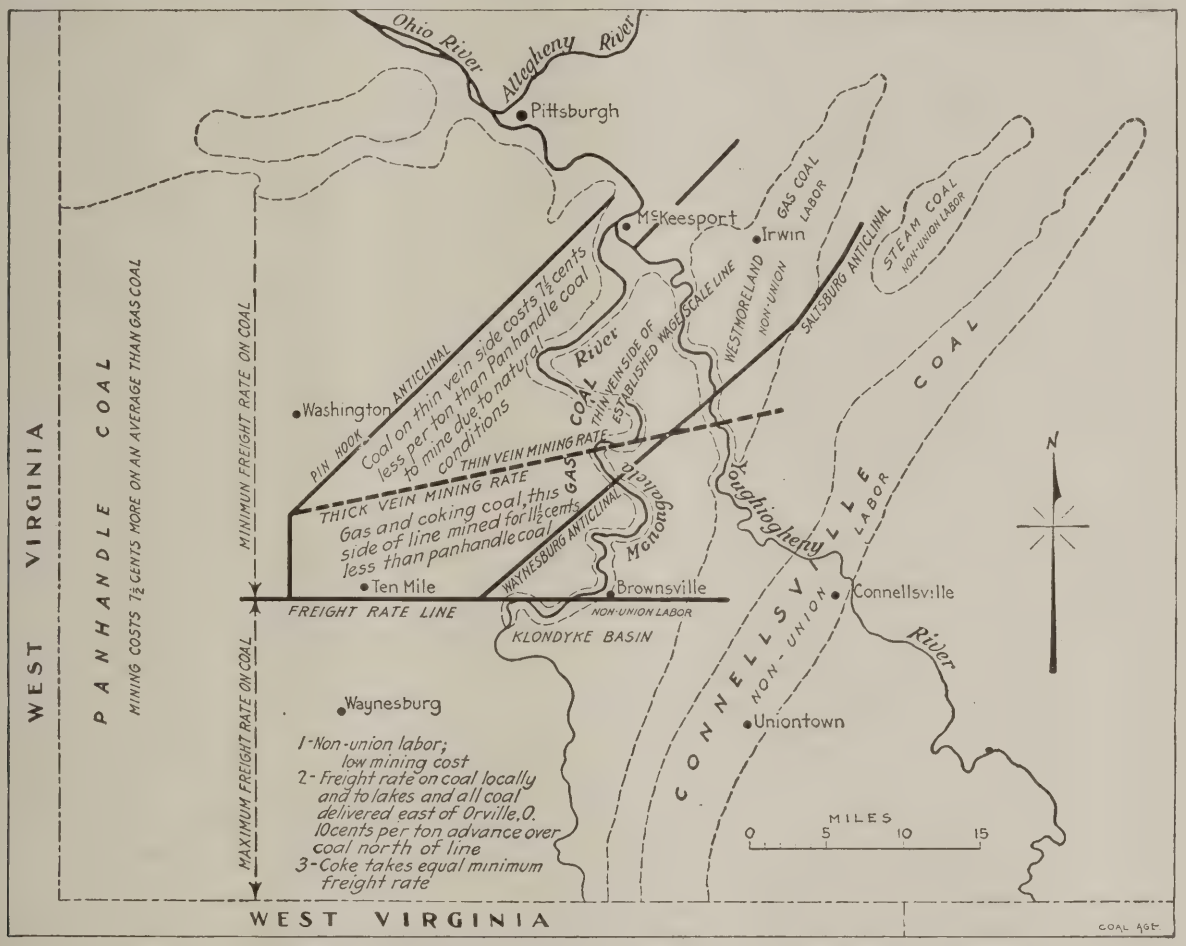


Fig. 2. Showing Divisions in Cost of Mining and in Freight Rates

the acre, cost of mining and cost of transportation to market, must be considered.

In Barely a Decade and a Half the Best Connellsville Basin Coal Will Be Exhausted

To measure the life of this coal field is an easy matter. In the Connellsville basin, the Lower Connellsville or Klondike basin, and other areas of coal east of the Monongahela River there are approximately 100,000 acres of the Pittsburgh seam available and unmined at this time. In 1912, I determined, from the assessor's books in each township comprised in the Connellsville and Lower Connellsville basins, the unmined acreage of coal and also the number of ovens attached to the properties. Thus my figures are based on the sworn statements of various owners of the coal lands and coke plants. I have added to these figures those published by the Connellsville *Courier*:

hausted. These ovens will have an average life of a little over 9 years. In the Klondike district there will be 6654 ovens and 9501 acres of coal. These ovens will be able to run a little over 13 years.

MERCHANT OVENS GOING OUT OF BLAST IN CONNELLSVILLE FIELD, DUE TO EXHAUSTED ACREAGE; ELIMINATING THE H. C. FRICK COKE CO.

	Old Basin	Klondike	Total
In next 3 years	2,575	1,310	3,885
In next 5 years	3,135	2,052	5,187
In next 10 years	4,691	3,814	8,505
In next 15 years	6,455	4,760	11,215

After 15 years there will be, of the present oven plants shown, 1039 ovens in the Old Basin, with 1653 acres of coal left. These ovens will have an average life of somewhat over 14 years. There will be 3842 ovens in the Klondike, with 5781 acres of coal left. These ovens can anticipate an average life of a little over 13 years.

NUMBER AND LIFE OF OVENS OF H. C. FRICK COKE CO. IN CONNELLSVILLE FIELD

	Tax List	Number of Ovens Connellsville "Courier"	Acres	Average Life, Years
Old Basin	15,491	14,199	23,896	14+
Klondike	4,182	3,664	14,271	31+

In addition to the above the H. C. Frick Coke Co. has 2935 acres in Redstone township, 1043 acres in Menallen township and 4423 acres in Luzerne township on which there are apparently no ovens. The coal from this property together with that from much acreage in adjoining townships will probably be shipped to byproduct ovens, making the total life of the Steel Corporation's coal lands in the Klondike district approximately 20 to 25 years, assuming that they draw on these lands to make up the decline in the Old Basin.

Gas-Coal Basin Will Be Depleted in a Few Years

It is clear from this accurate information that the original coking-coal fields of western Pennsylvania comprising these two basins of the Pittsburgh coal seam, which were thought to be inexhaustible a few years ago, have only a short life. More astounding than this, however, is the approaching end of the continued production of what is known as the Youghiogheny or Westmoreland gas coal, which comprises the coal in the gas-coal basin extending from Irwin on the main line of the Pennsylvania Railroad, east of Pittsburgh, in a southwest direction, crossing the Youghiogheny and Monongahela Rivers and extending into the northern end of Greene County. The coal from this basin has supplied probably 90 per cent. of the coal-gas illuminating plants in the United States up to the present time.

With the disuse of oil in gas making, steel heating and melting and in many other industries, the demand for this grade of coal will probably double within the next five years. Including the Westmoreland field and extending into the northern end of Greene County there is unmined and available in this basin approximately 150,000 acres. Because the southwestern portion of this basin makes a standard low-sulphur coke, various steel corporations have purchased large bodies of this land and there is now only available for the open market the product from about 70,000 acres of this coal.

The short life of the anthracite field is frequently matter for comment, but it can be shown that this particular grade of coal will be exhausted in one-seventh of the time necessary for the complete extraction of the anthracite coal in Pennsylvania, assuming that the peak of production in the anthracite field has been reached. The coal basin lying west and northwest of this between the Pinhook and Washington anticlinals will be called upon to supply the gas-coal from the Pittsburgh district when the gas-coal basin proper has been exhausted. In this discussion, however, all lands west of the Pinhook and Murraysville anticlinals are included under the name of "Panhandle" coal.

Fig. 1 shows the number of acres unmined in each subdistrict, the number of tons of recoverable coal per acre based on the past practice of the district in mining, and the divisions of quality in the district. Fig. 2 shows the divisions in the cost of mining and the freight-rate zones, both of which determine largely the values of the various lands of the district. Fig. 3 shows the estimated life of the various parts of the Pittsburgh coal field. The available and unmined coking-coal land may be divided into two parts, first, that containing coal running 1 per cent. of sulphur or under, and second, that underlaid by higher-sulphur coals.

This first includes the Connellsville basin, the greater part of the Klondike field and the eastern portion of Washington County east of the Pinhook anticlinal and southwest of Monongahela City, and the field in the northeastern portion of Greene County. The coking coal which has more than 1 per cent. of sulphur and which must be washed in order to make standard coke includes the upper portion of the Connellsville basin, the southern portion of the Klondike field and the southeastern portion of Greene County. The extreme thickness and large recovery of coal to the acre in the southeastern portion of Greene County and the low mining cost offset the expense incurred in washing.

The Pig-Iron Production Needs

An estimate of the pig-iron production tributary to this field up to October, 1912, was given recently in the *Iron Age* and a forecast was made showing the normal

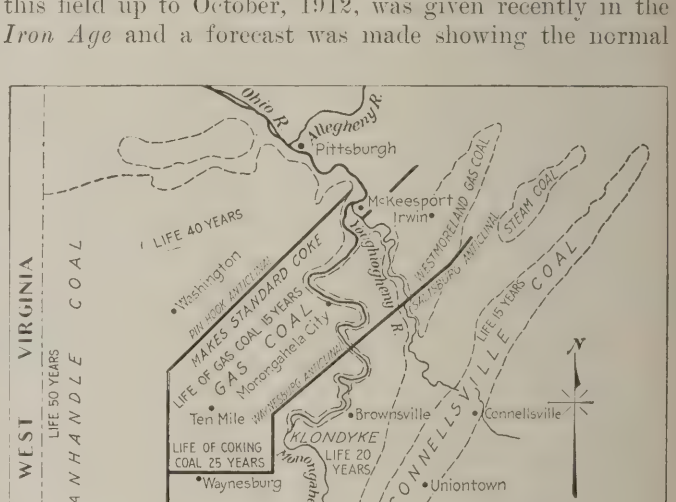


Fig. 3. Estimated Life of Various Divisions of Pittsburgh Coal Field

The calculations are based on the equivalent of a 4 per cent. annual increase for 12½ years. After that time and until the coal is exhausted a uniform production is assumed, which is taken as 50 per cent. greater than the present normal output. The assumption is also made that the high-grade coals will be mined first. The present output of gas coal is 45 million tons per annum, coking coal 40 million and Panhandle 15 million. The annual increases assumed are: Gas coal, 1½ million tons for two years, coking coal 2 million tons till 70 millions is reached, and Panhandle coal a half million tons till the exhaustion of the field.

increase. This calculation is taken as a basis on which I have made an estimate of the life of the various fields of coking coal. I have assumed in this inquiry that the coal from the new fields will replace that from the Connellsville basin as its output declines and will also provide for the increased consumption of coke as the output of pig iron in the area tributary to these fields increases.

The average annual rate of increase of pig-iron production, based on figures for 1900 to 1910, was approximately 1,171,334 tons. For the next 10 years 1,400,000 tons may be assumed as the average flat rate of annual increase. The productions from 1912 to 1920 would, therefore, be as shown below. This forecast allows little for increase in population or increased use of iron per capita.

PROSPECTIVE PRODUCTION OF PIG IRON AND ANTICIPATED COKE NEEDS

Year	Average Pig Iron Production, Tons	Coke Required for Smelting, Tons*
1912	29,115,000	45,419,000
1913	30,515,000	47,603,000
1914	31,915,000	49,787,000
1915	33,315,000	51,971,000
1916	34,715,000	54,155,000
1917	36,115,000	56,339,000
1918	37,515,000	58,523,000
1919	38,915,000	60,707,000
1920	40,315,000	62,891,000

* The coke requirement is based on the assumption that 1.56 tons of coke will be used to smelt one ton of pig iron.

The following table shows: (1) That 75 to 80 per cent. of all the iron production of the United States is located tributary to the coking coal of the Pittsburgh district, and (2) the quantity of coke required by the different iron-producing districts. This is obtained by taking the pig-iron production of the United States for the last five years and the coke production for a like period. The pig-iron production of the United States from 1907 to 1911, inclusive, was 117,445,261 tons, and the coke production from 1907 to 1911, inclusive, was 183,388,466 tons. The coke required for blast furnaces, foundries, smelters, and gas production is 1.56 times that of the pig iron smelted.

DISTRIBUTION OF PIG IRON PRODUCTION AND COKE DEMAND

District	No. of Stacks	Month of October, 1912. Pig-Iron Production, Tons		Coke Required, Tons	
Buffalo, New York	16	179,726		280,372	
Rest of New York	2	621,813		970,028	
Pittsburgh district	51				
Eastern Pennsylvania (small stacks)	35	227,106		354,285	
Western Pennsylvania	18	157,027		244,962	
Shenango valley (Penn.)	16	143,115		223,259	
Mahoning (Penn.)	20	256,711		400,469	
Central and northern Ohio	21	237,506		370,509	
Wheeling district (Ohio and W. Va.	10	118,037		184,137	
	— 189		1,941,041		3,028,021
Chicago district (Mich., Wis. and Minn.)	38	442,091		689,661	
	— 38		442,091		689,661
Southern Ohio	9	38,419		59,933	
New Jersey	1	5,370		8,377	
Southern states	41	239,686		373,910	
Western states	3	23,326		36,390	
	— 54		306,801		478,610
	281		2,689,933		4,196,292

Analysis shows that the net demand on the Pittsburgh district by the different iron-producing plants is approximately 35,000,000 tons of coke per year. In making this estimate the whole iron production for October, 1912, of the states of Pennsylvania, New York and northern Ohio and one-half that of the Chicago and the northern Lake district are taken into consideration. This total equals 40,485,212 tons of coke and from it must be subtracted 4,136,000 tons of coke manufactured in byproduct-coke ovens in Pennsylvania, New York and Ohio, and also 1,000,000 tons of hard coal used in iron smelting in eastern Pennsylvania.

Using the foregoing forecast as a basis and assuming that the pig-iron production tributary to the Pittsburgh coal field will be maintained at the same percentage to that of the whole production of the country, the life of the various subdistricts of coking coal may be stated approximately as follows: Connellsville basin, 15 years; Lower Connellsville or Klondike, 20 years; eastern Washington County, 25 years, it being assumed that one-half of this coal will be used for smelting iron ore and the other half used for gas making, steel melting and other purposes. The 175,000 acres in eastern Greene County will have a life of 40 years.

Merging all the acreage together the life of the coking coal in the Pittsburgh district based on a normal increase in the use of this coal in the iron and steel industry and as a domestic fuel to replace hard coal will be approximately 40 years. It may be assumed that the present type of ovens will be largely replaced by byproduct oven plants on the field and at the point of manufacture.

The Money Value of Coal Purity

The Pittsburgh coal field has been so largely operated and the coals from the different subdistricts tested that it is not only possible to determine approximately the number of tons of recoverable coal per acre but the value of the land can be calculated based on the number of heat units delivered per pound of coal. The purest gas coal is prepared for market with about 6 per cent. of noncombustible matter. The Panhandle coal as it leaves the tipple has 10 per cent. of noncombustible matter. The average difference in the ash of the two coals is therefore 4 per cent.

The average delivered cost of a ton of Pittsburgh coal, including freight rates, approximates $2.50. The lowest delivered cost in the Pittsburgh district is about $1.50 per ton. Coal shipped by way of the Great Lakes and into Canada and the West is delivered to the consumer at from $3.50 to $4.50 per ton; the average price, giving due weight to the tonnage, is approximately $2.50.

A difference of 4 per cent. in heat value on a basis of $2.50 delivered cost per ton shows a difference in delivered money value of 10c. per ton in favor of gas coal, and reduced to an acreage basis is equivalent to an excess value of between $800 and $900 an acre. As has been stated before, the gas coal merges gradually from the Pinhook anticlinal westward into Panhandle coal and there are points and locations immediately west of the gas-coal basin where the difference in value of heat units per pound of coal delivered would be much less than the average difference.

The value of any coal depends on the use to which it is put and the advantage of its use over other competitive coals in any special industry can be figured in cents per ton and therefore in dollars per acre of coal land. It has been stated by managers of illuminating-gas plants that the Pittsburgh gas-coal product has an ultimate excess value of 25 to 30c. per ton of coal over gas coals from other districts.

An Even Greater Premium on Purity When Ash Is Deleterious

The coking coal of the Pittsburgh seam in western Pennsylvania, because of physical and chemical properties, geographical location and freight rates, controls approximately 80 per cent. of the coke demand of the United States and Canada. Judge Gary, of the United States Steel Corporation, is credited with a public statement placing $2000 an acre as the value of coking coal from the Pittsburgh seam in western Pennsylvania. This checks up with a statement made to me by one of the Pig Iron Committee of a large steel corporation to the effect that a coke with the best physical structure containing 1 per cent. or less of sulphur is worth about 30c. a ton more in the manufacture of pig iron than a coke having a higher percentage of sulphur, for, in that event, additional coke and flux must be placed in the furnace in order to remove the surplus sulphur.

The Competition with Southern Illinois Coals

The geographical value of the Pittsburgh coking coal based on freight rates to distant markets has not been

fully grasped either by the steel companies or the public. For byproduct-coke making or gas making along the Great Lakes, at any point, it is possible to ship low-sulphur Pittsburgh coking coal to the lake front for a delivered freight cost placed on board vessel of 83c. a ton. The vessel rate from Lake Erie ports to any point on the Great Lakes ranges from 25 to 35c. a ton, making a total freight rate to Lake Superior points of $1.13 and to Lake Michigan points of $1.18 per ton.

The minimum railroad freight rate on coal from West Virginia and Kentucky to Chicago or Lake Michigan points is $1.90 per ton. A freight rate from southern Illinois based on about 3 mills per ton-mile would be $1.05 per ton to Gary, Ind. Coal shipped from the Pittsburgh coal field via lake to Lake Michigan points therefore shuts out all West Virginia and Kentucky coals by rail and can be put into the storage yard at the byproduct

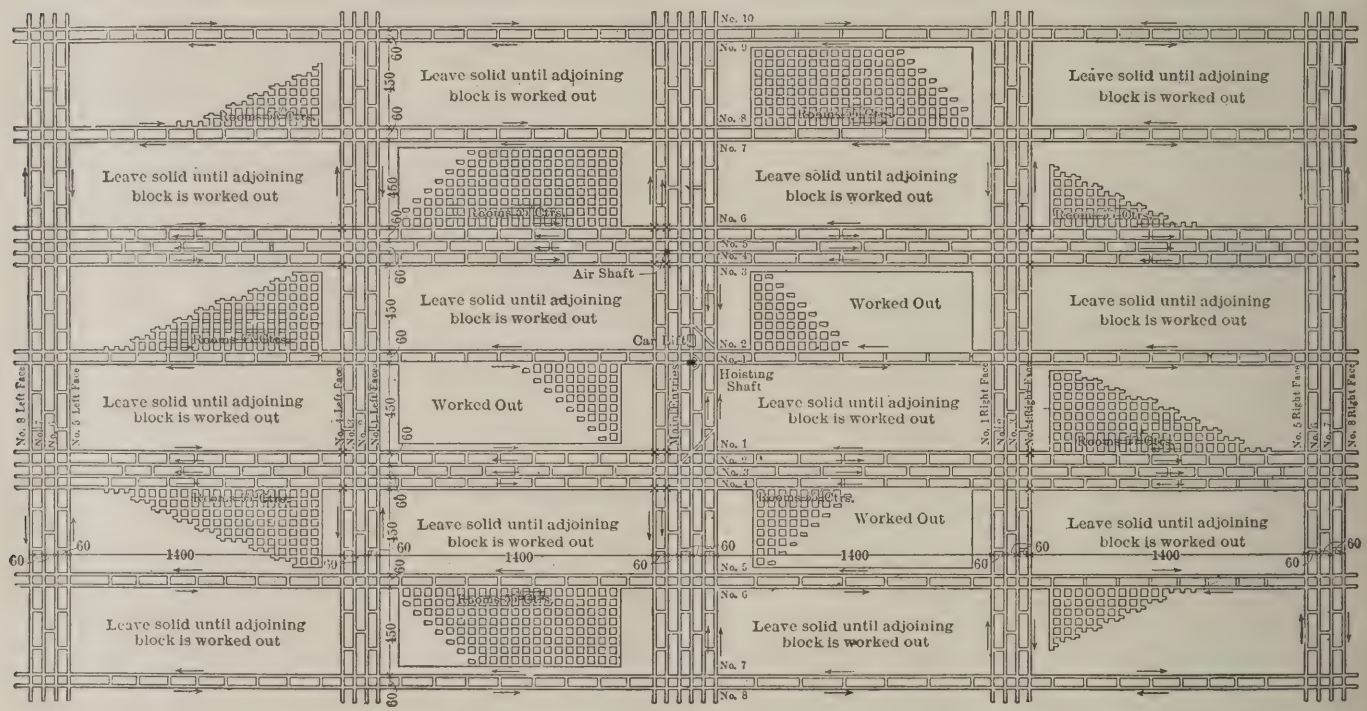


Fig. 4. Plan of Mining for Extraction of Coal by Mechanical Means

coke-oven plant in the Chicago district along the lake front (based on available carbon per unit of pig iron produced) at about an equal cost with southern Illinois coal.

According to a paper on Illinois coals,* the Franklin County coal contains from 18 to 21 per cent. of noncombustible matter as against the 6 to 7 per cent. found in Pittsburgh byproduct coal. I believe that recent developments indicate that these analyses of southern Illinois coals are too high in noncombustible matter, but taking this coal as now loaded into the railroad cars, 16 per cent. may be assumed as noncombustible matter, divided approximately into 9 per cent. ash and 7 per cent. water, or 10 per cent. ash and 6 per cent. water.

Freights Being Equal, Quality Will Determine the Issue

There would, of course, be certain losses in heat units in the coking of southern Illinois coal on account of the water that could not be charged to Pittsburgh coal, and excess sulphur in Illinois coal would also reduce the amount of available carbon per unit in the blast furnace. The foregoing facts when taken in connection with the superior coking qualities of Pittsburgh coking coal would indicate that southern Illinois coal for byproduct use in the Chicago district would not be as cheap ultimately as Pittsburgh coal shipped there by lake, based on equal cost of coal at the mines. A careful study of the situation indicates also that the pig-iron furnaces bordering on the Great Lakes, almost all the furnaces in northern and central Ohio, western Pennsylvania, furnaces in New York State, a large percentage of the furnaces in eastern Pennsylvania, and those in Canada will draw their fuel supply from the Pittsburgh coal field. As that industry increases in volume, the coal production will have to increase in the Pittsburgh coking-coal field and the life of the field will be shortened accordingly.

Wage-Scale Partition Line

The cost of mining is another factor governing the value of the coal and the length of life of the various areas of the Pittsburgh coal field (see Fig. 2).

The Union scale of wages divides the Pittsburgh field into two parts (known locally as the thin- and thick-vein mining-scale districts), the dividing line running from Port Royal on the Youghiogheny River west through Lock 4 on the Monongahela River, and extending still farther west through a point north of Bentleyville, Washington County. The coal north of this line has the thin-vein wage scale, which when reduced to a run-of-mine basis is 7c. per ton more than that obtaining south of this line. This, however, is not a true measure of the cost of mining coal in this district, as the natural conditions in various parts of the field modify the cost of extraction.

*Transactions of the American Institute of Mining Engineers, Vol. XL, p. 4 (1909).

The Pittsburgh Coal Co. made sworn statements before the Interstate Commerce Commission at Washington on the cost of mining 18,000,000 tons of coal from Apr. 1, 1910, to Aug. 31, 1911, as follows:

COST OF MINING PITTSBURGH COAL

	Production, Tons	Average Cost Mine-run Coal.*
Panhandle coal	8,174,880	$1.0434
Gas coal	5,070,600	0.9686
Thick-vein coal (coal south of wage-scale line)	5,052,887	0.9283

*Does not include interest or dividends.

Coal Land Worth $2000 per Acre

Because the tonnage is extremely large and covers a long period of time, and because the same accounting system was applied to the whole tonnage, and in like manner to each district, the statement is an accurate measure of the cost of mining Pittsburgh coal in the various subdistricts of the field, and for purposes of current operation places an accurate value on the land in the different districts. It will be seen that the fuel from the gas coal area in Fig. 2 was produced on board railroad cars for practically 7½c. per ton less than Panhandle coal. Reduced to an acreage basis this indicates that for current operating purposes gas coal costs $600 to $700 an acre less to mine than that classed as Panhandle. As a fuel for generating steam it has been noted before that it is actually worth, at a delivered cost price of $2.50 a ton, 10c. per ton more to the consumer, which makes its excess value above that of the average Panhandle coal about $1400 an acre, assuming that the consumer is willing to pay for the coal based on the heat units delivered.

The thick-vein coal was mined for 11½c. a ton less than the Panhandle fuel, or $1000 an acre. As a large part of this thick-vein coal is used for coke and gas manufacture, its value, based on delivered results, is almost equal to that placed on coking coal by Judge Gary, if we assume the average Panhandle coal as having a value between $200 and $300 per acre.

Profits Were Derived from Gas Coal

Another light may be thrown on the value of Pittsburgh coal lands by the sworn testimony of the Pittsburgh Coal Co. before the Interstate Commerce Commission involving the same period of time, by combining the foregoing statement with Comptroller Hornberger's Exhibit No. 5. That declaration before the court declares the average market value of all grades of run-of-mine coal at the mine for lake shipment during 1910 was $1.0708. If we assume that all three grades of coal were sold at the same prices, though the Panhandle coal is not of equal quality with the others, then the 8,174,800 tons of Panhandle coal earned the Pittsburgh Coal Co. $224,000 and the 10,123,487 tons of gas coal and thick-vein gas and coking coals earned this company approximately $1,338,000. But if the Panhandle coal secured only an inferior price, all the profits must have been made out of gas coal and the adjoining thick-vein gas and coking coal.

How the Freight Rate Aids

With all these accurate data in hand, it is easy to place relative values on the different parts of the Pittsburgh coal field. On comparing this district with those of West Virginia and Kentucky, we find that the excess freight rate now charged on coal from the Fairmont district in West Virginia to the lake front is 12c. per ton, and the same seam of coal is mined.

The charge for conveying coal from the Kanawha district and from West Virginia and Kentucky to the lake front is everywhere at least 19c. per ton higher than from this district. As compared with all-rail shipments as far west as Chicago, the freight rate on West Virginia and Kentucky coals lying nearest to Chicago is the same as the Pittsburgh rate, but by the way of the lake, the Pittsburgh field has an advantage of 12 to 19c. per ton over these coals, together with a higher market value based on delivered results.

The movement toward freight-rate adjustment will add additional value to the Pittsburgh coal field in western Pennsylvania. The certain failure of the railroads should they attempt to override the geographical disadvantage is illustrated by the misfortunes of the Cincinnati, Hamilton & Dayton R.R. when it sought to haul coal to the lake front for approximately 2 mills per ton-mile, as compared with the 5 mills paid by Pittsburgh coal.

It is reasonable to believe that changes in freight rates from the Pittsburgh district will be reductions, and that advances will be made in the tariffs from southern West Virginia and Kentucky, in order to maintain the solvency of the railroads which carry the coal. The Interstate Commerce Commission will find it necessary to fix the freight rates more nearly on the basis of cost of transportation, in order to maintain the solvency of the railroads themselves and to conserve the natural resources



Fig. 5. Advancing Plan

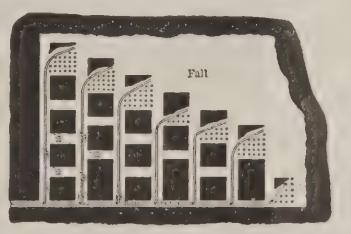


Fig. 6. Retreating Plan

of the country; all of which will tend to conserve the Pittsburgh coal field and probably extend its life over the estimates made.

The Poor Mining Methods of the Past

It may be stated that the Pittsburgh coal areas already worked over have up to the present only shown a recovery of 60 to 65 per cent. of the coal in the ground, though the Connellsville field has shown a better conservation.

In the old days of mining only the breast coal was saved and only cheaply extracted portions of this bench were hauled to the tipple. In recent years the more modern operations in the Pittsburgh district have adopted systems of extraction which permit a recovery of 85 per cent. and in some cases 90 per cent. is secured, but this percentage of recovery only represents the work of the last few years and only a portion of the district.

The Railroads Tried to Handicap Competing Districts

The destruction of the Pittsburgh coal seam in past mining operations in this district was made necessary by the fact that the railroads placed an extremely high freight rate on coal shipped, in order to divide the market with Southern railroads. The result

was that with nonunion labor and extremely high freight rates per ton-mile from the Pittsburgh district, and extremely low freight rates from West Virginia and Kentucky, it has been possible for operators in the Southern fields, to a limited extent, to enter markets which naturally belong to the Pittsburgh coal field.

It is obvious that it is bad public policy to permit the issue of railroad securities for transportation equipment, the effect of which is to destroy natural resources in the Appalachian coal fields, in order to secure an unnatural coal market for a distant coal field, and to increase the gross business of a railroad at no profit to the stockholders. As stated before, the present condition of the Cincinnati, Hamilton & Dayton R.R. illustrates the fallacy of this policy. The resources of the Pittsburgh coal field and those of the United States cannot be conserved unless the cost of service on railroads is a measure of freight rate. With gradual adjustments made in freight rates to cure this evil it may be assumed, basing our conclusions on present mining practices, that 90 to 94 per cent. of the Pittsburgh coal measures may be recovered.

The Connellsville field proper, under the supervision of Thomas Lynch, president of the H. C. Frick Coke Co., has employed methods in mining which are the most efficient in the United States. The recovery of coal in the Connellsville field through the system established by Mr. Lynch is about 93 to 94 per cent. The operations in this field from the standpoint of percentage of recovery, safety measures provided for guarding against death and accidents to miners, and improved living conditions around the mines, are an example for all coal-mining operations of the country. If the remainder of the Pittsburgh coal field, through adjustment in freight rates and mining costs, would adopt a modified system of the Connellsville plan of extraction, the life of the Pittsburgh coal field would be increased materially and the wealth of the district proportionately.

The Anticipated Improvement of Mining Systems

I have in a period of 10 or 15 years developed a system of mechanical mining to be applied to a modified system of extraction as practiced in the Connellsville field by the H. C. Frick Coke Co. (Figs. 4 to 5). After spending much time and money in this period of time, machines and methods were produced which have apparently reached a stage of perfection. Several of these machines have operated continuously for many months in the Pittsburgh coal field with small repairs and without any delays in operation. The results are so convincing that it can be announced without reservation that mechanical mining is established and that by means of machines now perfected and operating daily, and by adopting the modified plan of extraction equivalent to the methods in the Connellsville field, these results may be secured:

1. That 90 to 95 per cent. of the coal measure may be recovered mechanically.

2. That the cost of mining in thick seams averaging over 5 ft. will be reduced from one-third to one-half.

3. That one man operating the new machine, and using the methods now perfected and working, will be able to produce as much coal as four to six men produce under the present methods by the use of the existing machinery.

With all this in view the future of the Pittsburgh coal field is extremely bright and the wealth of the district is increased largely. It may be stated that the present beehive ovens or open ovens of the district will be used to exhaust areas of coal lands adjacent, but that future coke plants supplying the iron and steel industry tributary to this coal field will, to a large extent, be the retort type of oven with byproduct recovery. Some of these plants will be placed at the point where the iron and steel are manufactured and other plants will be placed in the coal field.

Why Most of the Pittsburgh Coal Will Be Coked in the District

The Pittsburgh district will face in a few years the total exhaustion of natural gas, or at least a large reduction in the supply. There are established throughout the district, and crossing the coal field, many large pipe lines which are now used as natural-gas mains. It is obvious that these mains may be used for piping retort-oven gas to various industries for industrial purposes and to the cities for domestic use. It is also obvious, since the anthracite field has approximately reached its peak of production, that small coke made at byproduct ovens will be used more and more to replace hard coal west of a line north and south running through Buffalo.

It is my opinion that the majority of the retort-oven plants will be placed in the coal field as the pipe lines are already established and as byproducts such as tar, ammonia and benzol may be shipped from the Pittsburgh district with as much economy as from practically any other point. Freight rates throughout the country have been established so that the cost of transporting a ton of coke to market from the Pittsburgh district is about equivalent to transporting 1½ tons of coal. This makes it possible to ship coke to the various points as cheaply as the coal necessary to make a ton of coke, so that there is no transportation advantage in shipping coal to a distant point to make byproduct coke.

The modern construction of railroad-coke equipment has reached a stage that enables the railroads now to haul a train of coke as cheaply as a train of coal of the same weight, the difference, if any, being slight. The tendency, therefore, will be to adjust coke freight rates on the basis of cost of transportation, which will be in favor of establishing coke plants in the Pittsburgh coal field.

With this adjustment in view, it would be more profitable to establish the byproduct-coke plants in the coal field, especially if the gas could be sold to the pipe lines now established. Or if the railroad lines are largely equipped for electric traction, it may be that it will pay to put the byproduct-coke plants in the coal field and by the installation of gas engines at the coke plants generate electric power which can be transmitted and sold to the railroads at low prices. The question of where to establish the byproduct-coke plant will be given an answer depending largely on whether the owner of the coke plant uses his own products or manufactures for the general market. It would seem, however, that a commercial coke plant would have a larger sale both for gas and coke if established in the Pittsburgh coal field than if placed elsewhere, as the established freight rates on coke would allow shipments to any point now available, and the local market for gas would absorb at fair prices the surplus gas of the plant.

The Labor Situation

SYNOPSIS—The orders of the War Office to the operators in Colorado reflect the probable action of the government in that state and in Arkansas. Troops have been dispatched to Hartford, Ark., to support the U. S. Circuit Court. In eastern Ohio the situation is unchanged.

It is important to operators everywhere to know just what action the government will take in mine disputes. Both Roosevelt and Wilson have been disposed to stretch the Presidential authority in the most autocratic fashion, and the War Office orders we now print will convince our readers that the editorial entitled "The Mailed Fist," in our issue of Aug. 29, was well justified.

Forbidding the Employment of New Men

Headquarters U. S. Forces,
Louisville, Colo., May 19, 1914.

Official in Charge,
Baum Mine.

Sir:

In view of conditions in this district, it is considered very undesirable, under existing conditions, to introduce any new labor into this district, or open up any mines which were not running just prior to the arrival of the federal troops in the Boulder-Louisville mining district.

New men entering the district should not be given employment, as such action would not be complying with the President's proclamation requiring all "to retire to their respective abodes."

Our first duty here is to enforce obedience to the law and restore conditions of peace and good order. In doing this, we are not justified in allowing new men to come into the district until conditions assume a more normal aspect and something approaching a settled condition has prevailed for a sufficient length of time to make it wise to do so.

You will therefore communicate this information to the proper officials of your mine.

Very respectfully,
CHAS. J. SYMMOND,
Major 12th U. S. Cavalry,
Commanding U. S. Forces.

War Office Eases Rule in Favor of Unsolicited Labor

Camp of U. S. Troops,
Frederick, Weld County, Colo., May 29, 1914.

The Official in Charge,
Baum Mine.

Sir:

In case of unsolicited applications for employment at your mine by men desiring to fill vacancies existing, caused by men voluntarily leaving, the employment of these men, under the conditions mentioned, will be approved, unless some special reason is known not to do so.

Men so employed must be promptly entered on the daily report, and in case their employment is not approved, notification will be sent you at once.

Very respectfully,
H. J. McKENNEY,
Captain 12th U. S. Cavalry,
Commanding Frederick District.

The War Office Requires All "Recently Hired" Men Not Citizens Be Discharged

Headquarters U. S. Forces,
Boulder-Louisville District, Aug. 17, 1914.

From: The Commanding Officer.
To: Baum-Consolidated Coal & Coke Co.
Subject: Employment of labor.

In compliance with instructions from the War Department, dated Aug. 14, 1914, the following regulations on the employment of labor will be enforced in this district. Laborers recently hired who do not conform to these regulations will be discharged:

1. Miners must seek work at the mines.
2. Miners must not be gathered and brought in by operators.
3. Miners must be citizens of the state of Colorado.
4. Miners must have complied with the laws of Colorado which relate to miners.

J. WATERMAN,
Lieut.-Col., 12th Cavalry,
Commanding U. S. Forces.

A Request for an Explanation

Aug. 19, 1914.

Capt. H. J. McKinney,
Troop I, 12th Cavalry, U. S. Army.

Dear Sir:

In order to obtain a clearer understanding of the last labor regulations you have issued, dated Aug. 17, 1914, we would like to have your decision upon the meaning of several things therein that are not now quite plain to us.

Does this regulation apply to merely "miners," as it states, or to all employees about a coal mine? A miner, as understood by us, is the actual coal digger—the man who shoots and loads the coal at the working face. This is generally so understood in all coal-mining practice.

I wish particularly to inquire, in this regard, what we are expected to do about the skilled labor, or craftsmen, who are so necessary to the operation of this mine and its machinery, and who, as a class, almost never apply at the mine in person for employment. This would include the following men: Mining engineers, draftsmen, helpers; office and supply clerks; master mechanics and electricians; shopmen—skilled laborers, such as blacksmiths and carpenters; hoisting engineers; firemen; foremen and bosses; certificate men—such as pit boss, firebosses, shot inspectors, etc., who are required by state law, and must have a state certificate of competency; pumpers and pipemen; weigh bosses, employed by the railroad weighing association; machine runners (skilled labor).

In regard to article 3, which requires that "miners be citizens of the state of Colorado," I beg to state to you that, if interpreted literally, it will practically close down this property. About 5 per cent. of our usual winter's operating force are Colorado citizens, and only about 20 per cent. citizens of the United States. Even restricting the employing of applicants to those who are **residents** of this state will more seriously handicap the operation of this mine than any of the regulations heretofore required.

Our intention is at all times to exactly comply with all rules and desires of the War Department regarding us. We are not evading these rules now, nor will we under any circumstances, even if we are seriously curtailed in our normal output this winter over what we have enjoyed for the last several years.

Therefore, we ask particularly about these points that we do not at present thoroughly understand.

Yours very truly,
C. W. SMITT,
Mine Superintendent.

The War Office Again Backs Down, But Is Still Unreasonable

Headquarters U. S. Troops,
Boulder and Louisville District.
Date, Aug. 22, 1914.

From: The Commanding Officer.
To: Baum.
Subject: Employment of labor.

In conformity with further instructions received from the War Department, dated Aug. 20, 1914, the following modifications are made in the circular letter to the mines, dated Aug. 17, 1914:

1. The word "miners" as used in the circular letter is construed to mean all employees of the mines.
2. Mines may retain all employees on their rolls Aug. 23, 1914, if employment complied with 1 and 2 of circular letter of Aug. 17, 1914.
3. One year's residence in the state of Colorado will be required of all employees hired after Aug. 23, 1914. Citizenship will not be required.

J. MALINE,
Lieut.-Col., 12th Cavalry,
Commanding U. S. Forces.

What Will Happen if Troops Retire

The miners seem to have made up their minds to resist the militia should it take the place of the U. S. troops and perhaps prospects of certain bloodshed following a withdrawal of his forces has made the President halt in his plans. J. F. Welborn states that:

At a meeting at Trinidad, Oct. 28, two organizers advised the men that it had been decided to drill the strikers and get ready for the militia. Within the last ten days an officer of the United Mine Workers of America, who is one of the leaders in the Trinidad district, stated in effect to a federal army officer that as soon as the federal troops are withdrawn the strikers will attack the state militia if recalled into the field, and will also destroy the property of the mining companies. He stated that in preparation for such an event union men in the neighboring states to the number of 3000 have been organized, drilled and armed and are in readiness to move when called on.

Is the Militia Entering the Coal Field?

On the other hand the U. M. W. of A. officials declare that armed militiamen are entering the mining district so as to be ready to protect the lives, liberties and property of the operators should the U. S. army be removed. But the officials do not so word their declaration. A message, stating that 14 militiamen in charge of Dr. Curry of the Victor-American Fuel Co., had been introduced into the coal field and condemning their intrusion as intended to incite trouble, was sent to the President on Oct. 21 by F. J. Hayes, J. R. Lawson, J. McLennan and E. L. Doyle, the policy committee of the strikers.

Mine Closed Down

The troops are still interfering with operation. The Jeffryes' mine at Starkville was shut down, according to one report, by U. S. troops because it had been opened without permission. A sergeant of the U. S. Army ordered the mine closed. Jeffryes refused and the sergeant returned to camp for four troopers and returning compelled the closing of the mine. The operation is run by the Jeffrye Coal & Mining Co. Our records show that the corporation produced 18,394 tons in 1910 and 24,214 tons in 1911 corresponding to daily tonnages of about 90 and 120 tons respectively. The government will soon interfere if John Smith, groceryman, hires a new clerk.

The Activities of the Militia on Behalf of Union

"Muckie" McDonald, the president of the Butte Mine Workers' Union; Joseph Bradley, the vice-president; Thomas S. Coyle and Mrs. Florence Gillis have been arrested. The first two are charged with deporting a miner, Edward O'Brien. The others were held pending investigation. McDonald is discovering that deportation of a union man is a crime of first magnitude in Montana, whereas in Colorado it is hard to secure conviction of a man for wilful murder, so uncertain is the administration of justice in union-ridden states. Still, McDonald may take comfort as he has been apparently mixed in even less creditable ventures than the one which is directly the cause of his arrest, namely, the seizing of 37 Federation men at the shaft mouth.

Sheriff Timothy Driscoll and Mayor Lewis J. Duncan have been found guilty of neglect in connection with the Butte riots by Judge Roy E. Ayres, of the district court. This is the sad fate of these socialist authorities. However, Butte still has a socialist in control, Clarence A. Smith, the president of the city council.

The Arkansas Situation

It will be remembered that on Apr. 4, the Bache-Denman mines commenced to operate on the "open shop" basis. There was constant disorder, as Arkansas is a strong union state. The company got an injunction from Frank Youmans, the U. S. district attorney, prohibiting interference with the operation of the mines. Franklin Bache was later appointed receiver. On July 17 and following days, when the mines were still under the authority of the court, the guards and miners were driven away, the tipples of five mines were burned, and two employees of the company were killed and their bodies cremated.

Judge Youmans asked for the assistance of the U. S. War Department. Until recently, the government has apparently been actively interfering with order, having required, it is said, the discharge of U. S. marshals, who before the burning of the tipples were guarding the property under the authority of the court. However, Lindley M. Garrison, Secretary of War and President pro tem, in the absence of Woodrow Wilson, issued an order for four companies of the Fifth Infantry to proceed from Fort Sheridan, Ill., to Fort Smith, Ark., to enforce the orders of the federal court. The commandant is Maj. Nathaniel F. McClure. Four miners have surrendered to the federal forces and perfect order prevails.

The Secretary of War says, relative to this action:

We have reached the conclusion that it is impracticable to enforce the law and the orders of the United States Court in Arkansas by any other means. The court had appointed a receiver for the coal mines; the mines had been blown up and the men who had been arrested charged with the crime had been forcibly released from the custody of the U. S. marshal by their friends. The U. S. court had been unable to enforce its processes.

The troops will not undertake to serve any processes; they will confine themselves to making it possible for the civil officers to perform their functions.

Immediate Reason for Action

On Oct. 28 members of a mob fired on two U. S. deputy marshals and on nonunion employees of Prairie Creek Mine No. 3, and burned eight unoccupied houses belonging to the Bache-Denman Coal Co. On the 31st they took government prisoners from Deputy Marshal Black. On the 5th of November six more houses were burned including a boarding house which had been designated as headquarters for the officers of the U. S. Cavalry force on its way to enforce the orders of the U. S. court.

It is said that the United States has not taken action since 1894 except on request of state authorities. At that time troops were sent by Grover Cleveland to Chicago to prevent the interference with U. S. mails and interstate commerce.

The Eastern Ohio Strike

No change is perceptible in eastern Ohio. Much political capital was made by Republicans out of the Mine-Run Law. The Democrats were urging its passage as a reason for continuing them in office. The Republicans urge that the bill was framed without any intention of ousting screens, showing that under its provisions the miners could still receive a lower price for slack than for lump coal; so low, in fact, might be the price paid for slack that the law would be practically inoperative. One of the propositions of the operators, it will be remembered, was to pay 2c. per ton for slack and 99c. for lump coal.

The case of the Rail and River Coal Co. against the Industrial Commission of Ohio, regarding the constitutionality of the Mine-Run Law is set for Nov. 30. Assistant Attorney-General Laylin filed a motion to dismiss the case. Chief Justice White announced the dismissal on Oct. 26 but finally granted an order for an argument of the case as stated Nov. 30.

Kentucky Workmen's Compensation Law

The validity of the Workmen's Compensation Law of Kentucky, enacted by the last legislature, was recently threshed out in court for the first time at Frankfort. It was argued that the law makes the administering board a judicial body, that it takes away the due process of law by practically coercing employers and employees into an agreement to arbitrate; that it does not allow sufficient compensation, and that it undertakes to bind the administrators of persons killed in industrial accidents as to the amount of recovery.

All these contentions are denied by the state, which maintains that the board has powers of arbitration only, and that the law applies only to those who elect to accept its terms; that the benefits stipulated are greatly in excess of the average amounts recovered in suits, and that a majority of industrial accidents are of a nature to deny recovery in the courts. The provision relating to administrators does not involve the validity of the law, it is declared, and may be left until some administrator brings suit under it.

The case was argued before Judge Stout, and an appeal will be taken from his opinion to the court of appeals, which will rule finally as to the constitutionality of the law. The compensation provisions become effective on the first of the year.

Illinois Problems

The three coal operators' associations in Illinois, known respectively as the Illinois Coal Operators' Association, the Central Illinois Coal Operators' Association and the Fifth and Ninth districts organization, agreed in the spring with the miners that they would appoint conjointly an arbitrator who would represent them. Edwin T. Bent, of Chicago, has met with the approval of the Illinois Coal Operators' Association and that of the coal operators of the Fifth and Ninth districts. Those in the Central Illinois Association refuse to indorse him, preferring George Wood, of the Chicago-Springfield Coal Co.

The Illinois Mine Workers have chosen John H. Davis, of Herrin, Ill., vice-president of the Seventh Subdistrict, as their representative on the arbitration board, and it is the intention of both parties to arbitrate under the agreement ignoring the Central Illinois operators, who will settle their difficulties in the old manner through the subdistrict and state executive boards.

Articles for Next Week

The Nov. 21 issue of COAL AGE will contain a number of articles sure to be of interest to all our readers. First there will be a detailed description of the new Loomis colliery just being completed by the Delaware, Lackawanna & Western R.R. Co. at Nanticoke, Penn. This plant is the last word in anthracite construction. Several articles intended for this week's paper were crowded out and will appear next week. One of these describes "A Modern English Mine-Rescue Station." A second article deals with the subject "Coal Waste in Mining Plants." Other articles will describe "A New Briquetting Plant," "Colliery Lubrication" and "Machine Mining in Pitching Seams."

Extracts from a Superintendent's Diary

Every payday we are reminded that we are not entirely separated from the outside world.

Early in the morning, collectors from near-by cities begin to arrive and throughout the day they wind about the streets of our village interviewing their clients wherever they chance upon them.

Installment furniture men, crayon-portrait solicitors, sewing-machine agents, phonograph agents, mail-order tailors, piano and organ demonstrators, all are present.

Time was when I looked upon solicitors of this class as parasites, and on more than one occasion, I have heaped insult upon some of them and then worked myself into a fury because they refused to be drawn into argument.

I first began to see things in a different light several years ago. We had a widow living in the camp who supported herself and a young daughter principally by taking in washing. Now the washing industry, like all other industries, strange though it may seem, has periods of depression, and it was during one of these hard-time periods (the miners of the camp were only working half time, and most of their women folk were counting their nickels and the dimes pretty closely) that the widow's financial affairs got beyond her control. I was appealed to and found that the straw that seemed to have broken the camel's back was a phonograph bought on the weekly installment plan.

I paid a visit to the phonograph salesroom and proceeded to tell the manager what I thought about him and his business methods. The widow had paid in one-third of the price of the instrument and the dealer agreed to take back the phonograph and cancel the obligation. Then to encourage the widow, I gave her a check equal to the amount she had already paid on the phonograph.

The lady who had first mentioned the widow's plight to me assured me that this would enable the widow to reestablish herself on a self-supporting basis.

But it transpired that my lady informant and I reckoned without full knowledge of the hankerings and aspirations of the widow in question.

What did the widow do but go to the phonograph company and pay them the check that I had made out to her. This payment with the amount previously paid in installments left only a balance due on the phonograph of one-third of the purchase price. They agreed to give her as much time as she might desire on this balance.

I decided then and there that phonographs meant more to some people than I had imagined, and a little investigation convinced me that in many cases things bought on the installment plan, although often purchased at outrageously high prices, brought cheer and pleasure, which far outweighed their purchase price, even measured in terms of sacrifice and self-denial.

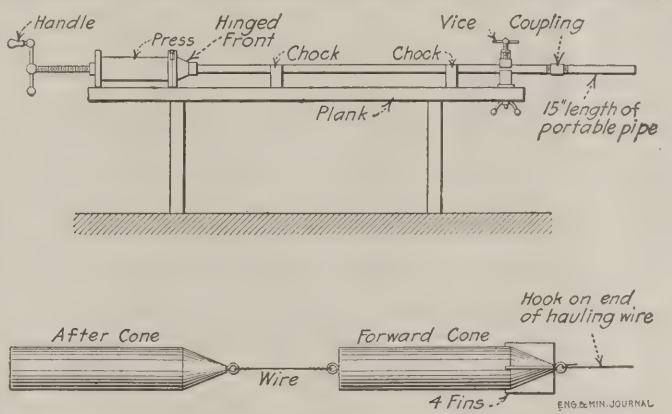
And now as I look back at my arbitrary high-handed rulings in the past in dealing with the installment men, I fail to find justification for my actions, even admitting that the purchasers could have gotten along without the things purchased.

Its pretty easy to justify offhand most any action taken on behalf of the weak and lowly, because the argument is always based on a lot of assumptions that we consider self-evident. They are self-evident only because we do not take the trouble to investigate closely. And it is quite possible that many of the misunderstandings around our diggings, and other people's diggings as well, could be traced back to ill-advised interference with everyday affairs of the humble, on the part of well meaning higher-ups.

Lining Pipe with Cement

Cement-lined wrought-iron pipes, because of their freedom from interior corrosion and stoppage, have been used for water service to some extent for many years. Recently, a company has been organized in Boston to line pipe on order, either taking pipe supplied to it or furnishing the pipe itself. This fact is of interest on account of the possible application of the cement-lined pipe to mine uses. The procedure in lining the pipe is described in *Engineering News,* Oct. 8, as follows:

A screw-piston press, 5 in. in diameter and about 18 in. long, mounted on one end of an 18-ft. plank, is used to force the mortar into the pipe. The forward head of the press cylinder is hinged to swing open; it has a central hole threaded for 2-in. pipe (other sizes are accommodated by use of bushings). The cylinder head is swung



Apparatus Used in Lining Pipes

open, the cylinder filled with mortar, and the head closed and locked. The pipe to be lined is then screwed into the hole in the cylinder head. By forcing the piston ahead, the cement is then shoved out into the pipe. After this the pipe is unscrewed and moved along into a vise at the front end of the plank. A coupling is set up on the forward end, with a portable length of pipe about 15 in. long screwed into it as far as another pipe would be fitted, usually about six threads; this keeps the threads clear of mortar for connecting one length of pipe to another.

A stiff wire is now pushed through the cement in the pipe, from the front end, and a pair of tapered mandrels pulled through the pipe by means of this wire, to core out the bore of the pipe. The mandrels are short lengths of brass pipe with tapered front end, fastened together by a loose wire. The outside diameter of the mandrels is ¼ in. less than the inside diameter of the pipe. The forward mandrel has four longitudinal fins, at 90° intervals, to center it in the pipe, while the rear mandrel is smooth and, following through the bore made by the first mandrel, finishes it to shape and surface. The result is a smooth ⅛-in. lining of cement mortar.

After inspection, the pipe is laid away for the mortar to harden. The short length of pipe at the point is unscrewed, but the coupling is left on. All tees, elbows and other fittings are also lined with cement mortar, giving a smooth and continuous interior surface.

Editorials

Alaska

The Mine Inspector for the Territory of Alaska in a recent report dismisses coal mining in that section of the United States in a few brief words. His reference is necessarily as short as one which might have been penned by a British governor relative to the iron industry in the American colonies when his Britannic majesty was disposed to believe that dependencies should not enter the mechanic industries and should be discouraged. He says:

> Coal mining has not received much attention. Two groups of claims were patented and operations begun on them. About 1600 tons of lignite coal was shipped from the Whorf property near Seldovia, on Cook Inlet. Much of the coal brought $4 per ton f.o.b. the mine, though some was delivered at Seward at that figure.

He goes on to tell about the expedition of the Bureau of Mines and its exploratory work and says:

> A small quantity of lignite was mined near Candle and Wainwright for local use, and patents were issued on claims in the Cook Inlet field and on Admiralty Island.

That is the summary of the coal production of the great coal districts of Alaska in the year of grace 1913. It sometimes seems as if Russia would have done better work in developing the Alaska coal than has the U. S. Government if she had only retained her American possession. The only real coal mine is at Seldovia. It mines 5 tons per day, the stint of one red-blooded man, and this mine was opened by the Russians years ago before the United States obtained Alaska.

The same inspector who thus reports a contemptible coal industry gives page after page of information on the gold, silver and copper outputs and mines. Ten thousand tons of copper came from the territory of Alaska in 1913 and only about 1600 tons of coal.

We cannot see why the general public believes gold and silver prospectors should be encouraged and coal miners harried and plundered at every available opportunity. For coal is power; it lightens burdens and gives warmth to all, whereas gold and silver are but the symbols of real things and the world would be almost as rich had men possessed neither.

American Coal and the War

The European war has changed the coal business at San Francisco from one of the most prosaic of trades to one of the most romantic. For several months past English and German cruisers have played hide-and-seek up and down the Pacific coast, just outside the three-mile limit in making efforts to capture merchant vessels of the opposite nationality engaged in the trans-Pacific trade. Numerous hairbreadth escapes have occurred on the part of the harassed merchantmen, and but few captures have been effected.

The problem of coaling has been a strenuous one for the German war vessels thus far and all sorts of strategic methods have been tried.

The steamer "Mazatlan" was held in San Francisco under suspicion of attempting to violate the neutrality regulations for some time before being allowed to sail for Mexico with coal. It has been claimed by interested parties that this coal was finally lightered out to a German war vessel after being delivered in Mexico and the case is still being threshed out by U. S. Government authorities.

A more celebrated case, however, is that of the steamer "Sacramento," formerly the Kosmos liner "Alexandria," a German steamer, which had been interned at San Francisco for several weeks, in company with its sister ship, the "Serapis." The North & South Steamship Co. was formed in San Francisco by local parties who purchased the "Alexandria" and registered it as the "Sacramento" and raised the American flag. A cargo of coal was loaded for South America, ostensibly for the use of an electric lighting plant. Rumors were started that the cargo was intended for German warships off the coast and much delay resulted, the vessel being kept under surveillance while protests were passed back and forth between San Francisco and Washington. Finally, the "Sacramento" was permitted to leave port and it is now well on its way to its destination, if it has not been captured by some British war vessel. In case of such capture, an international case of the highest importance will be developed.

The real danger to American trade lies in the fact that if German vessels are allowed to sail in this manner, and warships are coaled, the British are sure to raise the rates of war-risk insurance to a point that will seriously hamper our efforts to build up a merchant marine. It is reported on good authority that steps appear to have been taken already looking in this direction.

Panama Canal and American Coal Trade

One of the most important recent changes affecting the American coal trade is the impetus added to the shipping of American coal from the Atlantic coast to San Francisco and other Pacific ports through the opening of the Panama Canal. Heretofore the greater part of the coal that came around the Horn constituted shipments of steam coal for the United States Government for the use of the navy, and practically all of that was carried by foreign bottoms.

Now that the opening of the Panama Canal and the granting of American registry to foreign vessels is permitting a material increase in the United States merchant marine, a number of new steamer lines are sending scores of vessels via the Panama route to the Atlantic ports laden with lumber, dried fruits, canned fruits and a variety of Pacific coast products. These vessels must have return cargoes in order to operate successfully, and coal has already become a very important item in their westbound cargoes.

The Sudden & Christenson Steamship Line, which has six steamers engaged in the intercoastal-traffic, has already delivered several cargoes of coal at Pacific ports

and has more on the way. Other lines are seeking to build up a similar traffic. This Eastern coal trade will come into direct competition with the Australian bituminous coal, which has for many years been a favorable fuel for domestic use in San Francisco.

One difficulty Eastern producers of high-grade coal will have to face is the task of educating San Franciscans up to paying more for this American coal than they do for the Australian product. However, in the matter of price, some of the Alabama coal should be able to compete successfully with the foreign product.

In most parts of the Pacific coast, oil predominates as fuel. However, the coal trade is not inconsiderable even now and is certainly increasing. California is not a coal-producing state, although there are mines at Stone Cañon, Monterey County, which might produce a fair grade of fuel. Just at the present time, these mines are not operating, owing to difficulties in getting the coal to market, and also because of recent numerous fires in the mines.

In California there is probably 50,000 tons of Eastern bituminous coal used each year. This tonnage is now being brought by way of the Panama Canal, and because of the reduced freight rate is selling at $3 per ton under former prices.

As a further stimulus to the coal trade, it is predicted that the United States Government, in order to attract business to the Panama Canal in competition with the Suez route, will establish coaling stations in the Canal zone, which will enable steamers passing through the canal to replenish their coal supplies at this point. An article covering this subject will be published in COAL AGE about Nov. 28.

Proper Mining Laws

No matter is more vital to the coal industry than action tending to the passage of sensible, comprehensive mining laws. The industry should be carefully and completely regulated. It is not a business that can be ruled at random. The hazards are great. However, legislation can be enacted that will govern and yet not stifle progress. We can rule in the interest of safety and efficiency and still encourage the mine owner to broaden and develop his operations.

We therefore call particular attention to the discussion now starting on p. 798, and we sincerely trust that every coal man who can spare a few minutes' time will write us his views so that every phase of the subject will be brought to light. We need uniform laws—not legislation that handicaps one operator and benefits his competitor in another field. We also need laws that can be enforced; therefore they must be based on experience and a complete understanding of the economic and physical difficulties surrounding mining.

The folly of the coal industry has been the policy of its units to act independently. Individual initiative is all right, but beyond a certain point results can be attained only by united effort.

How can the industry, in your eyes, be benefited? How can the safety of men and property be advanced? How can coal supplies be conserved and efficiency of operation be insured? What laws are foolish, unfair or impossible? What and where is the remedy? How can we put the industry on a conservatively profitable basis?

When we have published a sufficient number of answers to these questions, COAL AGE will try and see that lawmakers in all coal states receive a copy of the correlated views of its readers.

A State of War and Yet No War

The correspondence in relation to the Colorado strike conditions published in this issue shows the undesirability of absentee control and the lack of knowledge of the situation in Colorado on the part of the President's cabinet. First, no man may be employed, then none but those who come unsolicited and to replace those not discharged, then none but citizens, and finally none but residents. The only consistent element in the rulings was the desire to hamper operations and help the union as far as possible without outraging public sentiment.

The President thinks it unreasonable to keep troops in Colorado indefinitely. The operators may well think it equally unreasonable for him to hedge their business operations with restrictions for such an extended period of time. In every case of martial interference with private business, coercion should be removed first, the troops much later. If coercion and offenses against liberty continue up to the end of the occupation, how can conditions be normal when the force is withdrawn?

If operators cannot be allowed to hire men because a state of war exists making this inadvisable, how can the time have arrived for excusing the President in declaring that the war has come to an end and justifying him in the removal of troops?

British Face Difficulties

The supply of pit-props in Great Britain is fast disappearing. This is one effect the present war is having on coal mining in England and Wales. There is very little timber available in Great Britain for use as mine supports, and the supplies from Russia and other countries are greatly curtailed.

The question seems to be as to what material shall be substituted for wood. One company in meeting the situation has purchased a quantity of second-hand metal tubes. Some of these measuring 5 ft. long and 3½ in. in diameter were built into novel props. At the top and bottom there was a tapered plug which fitted tightly inside the tube; between these two plugs, coal dust and sawdust were inserted and compressed. The resulting prop was less rigid and would bear weight without buckling.

Truly, war creates necessity and necessity fosters invention.

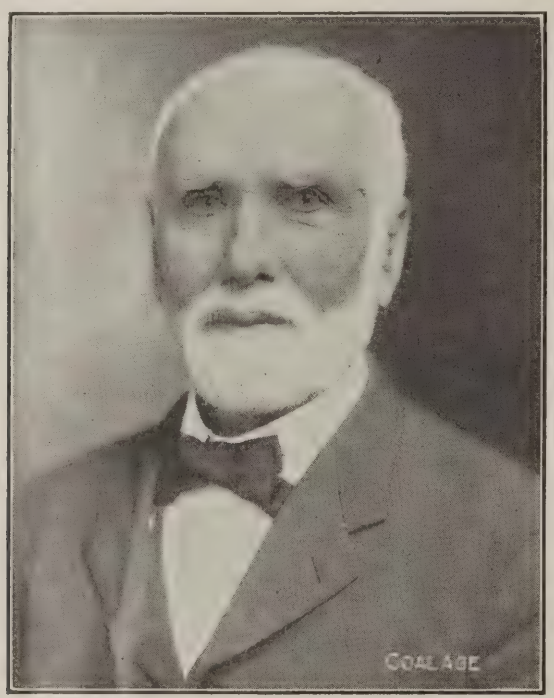
It is no surprise to us that the voters of Ohio have signified their impatience with the high-handed methods of the retiring administration in that state. Certainly the issue was closely contested. But this was only to be expected when one remembers the spectacular appeal for the labor vote which Governor Cox made at the sacrifice of every other consideration. It is particularly gratifying, in the face of such a desperate effort, to note that the conservative element of the population still predominates. In the years to come, when the people of Ohio look back upon the record of the coal industry for 1914, this alone will be sufficient explanation for the present change in administration.

Who's Who in Coal Mining

Robert Lee

One of the pioneers of the coal industry of the Middle West is Robert Lee, of Rock Island, Ill. He was born in the County of Durham, England, July, 1834, and came to the United States with his parents when 14 years of age. The Lees settled first in Pittsburgh, later moving to Washington County, Penn., where they resided until the fall of 1851. In this latter year the family moved to Hawesville, Ky., a town on the lower Ohio River.

While in Kentucky, the elder Lee purchased a farm in Perry County, Ind. However, young Robert Lee had secured work in the coal mines near Hawesville, and continued in this employment after his father and the rest of



Robert Lee

the family had gone to Indiana to live on their farm. In August, 1856, Robert Lee married, and after spending a short time at his father's home in Indiana, left for Rock Island, Ill., where he secured employment with the Coal Valley Mining Co., being the first miner engaged to work for this newly organized corporation.

Mr. Lee continued in the employ of the Coal Valley Co. as a miner and tracklayer until the fall of 1861, when this same company proposed to him that he take a lease from them to open up a mine for the local trade. He accepted this proposition, signing a five-year lease, with the privilege of a three-year extension.

Shortly after Mr. Lee had opened up this new mine and put it on a producing basis, the Coal Valley Mining Co. offered him the superintendency of their railroad mines. He accepted this position, which change in his employment necessitated his turning over the management of the local mine to a partner, whom he had taken into his business some time previous.

In 1865, Mr. Lee, in conjunction with his partner, purchased the property and stock of a general store in the town of Coal Valley. This business was managed by hired employees, under the firm name of Lee & Bardsley. In October, 1869, Mr. Lee left the employ of the Coal Valley Co. to engage in the active management of his mercantile business. The following year he purchased his partner's interest in their commercial venture and devoted his full time to merchandizing. In 1875, his health failing because of too close confinement to business, he advertised for sale all of his store properties and stock of goods.

Officials of the Coal Valley Mining Co., in August, 1875, proposed to Mr. Lee that he locate and purchase a new coal field for their company in Mercer County. This work he accomplished, and in 1876 his employers built the Rock Island & Mercer County R.R., a branch line 26 miles long and extending to Cable. In 1894, this line was built on to Sherrard, where the Sherrard mine, a property still operating, is located.

In 1907, Mr. Lee was again confined to his home by illness, and in September of that same year wrote his resignation to Carl Scholz, president of the Coal Valley Mining Co. This resignation was accepted by Mr. Scholz on Sept. 11, the 51st anniversary of the day Mr. Lee first entered the employ of the Coal Valley Co. Since that time Mr. Lee has lived a retired life, his second son, Robert Lee, Jr., having succeeded him as superintendent of the Coal Valley Mining Co.

There is no man who has ever been connected with the coal-mining industry of the Middle West more universally beloved than Robert Lee, the daddy of them all in the State of Illinois.

A Record Output in Illinois

The mine of the New Staunton Coal Co., located at Livingston, Ill., has been hoisting coal at a very rapid rate since business began to pick up for the fall. During the first half of September, working $9\frac{7}{16}$ days, they hoisted 42,289.8 tons, making an average of 4481 tons per day. During the second half of the same month, working ten days, they hoisted 45,822.95 tons; making an average of 4582 tons per day. This makes a total average of 4533 tons for every day worked during the month of September.

The best single day's hoist made at this mine was on Oct. 3, when an output of 4772 tons was brought to the surface, which required 1635 hoists. This mine is located on the Big Four R.R., in Madison County, and is a shaft mine. The shaft is 287 ft. deep to the No. 6 seam; the coal is mined by machines and is of a good quality.

The annual output of the mine for the past three years has been as follows: 1912, 737,632 tons; 1913, 848,715 tons, and 1914, 805,752 tons. There were several weeks that the mine was idle, during 1914, on account of the wage settlement. For the year ended June 30, 1913, this mine ranked first in the state in production; it was third in 1912, although during 1912 they made the best average for the whole year.

T. G. Hebenstreit is the superintendent in charge of the property, and great credit is due him for his able management. We can expect even greater records to be made under his careful and efficient supervision.

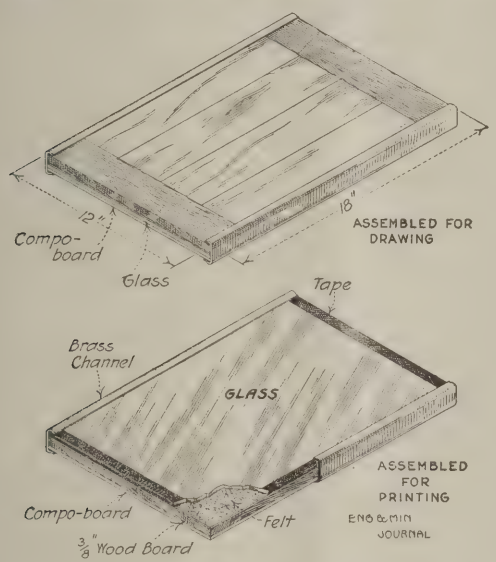
The need for boiler settings which will not leak air has caused the United Electric Light & Power Co., of New York City, and others to case their boiler settings with steel, using heat insulation between the brickwork and the metal to protect the latter.—Bromley in "Power."

Portable Combined Blueprint Frame and Drafting Board

Many engineers engaged in examination work have felt the need of tracings and blueprints to accompany their reports and often have had to wait to make them until a place was reached where there were facilities—with inconvenience to themselves and loss of valuable time. For this reason, an article by F. W. Foote in the *Engineering & Mining Journal* is of timely interest to coal engineers.

Mr. Foote has devised an outfit which is light and compact, fitting in a suitcase, and performing well the work required of it. It consists of a drawing board, 12x8 in., built with end cleats rather than back cleats; a piece of "Compo" board; a piece of clear glass of the same dimensions; and two channels of brass, 18 in. long and of the desired thickness.

The drawing board is ⅜ in. thick. If made up of several narrow strips and held together by the end cleats, the danger of warping is greatly reduced. One side is



MANNER OF ASSEMBLING FOR DRAWING AND FOR PRINTING

dressed for drawing and the other side is covered with felt. The glass is bound on the edges with adhesive tape to prevent chipping and lessen the danger of cracking where the channels come in contact with it. The channels are of sufficient depth to accommodate the board, glass, "Compo" board, a reasonable amount of tracing cloth, drawing paper and blueprint paper, the latter being kept in a black-lined case or tube to protect it from the light.

The drawings show the outfit assembled with the glass inside, for use as a drawing board; and also with the glass outside for blueprinting. Thus assembled, it can be set up in any window-sill in the sun and the blueprints washed in the bathtub if the engineer is in a hotel or in a hand basin if he is in the field. The whole outfit may be made for a dollar or so; if it does not have to be carried in a suitcase, the size may be altered as desired.

Our Front Cover This Week shows two installations of Jeffrey mine fans. The upper one is a view of a 16-ft. double-inlet exhaust fan, direct connected to a steam engine for the Delaware, Lackawanna & Western R.R. at the Truesdale Colliery, Scranton, Penn., and the lower view is a 20-ft. double-inlet exhaust fan, direct connected to an engine installed at the Woodward colliery of the same company.

Difficulties in Fan Shipment

The Henderson Coal Co., for installation at a new development at Hill Station, Penn., recently ordered a 150,000-cu.ft. capacity Sirocco fan, to be shipped from the factory assembled. As the limit of height for a railroad car was 15 ft., it was necessary to decidedly alter the construction of a flat car to accommodate this wheel.

As finally shipped, the fan wheel was supported on edge and extended down through the floor of the car, clearing the top of the rails by 6 in. This allowed the wheel to successfully pass under bridges and through tunnels on the railroad. The wheel alone weighed nearly 6 tons, while its steel housing made up a separate carload.

While many fans are at present in use of larger diameter than this one, it is seldom that the large sizes are shipped in one piece, or that such severe measures have to be taken in their transportation.

A Record Production

Ebensburg No. 1 mine of the Ebensburg Coal Co., at Colver, Penn., for the month of October, produced 102,700 net tons. This is remarkable, when it is considered that this is from a single opening, and the seam of coal only 3½ ft. high. It is doubtful whether this feat has been surpassed or equaled by any single opening in the United States operating in a low bed of coal.

COAL AGE especially invites data from coal companies recording instances of noteworthy achievement.

Erratum

R. V. Norris informs us that the equation for size of pillar in his article on "The Conservation of Anthracite Coal," republished in our issue of Oct. 31, on page 707, should read:

$$p^2 + \left(\frac{7}{3}T - \frac{DT}{300}\right)p = \frac{CDT}{300}$$

The equation $s = \frac{8fx'}{3ws}$ should read $s = \frac{8f}{3w}$;

$\frac{x'}{s}$ = number of cars per yard of chamber.

Coming Meetings

The American Society of Mechanical Engineers will hold its annual meeting in New York City, Dec. 1, 2, 3 and 4, 1914. Calvin W. Rice, secretary, New York City.

The American Mining Congress' seventeenth annual session will be held at Phœnix, Ariz., Dec. 7, 8, 9, 10 and 11, 1914. J. F. Callbreath, secretary, Denver, Colo.

The Coal Mining Institute of America will hold its winter meeting Dec. 8 and 9, 1914, at the Fort Pitt Hotel, Pittsburgh, Penn. Charles L. Fay, secretary-treasurer, Wilkes-Barre, Penn.

The West Virginia Coal Mining Institute's winter meeting will be held at Huntington, W. Va., Dec. 9 and 10, 1914. Prof. E. N. Zern, secretary-treasurer, Morgantown, W. Va.

The American Institute of Mining Engineers will hold its annual meeting in New York City, beginning Feb. 16, 1915. Bradley Stoughton, secretary, New York City.

The Kentucky Mining Institute's winter meeting will be held Dec. 4 and 5, 1914, at the Seelback Hotel, Louisville, Ky. Ivan P. Tashof, secretary-treasurer, Lexington, Ky.

Discussion By Readers

Mining Law, Legislation and Mine Regulations

Letter No. 3—In the issue of Coal Age, Oct. 31, p. 698, I note the invitation for comments and discussion relating to mining laws, legislation, or mine regulations, by those affected by such laws and regulations. This suggestion is most timely, and I hope that it will receive the cordial response that it deserves.

I am especially prompted to write this letter because of a very common misunderstanding in regard to the representation made by coal operators and operators' associations, before the state and national legislatures. There is no question that the coal operators have been too diffident in respect to the presentation of suitable laws for enactment designed to benefit the industry. Mining laws should involve both the safety of employees and the stability of the business, as the two go hand in hand. Any legislative measure that unfairly attacks the industry, sooner or later reacts upon the employees, either by affecting their wages or conditions of safety, or both. Therefore, proper representation by the coal operators before the law-making bodies is not only desirable, but *a positive obligation.*

Too often such representations are referred to as "lobbies," with the common understanding that a lobbyist is either a grafter or a person who, by undue influence over legislators or congressmen, endeavors to obtain a condition to which he is not properly entitled. No worse misconception could exist in respect to any honest and legitimate endeavor, on the part of those interested, to secure legislation that would benefit an industry.

With the many problems that confront our legislative houses, both state and national, it must be evident to thinking men that their representatives cannot possibly be thoroughly posted on the various matters that come before them and demand intelligent action. A legislator cannot possibly vote intelligently on a matter pertaining to a line of business with which he has little or no practical acquaintance, unless he can appeal to some authority for correct information and advice.

For example, it is not reasonable to suppose that a congressman from Florida would know much about the apex law, which is of the greatest importance to the metal-mining industry. Many similar examples can be mentioned, and it would seem necessary, therefore, for the various industries to have representatives available on whom members of congress can call for any desired information, which should be furnished them as accurately as possible. By such methods it can readily be seen that what was formerly known as a "lobbyist" would, instead, prove to be a most useful representative. I may add that with this purpose in view, solely, the American Mining Congress has maintained its office at Washington.

The mining laws of Illinois have been very carefully considered by a commission appointed for that purpose. The members of this commission were chosen from representatives of the mine owners, mine workers and the state and national governments. The work of this commission has resulted in giving to Illinois complete and effective mining laws, which afford greater protection to the mine workers than the previous statute. It has even been stated that the Illinois code is "as fine a body of mining laws as exists in the United States, and that its solicitude for the well-being of the worker has been carried to the point of injustice to the mine owner." This editorial statement, in one of the leading newspapers of this country, emphasizes the fact, which is quite generally true, that *mining conditions are viewed from the standpoint of the employee only.*

Besides its excellent mining code, Illinois has a Workmen's Compensation Act; and many of the mines of the state are being operated under that act. It yet remains to be seen, however, whether this will afford the expected protection of the mine workers; because as the old adage says, "You cannot get blood out of a turnip."

Consider, for a moment, the terrible results of the great mine disasters that have occurred and are still taking place in Illinois. In the case of the recent catastrophe at Royalton, it is generally hoped and believed that the company will be able to provide for the widows and orphans created by that disaster, just as the St. Paul Coal Co. was able to do in the Cherry disaster, Nov. 13, 1909. Fortunately for the families of the victims, in the latter case the company had the backing of a large corporation, which provided the desired protection.

But, from this condition, let us turn and ask, What would have been the effect of the Workmen's Compensation Act had the Cherry mine been owned by one of the many coal companies in this state not backed by other interests? Would it not have meant financial ruin to the company accompanied in most cases with no compensation to the widows and orphans? Under the present existing conditions of the coal industry in Illinois, it is a serious question whether, in the majority of cases, a great mine disaster would not mean the ruin of the coal company, without furnishing the desired compensation to the victims.

In order to be of value to the state, the coal industry must be placed on a sounder basis than exists at the present time. There must be coöperation. In the present order of things, coal-mine owners must deal with the miners' organization, in respect to the *wage scale.* In the matter of furnishing *protection to employees,* they must deal with the state of Illinois, either through the Compensation Act or by voluntary settlement of lawsuits. But, in the *sale of coal,* the coal operators stand singly and alone, with the result that the fiercest competition exists, which is destroying the industry by preventing an earning commensurate with the risk of the business. The present condition not only deprives the company of its just earnings, but robs the dependents of the employed, in case of accident, since no claim however deserving is of value when the company is bankrupt.

The coal operators do not desire a trust or a monopoly, and it is obvious this could not exist with the competi-

tion from other states. But, for the good of the industry, Illinois operators should be permitted, and, perhaps, required to coöperate in the sale of their coal, to the end that a price be obtained for the output that would enable them to pay proper wages and still realize a profit on their investment, besides providing for their employees, in case of accident. If wage scales are established and laws made effective by collective bargaining it is equally necessary that the same collective action should control the sale of coal.

In closing, permit me to say that no greater service could be rendered to society at large than the inauguration of a condition that would place the coal industry of the state on a stable basis, both in respect to the mining and selling of coal.

CARL SCHOLZ, President,
The American Mining Congress.

Chicago, Ill.

Letter No. 4—In his letter pertaining to mining laws, Letter No. 2, COAL AGE, Oct. 31, p. 722, I. C. Parfitt questions the wisdom and justice of the Pennsylvania bituminous mining law, requiring that all examination papers of candidates trying for certificates of competency as mine inspectors, foremen, etc., be retained and filed in the Department of Mines as state documents and not returned to applicants, after the examination is completed and the marks of proficiency determined. Although the mining laws of Tennessee have no mandatory act, requiring the examining board to file the examination papers of candidates in the State Mining Department as state documents, this is always done.

However, I am of the same opinion as Mr. Parfitt on this question, believing the work of the candidate before the board and his standing as determined and marked on each question by the board should be returned to him; thus giving him the benefit of the knowledge accruing from any mistake made by him in the examination. By this means, his work becomes a schooling to the applicant, giving him an opportunity to profit by his mistakes.

The examining board in Tennessee is composed of the chief mine inspector and his two district inspectors. The law requires the chief inspector to have had "six years' experience in mining," and also "possessed of a competent knowledge of chemistry, geology and mineralogy of Tennessee, so far as these sciences relate to mining, and a practical knowledge of mining engineering." The two district inspectors are required to have had six years' practical experience in mining and to hold a "Class A" certificate of competency. These requirements make the mine inspectors of Tennessee, who by law constitute the board of examiners for mine foremen, assistant foremen and gas bosses, well qualified to pass on the competency of candidates for certificates. The board is both technical and practical and, being appointed by the governor, is naturally fair and impartial to applicants and operators alike.

The method adopted and followed by the board is to select, as far as possible, practical questions; or, in other words, questions that can be answered by possessing only a practical knowledge of mining. The board seeks to ascertain by these questions, as far as it can, what the applicant knows about mining from experience; instead of what he has learned from others, in this respect. Each question propounded to applicants is given a certain value or is worth so many points if answered correctly. One question may be valued at 10 points, and another at 25 points. The value of a question thus fixed by the number of points given to it shows the candidate, at a glance, the importance of that question, and the value placed upon it by the board, as showing the candidate's knowledge of those things most essential to safety and the protection of life in mining, and his ability to successfully manage mines.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

To Prevent Freezing of Mine Shafts

Letter No. 1—Replying to the inquiry of a Mine Superintendent, COAL AGE, Oct. 31, p. 725, asking for the best method of keeping his hoisting shaft from freezing during cold weather, will say that I would consider some other method before adopting either of the two he mentions. Unfortunately, the inquiry does not state whether the fan shaft is wet the same as the hoisting shaft; or whether the mine gives off gas, or is worked with open or safety lamps.

Assuming, however, that the mine is gaseous and is worked with safety lamps and that the fan shaft is also wet, I would suggest reversing the air current, thereby making the hoisting shaft the upcast. The warm return air from the mine would prevent any freezing in the hoisting shaft. In addition to this, I would heat the air in the downcast shaft to prevent it from freezing. By adopting this method, the danger of the pipes being accidentally broken is averted; the mine air gets the benefit of the added humidity; and the hoisting shaft now being the upcast instead of the downcast, the tipple dust is blown away from the mine instead of being carried into the mine, as is necessarily the case when downcasting the air at the hoisting shaft. This method will also eliminate the undesirable feature of the men working at the shaft bottom, in a warm, moist and enervating atmosphere.

While I consider the two methods referred to by Mine Superintendent as being practical, I believe the method I have described above has some additional good features, provided, of course, that the conditions will permit of changing the direction of the air current.

C. O. MESSENGER,
Mining Engineer.

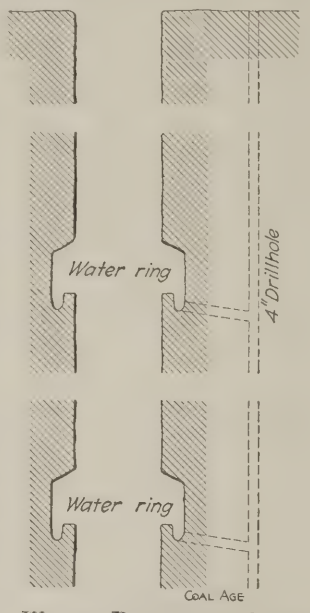
Wilsonburg, West Va.

Letter No. 2—Replying to Mine Superintendent, COAL AGE, Oct. 31, p. 725, in regard to the best method of preventing the freezing of the hoisting shaft in cold weather, I assume that the hoisting shaft, in this case, is the downcast and that the fan is exhausting.

In the first place, I would suggest that the simplest remedy to apply is to reverse the air current, in cold weather, whenever this is possible. In other words, run the fan as a blowing fan and force the air into the mine instead of exhausting as at present. By this means, the fan shaft is made the downcast and the hoisting shaft the upcast for the entire mine. The air current in passing through the workings becomes heated and the freezing of the hoisting shaft is prevented.

If ice accumulates in the fan shaft, in this arrangement, the difficulty can generally be avoided by turning the exhaust steam from the fan engine into the shaft. This will, of course, produce a fog in the intake air current for a short distance from the bottom of the shaft; but that will disappear before the air reaches the workings. Such an arrangement is commonly adopted in many localities.

In regard to rendering the shaft waterproof by lining it with concrete by means of the cement-gun, I do not believe that this can be done successfully, as water will still come in around the timbers. While some shafts are lined with a tight curbing from top to bottom, others only have timber sets 4 or 5 ft. apart and, in others, buntons alone are used to carry the guides and pipe lines in the shaft. Assuming that the shaft in question has timber sets, say 5 ft. apart, the question arises, would it be possible to make this shaft waterproof around the timbers by the use of a cement-gun. Also, it must be remembered that when the timbers require to be renewed, it will be necessary to renew much of the cement lining.



WATER RINGS IN A WET SHAFT

I want to suggest a method of draining this shaft by water rings run around the shaft, just below the water-bearing strata. This method has been tried and has proven successful in draining the shaft to an extent that freezing is wholly prevented. As shown in the accompanying figure, the water rings are made by excavating an annular opening in the strata completely surrounding the shaft and providing a ditch in this opening, which is drained by means of a borehole connecting the ditch with a 4 or 6-in. drillhole sunk at the side of the shaft, from the surface. This drillhole should be about 4 or 6 ft. away from the shaft and drain the water to the sump at the shaft bottom, from which it is then pumped to the surface.

Where the shaft makes a considerable amount of water, it is often better to locate a sump at each water ring and install pumps at these points to handle the water draining into each sump. By this means, the water is pumped directly to the surface instead of draining to the bottom of the shaft, which decreases the cost of pumping.

PENNSYLVANIA MINING ENGINEER.

Uniontown, Penn.

Storage-Battery Locomotives in Mine Haulage

Letter No. 1—I read with interest the description of the Grant mine, by R. Dawson Hall, COAL AGE, Oct. 10, p. 576. We are always open to constructive criticism but feel that Mr. Hall failed to understand our aims and the circumstances with which we and other Indiana operators must contend.

It is our constant aim and endeavor to *mine coal profitably,* by the use of safe and economical practices. However, in the face of the present seeming inability to raise the selling price much above one dollar per ton for mine-run coal, and with the operators in the thick seams across the state line apparently bent upon compelling the consumer to accept their mine-run coal at 95c. per ton, the resulting cost-sheet necessarily modifies many of our ideals to a greater extent than can be grasped by the occasional visitor who comes to us fresh from the more prosperous fields where possibly *labor* bears some of the burdens that in Indiana must rest upon the operator.

One of the most important modifications in the methods of mining that Indiana operators have had to accept relates to pillar work. The prevailing idea in Indiana has been that the pillars could not be extracted, with profit; and up to the present time room breakthroughs have usually been slabbed and all room pillars left standing. But with the increasing cost of coal in the ground, we are being forced to aim at a more complete extraction. At the Grant mine we have adopted the principle that all pillar coal must be mined if it can be gotten profitably.

The extremely fragile character of the mine roof and its tendency to cut, under the alternate wet and dry condition of our mines—these together with the narrow margin between a fixed mining rate and an equally uncompromising selling price, make it imperative that all extraction within a given area shall be immediate. Any coal left behind is soon obstructed by falls and must be abandoned.

We have adopted the plan of driving our rooms 21 ft. wide, to a depth of 200 ft., with the track 5 ft. from the rib. When the room is worked to the boundary, the pillar is drawn back to the neck and all available timber and track removed as the work recedes, every effort being made to induce a fall of roof. Room pillars are left not more than 9 ft. thick, which is sufficient to support the roof during the process of working. A greater width of pillar would increase the cost of breakthrough yardage and inevitably require the turning of a track into each breakthrough, for a miner in this state cannot be compelled to throw his coal a greater distance than about 12 ft., and the company must pay for keeping up his track.

A breakthrough, in order to be driven without yardage cost, must be at least 18 ft. wide. Whether long or short, crosscuts of this width cannot be maintained without ample props and this item of expense soon eats up the saving of a wide breakthrough. For this reason, we have developed the mine in panels about 500x900 ft. each, with 100-ft. barrier pillars against the main haulageways, as shown in the plat, COAL AGE, Oct. 10, p. 578. In these panels, we aim to get as large an extraction of coal as circumstances will permit, and in doing this we encourage the roof to fall immediately behind the work. When it breaks, as it usually does, we have no trouble. Occasionally, it will not break, but rides the room stubs and crushes the chain pillar. In order to obviate this possibility, we are now working out four rooms on an entry, as we advance, leaving the next three rooms to be gotten on the retreat. This block of solid coal acts as a support to the roof when it will not break, and relieves the crushing strain on the room stubs and chain pillar.

Thus far, we have gotten the bulk of the pillar coal and, in an operation of about a year and a half ago, no miner has even been scratched by falling slate. The rooms are

well propped and if a piece of roof becomes dangerous no risks are taken to extract the pillar. If Mr. Hall will outline how, in his judgment, pillars in our seam can be *gotten profitably* it may stimulate a discussion and experiments that will lead to something better.

In regard to the storage-battery locomotives, it is presumable that there are as good or better makes. There has been some dissatisfaction with a few tried out in Indiana mines; but this is seemingly the fault of crude design; or disproportionate construction and use of too small a motor for the intended load; or batteries not fitted for the voltage or amperage of the motor; or poor transmission; or some other obvious defect. The Jeffrey motors with wormgear, carrying Edison storage batteries, have made good in our mine. They have shown a greater performance than the makers were willing to guarantee and are altogether up to our expectations in performance, in endurance and in economy of operation.

Given a thin seam of coal, you have the alternative of using a small mule and a little car or incurring the expense of taking up a large amount of bottom on all roads, during the entire life of the operation. Therefore, if such a mine is being developed with the assurance of a long life, justifying its being well equipped, there are strong reasons for gathering the coal with motors.

Some who have tried the reel or crab locomotives are enthusiastic in their praise. We have never used any motor of this type; but our experience with the storage-battery locomotives would make it hard for us to recommend any other type of motor for gathering.

Its obvious advantages are the elimination of the cost of trolley wire, rail bonds and reel-cables, and the absolute freedom of action that permits the motor to go anywhere on almost any kind of track and work equally well either pushing or pulling, to say nothing of the absolute quietness of the whole operation as compared with the sweat, stench, turmoil and profanity of the mule haulage. These items directly affect the daily cost-sheet by the saving they cause in drivers, mule feed, harness, shoeing, mule depreciation and hospital expense. With four motors we gathered regularly between 1400 and 1500 tons of coal, while with the six motors now operating, we expect to haul upward of 2200 tons without difficulty, when the mine will furnish that tonnage, which means that we are easily displacing four mules with one motor.

Such results, however, can hardly be obtained except in a panel mine, where the gathering operations can be confined within a given radius and the partings kept close to the working face.

THEODORE BRENT, President,
Grant Coal Mining Co.
Chicago, Ill.

Study Course in Coal Mining

BY J. T. BEARD

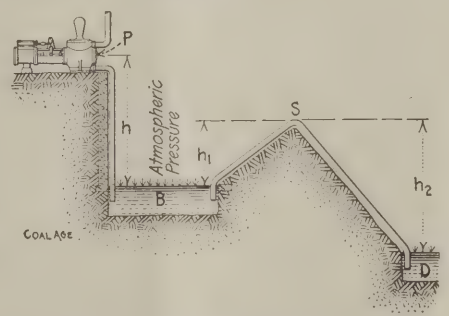
The Coal Age Pocket Book

Siphoning or Pumping Hot Water—Since water vaporizes at all temperatures, the vacuous condition existing in the suction pipe of a pump or in the short leg of a siphon is reduced by the tendency of the water to form vapor under the reduced pressure in the pipe. In other words, the atmospheric pressure that forces the water up the suction pipe is opposed by the tension of the water vapor in the pipe, which reduces the atmospheric head effective in raising the water.

As shown by the table giving the saturated water-vapor pressures or tension, at different temperatures, the pressure of the vapor increases rapidly with the temperature; and at 212 deg. F. is equal to the normal atmospheric pressure at sea level (14.696 lb. per sq.in., or 29.925 in. bar.).

As shown by the table giving the normal atmospheric pressure, at different elevations above and below sea level, this pressure decreases as the elevation above sea level increases and vice versa. But whenever the vapor pressure is equal to the atmospheric pressure ebullition takes place (see Laws of Vapors). For this reason water boils at about 203 deg. F., at an elevation of 5000 ft. above sea level; or 193 deg. at 10,000 ft. elevation. The boiling point, for any given elevation, marks the limit of temperature for pumping with a suction pump or for siphoning, since the vapor pressure then conterbalances the atmospheric pressure and the water will not rise in the suction pipe.

The accompanying figure shows clearly that it is the atmospheric pressure acting on the surface of the water in the sump or basin B that forces the water up the pipe to the pump at P, or to the crown of the siphon at S, against the more or less vacuous condition at those points.



VERTICAL SECTION, SHOWING PUMP AND SIPHON AT WORK

It is evident that if the water is hot its vapor pressure will resist the atmospheric pressure and, to that extent, reduce the effective suction head. Obviously, therefore, the possible suction head of a pump or siphon depends on two important factors, aside from the mechanical perfection of the apparatus; namely, (1) elevation above or below sea level, as determining the atmospheric pressure; (2) temperature of the water, as determining its vapor pressure.

The Coal Age Pocket Book

Safe Suction Head, Vertical Lift—The safe limit of suction, in feet, when pumping or siphoning hot water, assuming a fairly vertical lift, may be taken as about nine-tenths of the effective barometric pressure, in inches; or, in other words, the height of the barometer, in inches, diminished by the vapor pressure expressed in inches of mercury.

Example—Find the practical limit of suction when pumping water from a sump where the temperature of the water has been raised to 150 deg. F., by the discharge steam of the pump, the elevation being 3000 ft. above sea level and the suction pipe vertical.

Solution—From the tables, the normal barometric pressure, at this elevation, is 26.813 in. and the vapor pressure of water, at a temperature of 150 deg. F., is 7.57 in. of mercury. The effective barometric pressure is, therefore, 26.813 — 7.57 = 19.243 in. The safe vertical suction may then be assumed as 0.9 × 19.243 = 17.3, or 17 ft. 4 in.

Inclined Lifts—When the suction pipe is much inclined, as when pumping in slopes, or as is almost invariably the case in all siphon work in mining, the frictional resistance of the pipe is much increased by reason of its greater length. This increased resistance reduces the effective head.

The length of pipe, for the same vertical height, varies inversely as the sine of the slope angle (a), and the loss of head likewise. But, for a vertical lift, the loss of head, in feet, was assumed as one-tenth of the barometric height, in inches, (0.1 B). Hence, for an inclined lift, slope angle a, the loss of head may be taken as 0.1 B/sin a, which makes the **effective head,** $B(1 - 0.1/\sin a)$, in which B is the effective barometric pressure, after subtracting the vapor pressure for the given temperature of the water, expressed in inches of mercury.

Example—Find the effective suction head of a mine siphon, the short leg or suction pipe having a slope of 30 deg. from the horizontal and the water to be drained having a temperature of 130 deg. F., the barometric pressure in the mine being 28.4 in. Also, calculate the length of the pipe for this maximum lift

Solution—The saturated vapor pressure at a temperature of 130 deg. F., is 4.52 in. of mercury; and the effective barometric pressure, in this case, is 28.4 — 4.52 = 23.88 in. The safe suction head is, then,

$$h = B\left(1 - \frac{0.1}{\sin a}\right) = 23.88\left(1 - \frac{0.1}{\sin 30^\circ}\right)$$

$$h = 23.88\left(1 - \frac{0.1}{0.5}\right) = 23.88 \times 0.8 = 19.1\ ft.$$

The maximum length of suction pipe, under the given conditions, is, then,

$$l = \frac{h}{\sin a} = \frac{19.1}{\sin 30^\circ} = \frac{19.1}{0.5} = 39\ ft.$$

In ordinary mining practice, it is fairly safe to assume the coefficient of friction, in water pipes as 0.01, which forms the basis of the above assumed percentage of loss.

Inquiries of General Interest

Ignition of Coal in Storage

I would like to ask of COAL AGE and its practical readers any information they can give in regard to the best method of avoiding the spontaneous combustion of coal stored in large quantities in a bin; as, for example, where a winter's supply of coal is stored in bins in the basement of a building. If this coal should become heated and fire, what means can be adopted to prevent the spread of the combustion throughout the entire pile.

As a practical example, I would cite the following instance: Soft coal of a good quality which was stored in a bin in the basement of a school, in one of the wards in this city, became ignited, and the city fire department was called out to deal with the situation. It was found necessary, later, to remove the entire amount of fuel from the bin to get at the seat of the trouble.

As we are storing from 100 to 250 tons of coal at a time in our bins, 30 ft. underground or in the sub-basement, and cannot afford to take chances on the safety of this fuel supply, we would appreciate any information given by COAL AGE or its readers that will enable us to safeguard our supply of coal against possible trouble.

ASA P. HYDE, Chief Engineer,
Security Mutual Life Insurance Co.
Binghamton, N. Y.

The subject of the spontaneous ignition of coal in storage has received much attention at the hands of experimenters and investigators of coal problems. It cannot be said, however, that the subject is well understood at the present time, although much progress has been made in determining the source of the ignition.

For a long time, it was held by good authorities that the most active factor contributing to the spontaneous ignition of coal was the presence of iron pyrites so commonly found in coal. It is now well established that, while the presence of iron pyrites in coal greatly assists its disintegration, and, as a result, fresh surfaces of the coal are exposed to the action of the air, the oxidation of the pyrites is not the responsible factor in the ignition.

More recent experiments have shown that there are two processes set up immediately after the coal is taken from the seam and exposed to the atmosphere. These processes are the following: 1. The exudation of the hydrocarbons contained in the coal, which consist chiefly of methane (CH_4). 2. The rapid absorption of oxygen from the atmosphere into the pores of the coal, which is immediately followed by the oxidation of the organic matter of the coal, causing heat and liberating combustible gas within the coal itself.

As these processes continue, the ignition of the gas is quickly followed by the ignition of the coal itself, resulting first in the slow combustion of the coal, but often followed by a more rapid combustion. The addition of water to arrest this process only makes the matter worse, as the action is more rapid under moist conditions. The quantity of water required to stop the progress of the combustion in the coal would be too large to be practical, under ordinary conditions.

In order to reduce the liability to spontaneous combustion in large storage bins, it is advised that the bins should be built of incombustible material and constructed in such a manner as to allow the free circulation of air about the sides and underneath the floor of the bin. The ventilation of the coal pile itself by introducing streams of air into the pile, as has been done in some cases, is not well regarded. It is claimed that the admission of fresh air into the coal pile itself supplies more oxygen, and, to that extent, increases the oxidation going on in the coal. What is needed is a circulation of air outside, to cool the walls and abstract the heat as much as possible.

It has been found in practice that coal should not be piled to a greater depth than 12 or 14 ft. in a storage bin. When the depth of coal in the bin exceeds this amount, heating and spontaneous combustion are more liable to ensue. We would be glad to have this subject further discussed by readers who have had experience in the storage of large quantities of coal.

A Conundrum

Assume that a pound of coal contains 14,500 B.t.u., and it is clear that the heat derived from "one pound of this coal will raise (the temperature of) one pound of water, 14,500 deg. F.;" provided all the heat of the coal went into the water and the latter was confined under a pressure sufficiently great to prevent the formation of steam; and, assuming, further, that the specific heat of the water remained constant, as the temperature increased, which assumptions are not realized in practice.

A more reasonable statement, however, is that the heat derived from one pound of this coal is capable of raising the temperature of 14,500 lb. of water 1 deg. F.; or, applying the same reasoning, the heat derived from one pound of this coal would be capable of raising the temperature of 68.4 lb. of water 212 deg. F.; or, say from 32 deg. to 244 deg. F., provided again that the pressure in the containing vessel be sufficient to prevent the formation of steam under this rise of temperature.

This line of reasoning is quite clear to me, but there is no steam yet; and I fail to see what this argument has to do with the "efficiency of steam" that I read about in another mining paper. Perhaps some reader of COAL AGE can explain the intended meaning.

W. L. A.

Pittsburgh, Penn.

The term "efficiency of steam" has no intelligent meaning, except in relation to steam being made *the medium through which heat energy is converted into mechanical work*, as shown by the Rankine, Carnot, or other steam cycle. The above "argument," if such it may be called, has no reference to any cycle; but considers only the possible rise in temperature of a pound of water, caused by the potential heat of a pound of coal.

Examination Questions

Mine Foremen's Examination, Held at Price, Utah, Sept. 15 and 16, 1914

(*Selected Questions*)

Ques.—Do you receive and read any instructive literature pertaining to the various systems of coal mining and points of safety in operating same? What magazines along these lines do you take?

This question, which obviously must be answered from the candidate's own experience, is inserted here to show the importance of all candidates for examination as well as other mining men keeping up their study of mining questions and reading mining literature and being regular subscribers to mining magazines.—Editor.

Ques.—What four principal things are bandages used for?

Ans.—Bandages are used for the following purposes:

1. To keep dressings in place.
2. To hold splints in place.
3. To stop bleeding, by pressure.
4. As slings.

Ques.—Name the different kinds of bandages generally used in first-aid-to-the-injured work.

Ans.—The three kinds of bandages most commonly used are the triangular, roller and four-tailed bandages, described as follows:

1. The *triangular bandage* made from unbleached cotton cloth or from any available material, such as bed sheets, pillow cases, napkins and handkerchiefs, is made by folding a square piece of the cloth diagonally and cutting in the fold, which forms two triangular bandages.

2. The *roller bandage* is made by cutting muslin, cotton cloth, flannel, gauze or cheese cloth into long strips of any desired width and rolling up the strips into a neat roll for use.

3. The *four-tailed bandage* is made from strips of a roller bandage from 5 to 8 in. wide and about 3 ft. long. These strips are torn down the center from each end, to within a few inches of the middle of the bandage, thereby providing four tails by which the bandage is tied or bound about the wound. This bandage is mostly used in binding up the head.

Ques.—Describe the Red-Cross, first-aid outfit.

Ans.—The Red-Cross first-aid outfit is a hermetically sealed package containing a long gauze bandage having a compress of gauze sewn to it in the center. This bandage is so folded that it is impossible to touch the surface of the compress, which will cover the wound, except through carelessness. The package also contains a triangular bandage, printed so as to show how it is to be applied, two safety pins and all necessary instructions.

Ques.—Name some stimulants you would give and state how you would give them.

Ans.—Stimulants should never be given for an injury in the head. They are necessary in case of shock resulting from injury or otherwise. The best stimulants for use in first-aid work are hot coffee or tea, or aromatic spirits of ammonia, a teaspoonful in half a glass of water. If whisky or brandy is given, the amount should not exceed one or two swallows, as a larger amount is apt to produce depression, instead of stimulating the system. If alcohol is given, this must be pure and diluted with three times its quantity of water. Wood alcohol or denatured alcohol is poisonous and cannot be given.

All stimulants should be given as hot as can be taken, as the heat alone has a stimulating effect. A hot-water bag placed between the legs or against the outside of these members; or between the body and the arm has a stimulating effect; also, a light hot-water bag placed over the heart stimulates the heart action. Great care is required to make sure that the heat applied is not sufficient to cause a burn, especially if the person is unconscious.

Ques.—When should you send for a doctor, or take the injured person to a doctor?

Ans.—In all cases of serious injury or shock, send for a doctor at the earliest opportunity. There should be no delay, however, in giving first-aid assistance to the injured one. Where bones are fractured, the injured person should not be moved until after careful examination has been made and the proper splints and bandages applied, so as to prevent any sharp splinters of bone from cutting the flesh and possibly causing dangerous bleeding. Immediate efforts should be made to stop the dangerous bleeding of a wound, give the necessary stimulants and perform other first-aid work.

Ques.—(a) What is shock? (b) When does shock occur? (c) Describe the treatment of shock.

Ans.—(a) Shock is described as "a more or less profound depression of the nervous system." It is more commonly known as "collapse" or "prostration."

(b) Shock may be caused by the receipt of bad news or may result from a severe injury; but all persons are not equally sensitive to shock. A person suffering from shock becomes pale and has an anxious expression, his eyelids droop, the eyes are dull and the pupils often enlarged. The skin is cold and a cold sweat pervades the body. The sufferer is more or less stupid and often partly or totally unconscious, or his mind may wander. The pulse is rapid and weak and the person often lies quiet and will not move unless disturbed.

(c) In treating one suffering from shock, send for a doctor at once, but warm and stimulate the body in every possible way while waiting for the doctor to arrive. Place the injured person on his back, with the head low to induce the flow of blood to the brain. If the person is able to swallow, give stimulants, hot coffee or tea, or aromatic spirits of ammonia in water. These should be given in small quantities, a sip or a swallow at a time. If the person is unconscious and cannot swallow, smelling salts, water of ammonia, or hartshorn, should be applied to the nostrils. The arms and legs of the sufferer should be rubbed toward the body, underneath blankets to preserve the warmth of the body. Every effort should be made to apply heat to the limbs and body by means of hot-water bottles, hot bricks or hot bandages, care being taken to prevent causing a burn.

Book Review Department

HOW TO BUILD UP FURNACE EFFICIENCY. By J. W. Hays, consulting engineer, Rogers Park, Chicago, Ill., 126 pp. 5x7¼ in. 23 illus. Paper cover. Price $1.

This little book is not a scientific treatise but an extremely readable little volume for people who don't know anything about boiler-furnace efficiency and perhaps care less but to whom the subject is of the most vital and pressing concern. The reader will find the introduction too long and the first chapter trying, but when he has gotten a little farther in its perusal he will stay steadily with the author to the end and the rest of the book will be read in one sitting.

Hays is an Irishman with true Hibernian wit and he makes the problem of combustion interesting. When you have read the book, hand it to your firemen. They will read it and appreciate the fact that a practical man has written it. The reviewer as soon as he finished reading the book ordered a copy for a friend. It is likely the reader will want to do the same.

The author says that a furnace should pass about 40 per cent. more air than is necessary for complete combustion. Enough air has to be supplied to assure that the fuel is all

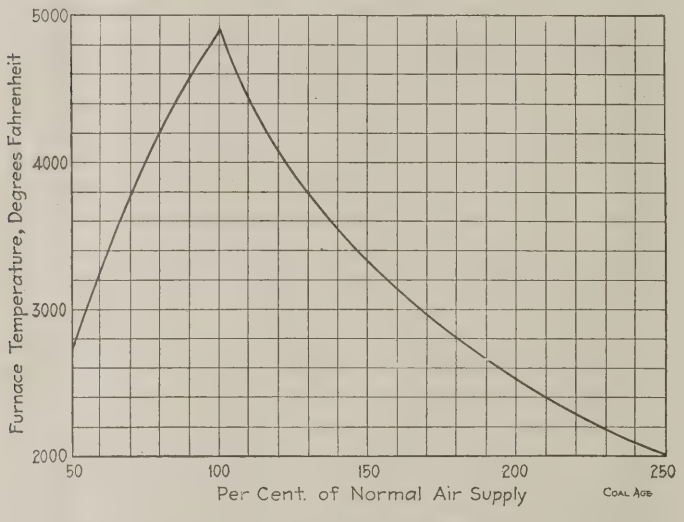


CHART SHOWING HOW TEMPERATURE OF COMBUSTION DEPENDS ON AIR SUPPLIED. TEMPERATURE IS HIGHEST WHEN AIR IS JUST SUFFICIENT FOR COMBUSTION OR 100 PER CENT.

consumed but a much larger current lowers the temperature of the furnace and wastes fuel. He explains how in some plants coal is lost by mixing with the ashes from the furnace and is wheeled out to the ashpit unconsumed. In other furnaces so much air leaks in through the furnace walls that the gases are cooled off and cannot heat the flues or the water tubes.

In this case "make a thin mixture of fireclay and stir cotton waste into it, first pulling the waste apart so that every fiber of it will be covered with the clay." Plaster this in the cracks and push it in with a calking tool. This will stay in place indefinitely. Then again bricks leak through their pores and a coat of paint will stop this leakage. But there are often large leaks which are not to be discovered without a candle or a torch. The boiler should be inspected for these especially around the boiler doors; only rarely are these tight.

Another loss is from leaving the furnace door open and excessive draft is yet another. There is a way of discovering the best thickness of coal to carry on the grates for a given draft. When you find it you can mark it on the furnace-door liners. The fire must be kept of equal depth all over, otherwise the air will pass through one part of the fire more rapidly than another and there will be too much air in one part with consequent temperature reduction. You can't keep down your excess air to the right figure if you have holes in your fire.

About 15 per cent. of carbon dioxide should be formed in good practice giving 38 per cent. of excess air. If less is found, air is being admitted without advantage, if more then there may not be, at least in parts of the fire, enough air for the monoxide of carbon to burn into dioxide, and much heat is lost because this final combustion is missed. If you could burn anthracite fuel without an excess of air you could get 20.7 per cent. of carbon dioxide but such a perfect result is unattainable. Bituminous fuel at best owing to the presence of hydrogen in the combustible material will not give more than 17 to 19 per cent. on complete combustion.

We recommend this book to those who are selling coal and who should understand combustion thoroughly if they would make satisfied customers. We commend it to mine operating forces because the study will enable them to save coal and make their boilers do more work and keep in order with little expense and attention. We suggest its purchase by firemen because they can save themselves from handling so much coal and wheeling out so much ash and because efficiency is always worth while. A fireman who reduces his work a quarter will certainly be awarded in ease of operation. As he will save that amount of fuel to his company, his wage will surely be raised if he is working for an appreciative management.

COAL-GAS RESIDUALS. By F. H. Wagner. XIV+179 pp., including index. 45 ill. Several tables. McGraw-Hill Book Co., Inc., 239 W. 39th St., New York. Cloth Boards. Price, $2.

This book fills a very present need, for it seems reasonable that coal-gas residuals and coke byproducts should be manufactured in this country. There are a number of products which have been mentioned as suitable to American enterprise, the manufacture of which in this country is far less feasible. The chemical industry is not one demanding a large amount of labor and the materials being at hand and seeking a purchaser almost in vain, are at a low price. Consequently it should be possible to meet foreign competition with profit and without the assistance of a tariff. The only difficulty is in the case of benzol. The low price of gasoline in America makes competition with this product difficult.

This book contrasts strongly with "Coal Tar Distillation and Working Up of Tar Products," reviewed in our issue of Feb. 21, as the subject is treated less from a severely practical and more from a chemical point of view. The first chapter treats of tar and the second of naphthalene ($C_{10}H_8$). This latter product has undoubtedly a great future, though at present it is a byproduct which is removed at an entire loss. It stops, by sublimation, the pipe connections in the distributing lines and so has to be removed if found in excess, even though it improves the quality of the gas. One per cent. of napthalene, says the author, raises the candlepower 25 per cent. It would seem that if some method could be discovered for injecting napthalene into natural gas it could be made as light-giving as the artificial product with or without the use of a mantle. It appears that napthalene has been used in France in an internal-combustion engine but no statement is made as to its success as a source of power in this connection.

Cyanogen (C_2N_2) is a profitable product and may be produced either by the Bueb or the Feld process. Of course, the amount obtained is dependent on the kind of coal coked but roughly 1.7 lb. will be obtained from a ton of coal. Small as this is, the author shows that a large plant will extract the chemical at a profit.

Of course, ammonia, treated in the fourth chapter, is the principal product. About 7¼ lb. of ammonia can be obtained per ton of coal, though there is enough nitrogen to make 48 lb. of product were there no losses in the conversion. About 28¼ lb. of ammonium sulphate can be manufactured from this ammonia. The writer in every case shows the costs of production of the materials but omits interest on plant, depreciation and obsolescence charges.

The writer quotes F. Puening, of the Koppers Co., stating that 2 gal. of benzol can be obtained from a ton of coal. This seems a small quantity, but were all the benzol saved which the coking of coal would produce, the output of the United States from this source would be 98,000,000 gal., or about 2⅓ million barrels. Owing to the war, the making of benzol is less attractive now than it was a few months ago.

Coal and Coke News

Washington, D. C.

There seems now to be a practical unanimity of assent that the forthcoming opinion in the renewed application of the Eastern roads in the 5 per cent. rate case will not be granted. This is reluctantly admitted by railroad managers, who are loth to concede that their hopes of an advance are not likely to be realized. Inasmuch as there seems to be such small chance of the granting of the roads' application as respects any commodities, the coal producers who have been fearful of the proposed increase in the past are now resting much easier. They do not believe that they are in any particular danger as things stand, being persuaded that the increase on coal asked for by the roads would hardly be granted even if there were to be an increase on other articles.

It is of considerable interest to note that the apparent indisposition of the Commission to allow any advance is due to the improvements in the revenues of the Eastern lines during recent months since the development of war in Europe. It had been stated as an argument in favor of the plan of reopening the case that the roads had been unfavorably affected by war conditions, and were in consequence unlikely to be able to endure the reduction of incomes to be expected. Hence the necessity of conceding to them, it was argued, an increase in the level of the rates.

Refusal to grant this advance now seems likely to be based upon the absence of a showing that the roads have suffered in actual income in consequence of the war. As to coal, it is being pointed out with considerable force that that article has been moving in undiminished quantity domestically, while exports have increased. The growth of exports has furnished export freight to the roads and has enabled them to improve their incomes from coal through increase in the density of traffic.

There is, it is argued, no reason in the coal situation for an advance in the charge made for transportation, since profits in the business are somewhat better than they were. Hence the attitude assumed with regard to the proposed advance of freight charges on that and other articles of like kind. It is the general impression that the agitation for an advance on coal is over for a good while to come.

Conditional Contraband

The British Government is taking decided steps to prevent contraband and conditional contraband articles from reaching Germany from the United States. Already a strong stand has been taken as regards copper and other articles, and it is understood a like position will be assumed with reference to coal if occasion demands. The position as to copper is embodied in a circular lately issued from the embassy and which it is understood will be paralleled in case of need by a similar document as to coal. In the copper circular it is stated that:

Information in possession of the British Government conclusively proves that very large shipments of copper, rubber and other commodities are passing through Italian ports on their way to Germany.

In New York large purchases of copper are being made by houses in Rotterdam, Amsterdam and Copenhagen who are working on German account. Directions are at the same time being given that these large consignments of copper are to be shipped through.

Meantime, official announcement is made here of arrangements between England and the Scandinavian countries for mutual observance of rights to neutral trade in noncontraband or conditional contraband articles, the list of which includes coal.

Getting Busy in Alaska

It is understood that the Interior Department is preparing regulations under which the exploitation of coal lands pursuant to the Alaska coal land leasing act may proceed.

The regulations are expected to cover a number of phases of the situation, and may require a good while in the process of working out. As soon as possible, it is understood the process of arranging to apply the act will be completed and arrangements will be made to begin operations in accordance with the law.

HARRISBURG, PENN.

Members of the Public Service Commission are highly pleased by the announcement from Washington that the Interstate Commerce Commission has reversed itself in the industrial railroad cases and decided that they may be given allowances. The Pennsylvania Commission had ruled in the Monongahela Connecting R.R. case from the Pittsburgh district that the industrial railroads or short lines were entitled to allowances for switching and other services, if they were really railroads.

The Interstate Commission, which had previously ruled the other way, came out during the past week with the decision that the industrial roads should have allowances restored.

The Public Service Commission on Nov. 7 heard the last of its dozen or so industrial cases, the point being to determine whether these carriers are really railroads.

The commission also heard the complaint of manufacturers of York and Lancaster that the rates for transportation of bituminous coal from the Clearfield region to those cities were discriminatory as compared with rates charged to Philadelphia and Harrisburg. The Pennsylvania R.R. defended the rates as reasonable, and was supported by counsel for the New York Central, Reading and Baltimore & Ohio.

PENNSYLVANIA

Anthracite

Hazelton—After being idle two months while the Beaver Meadow colliery of the Lehigh Valley Coal Co. was being modernized with new machinery and buildings, the 600 employees of that operation started work recently.

The fallacy of predictions of coal exhaustion is shown by the driving of a tunnel from the Buck Mountain to the Wharton vein in the Coleraine mine which, after yielding a fortune 30 years ago to W. T. Carter, of Philadelphia, was abandoned only to be reopened and reworked by his son who also retired wealthy. He let the coal rights pass to the A. S. Van Wickle Estate which has been extracting coal ever since. It is estimated that the new measures now being opened will give work for 15 years.

Tamaqua—Sixty men working in four-hour shifts recently saved Mart MacDonald, of Kaska William, from almost certain death after the man had been imprisoned in the No. 10 slope of the Mount Hope Coal Co., at St. Clair, for 8 hours. MacDonald, although uninjured, suffered from the cold and was placed under the care of Dr. R. T. Weaver, of St. Clair.

Sugar Notch—Maxwell No. 20 colliery, the largest operated by the Lehigh & Wilkes-Barre Coal Co., was thrown into idleness on Nov. 5, owing to the refusal of driver boys to work because one of their number did not receive pay for an extra hour. The boy demanded pay for this extra time, but the company foreman refused to hear his complaint.

Carbondale—The double frame dwelling house at the corner of Orchard and Green Sts., owned by Martin Kane, was badly damaged on Nov. 3 by a cavein at No. 1 mine of the Delaware & Hudson Co. The settling began at midnight and continued until 4 o'clock. At this hour the surface for 100 ft. square about the Kane property had dropped a distance of 5 ft. Other properties nearby were slightly damaged by water from bursting water mains.

Bituminous

Connellsville—It is reported that the coke production of the Connellsville region has dropped to approximately 200,000 tons per week, and the prospects are that it will go lower. Several blast furnace interests on the other hand have opened negotiations for Connellsville coke to cover their 1915 requirements. Efforts have been made to arrange for coke for the entire year on sliding scale contracts based either on pig iron average prices or trade journal quotations.

Uniontown—All efforts to check the fire which started Nov. 7 in the Martins mine of the Republic Iron & Steel Co., at Martins, having failed, the mine was flooded with water on Nov. 8 in an effort to extinguish the blaze. The damage so far is estimated at $10,000.

Monongahela—John Carroll, a mine foreman at the Shoenberger mine, recently entered a plea of guilty to a violation

of the mining laws by not taking certain precautions as prescribed at the mine door. He was fined $10 and costs.

Charleroi—Although the coal shipments for October passing through Lock No. 4 on the Monongahela River were larger than for many months, they did not reach the output from the river mines of 19,933,000 bu. for the month of October, 1913. Shipments through Lock No. 4 for October of the present year totaled 15,591,000 bu. of coal. The total passing through the lock in September was 14,739,000 bu.

Pittsburgh—Through the Pittsburgh offices of the Phipps properties a denial was recently made of the rumors of the exchange of several Phipps properties in a deal for coal land, the report having been that values amounting to $15,000,000 were involved. It had been extensively reported that the Fulton and Bessemer buildings, together with other holdings, were to pass to the hands of J. V. Thompson, of Uniontown, in exchange for large tracts of coal land.

WEST VIRGINIA

Bluefield—The Pocahontas Coal Operators' Association held its regular monthly meeting in this city on Nov. 5. This organization has a small auditorium and committee room on the sixth floor of the Law and Commerce Building. These have been newly furnished and serve well as a meeting place.

Goodwill—G. A. Bolden, assistant secretary of the West Virginia Commission of the Panama Pacific Exposition and N. E. Merhie, official photographer for the Commission, recently took a series of motion pictures of the Louisville first aid and mine rescue crew in action. This consisted of a demonstration given at the mine entrance. The crew was fully equipped with Draeger oxygen helmets and entered the mine after a supposed explosion, returning with a man apparently overcome by gas, also having some fractured bones. He was restored to consciousness by artificial respiration and afterwards given first aid.

Huntington—The West Virginia Coal Mining Institute dates of Dec. 9 and 10 have been changed to 10 and 11. President H. A. Zeller will shortly appoint a committee to arrange for the entertainment of the mine operators. The meeting is one of considerable importance and this year will no doubt have special significance owing to the depression in the coal business.

TENNESSEE

LaFollette—The employees of the LaFollette Coal, Iron & Ry. Co., who have been waiting nearly a year for payment of money earned Nov. 1 to Dec. 23, 1913, the company at that time having been placed in the hands of a receiver, were recently paid the amount due them by order of the United States court. Shortly after the appointment of the receiver 10 per cent. of back earnings up to $5 per man was paid.

KENTUCKY

Sebree—All the property of the Sebree coal mines, including machinery, tipple, tracks and mineral rights, was bought by J. D. Smith and J. W. Miller, of Birmingham, Ala., when it was sold a few days ago by the county commissioner. It is said that the purchasers are considering disposing of the property to other interests but that, should the deal not be consummated, they will reopen the mines the first of the year.

Owensboro—Receivership proceedings have been begun against the Fern Hill coal mines near here by T. A. Pedley, receiver for the Owensboro Savings Bank & Trust Co., who by this means seeks to protect the interests of the bank's creditors. Mr. Pedley alleges that the Fern Hills Mining Co., owner of the mines, is indebted to him in the sum of $935.55 and also for $30,000, represented by bonds and interest from Oct. 1, 1913. The court has not ruled on the question as yet.

Louisville—The Kentucky Mine Owners Association will hold a special meeting in Louisville on the evening of Dec. 3. One of the matters to be considered will be the raising of a fund to pay for the expenses the association has been put to in the matter of the Workmen's Compensation Act, it having retained attorneys from time to time to represent the association when the law was being prepared and since then, as progress has been made in applying it. The Court of Appeals is expected to hand down its decision on the law between now and the date of the meeting so that the members of the association will know where they stand.

Madisonville—Only three employees, the engineer, stable boss and pump man were left at work when the mines of the Nebo Consolidated Coal Co., at Circle City, were closed down for 60 days recently. No reason was given in the orders for suspension which were received from headquarters of the company at Louisville, where further inquiry failed to elicit explanation. This throws about 150 men out of work.

Madisonville—"Night Riders," or "Possum Hunters," have been active in the last few days in this part of the western Kentucky coal field. These lawless bands have been directing their efforts to drive negro miners from the western part of Hopkins County. At Carbondale 30 negroes formerly in the employ of the Carbondale Mining Co. failed to report for duty following an attack by "night riders" during which a negro child was shot and another wounded. On Nov. 3 two negroes were flogged at Daniel Boone. Here signs were posted ordering the negroes to leave. At Carbondale a wooden blockhouse has been erected and every night guards with high-power rifles watch for visits of the marauders. Another guard has been organized at Earlington while in other parts of the section the operators are taking similar precautions. Some operators affirm that the situation is serious enough to justify calling out troops but no one has appealed to the governor for them as yet.

OHIO

Cincinnati—Stock in several eastern Ohio and West Virginia coal companies, valued at $3,750,000, passed into the hands of John S. Jones, coal operator of Chicago, recently, as the result of an entry made by United States District Judges Warrington, Knappen and Denison, in a suit brought by the Government against the New York Central, and the Chesapeake & Ohio railroad companies, former subsidiary lines, and various coal companies controlled by them. The dissolution decree of the court was thus satisfied.

Martin's Ferry—The Elkins Coal Co., which recently leased and repaired the Buckeye mine, west of Bridgeport, and changed its name to the Locust mine, has released it to the International Coal Co., of Pittsburgh. It is expected that the new lessees will send a superintendent from their other workings to take the place of George Long, who has been in charge of the Locust mine under the Elkins company.

Coshocton—Coshocton operators and miners arrived at an agreement on the wage question at Coshocton Nov. 9. Both made concessions, but the terms of the agreement were not made public because they are subject to approval by the miners who will vote upon the contract this week.

Columbus—The new re-weighing rules promulgated by the Baltimore & Ohio R.R. have been put into force and B. F. Nigh, secretary of the Michigan-Ohio-Indiana Coal Association will wait to see how they work out before pushing the application for a change in re-weighing rules now pending before the Ohio Utilities Commission. The new rules provide for the weighing of cargoes at the nearest scales to the destination, which is a concession on the part of the railroad company. The old limit of 1000 lb. is retained, however. The application of the Coal Association provided for a limit of 500 lb.

INDIANA

Terre Haute—Thomas Archer recently asked $10,000 damages from the Otter Creek Coal Co., for injuries received while driving a mine mule. The jury, after a trial lasting several days, gave him $750.

Bureau of Mines Car No. 8 has left here for West Virginia under orders to stay there until July, in connection with a mining school. Car No. 3, in charge of Dr. August F. Knoefel and G. T. Powell, now at Evansville, will start on a training trip through the southern Indiana field. J. W. Paul, head of the government's mine rescue work, who stopped here on his way back to Pittsburgh from Royalton, Ill., where 327 men were caught by an explosion and all saved but about 50, said the bureau men worked 18 hours without stopping and with their breathing apparatus on all this time.

ILLINOIS

Percy—The mine near here, belonging to the Missouri & Illinois Coal Co., St. Louis, has closed down for an indefinite period of time. The output of this mine, for some years past, has been sold as company fuel to the M. & O. R.R. through a St. Louis coal company controlling most of the mines on the M. & O. Lack of business in the commercial field has compelled the St. Louis company to tighten up on outside coal and give their own product, as much as possible, to the railroad.

Murphysboro—The Big Muddy Coal & Iron Co. of St. Louis has bought the mine of the Gus Blair Big Muddy Coal Co., situated north of here on the M. & O. R.R. It was reported a few weeks ago that this mine would be abandoned on account of failure to obtain any further acreage. The Big Muddy people have, however, a tract of several hundred acres adjoining and it has been decided to purchase the Blair mine and work this acreage through the Blair shaft. Of the five mines in the Big Muddy field, three will now be controlled by the Big Muddy Coal & Iron Co., one by the

Gus Blair Big Muddy Coal Co., and the other by the Gartside Coal Co. of St. Louis. Another company formerly operating in this field, the Schmidgall Coal Co., abandoned its mine about two years ago.

Royalton—Operations were resumed Nov. 2 at the Franklin Coal & Coke Co.'s mine near here, which has not been operating since the recent disastrous explosion in which somewhat over 50 lives were lost.

Canton—The Mine Rescue Car, under the management of Messrs. Thomas Rogers and Thomas Trigg, has been moved to Dunfermline, where first aid and helmet work lessons will be given. The car was in Canton for approximately three weeks.

Springfield—It is stated by officers of the United Mine Workers that mine after mine has been closed throughout the state during the past two weeks and that the coal mining industry is decidedly disorganized. The conditions now facing the miners are said to be the worst in the history of the state exclusive of strike years. The general business depression existing throughout the United States is blamed as the chief cause of the bad conditions.

IOWA

Knoxville—The old Hawkeye mine, a short distance east of this city, and for many years the largest coal producer in Knoxville Township, has been permanently abandoned. The boilers and engines have been removed, and the rails and timbers torn out. During the past 16 years it is stated that over 750,000 tons of coal have been loaded onto the Rock Island tracks at Hawkeye.

FOREIGN NEWS

Edmonton, Alta.—J. T. Stirling, provincial inspector of mines for Alberta, reports that the coal mining industry of that province is at present in an unsatisfactory condition. In the Lethbridge and other Southern fields only about half the mines are working and they are on half time. Conditions are better in the Edmonton district, where the majority of the mines are fairly busy. The demand for coal this season has been light and the price has been lower than for some years, so that production at prevailing figures is unprofitable. As none of the dealers are laying in stocks a cold spell of any considerable duration may result in a shortage in the coal supply.

Glace Bay, N. S.—The production of the Dominion Coal Co.'s mines at Glace Bay and Springhill, N. S., for the 10 months ending with October is roughly stated at 4,071,000 tons as against 4,284,489 tons for the corresponding 10 months of 1913. While production at the Glace Bay mines has been curtailed owing to trade depression and the war, the output of the Springhill collieries, which have worked without interruption, has increased from 318,510 tons to 341,000 tons.

PERSONALS

Harry Dale, for many years past with the St. Louis Carterville Coal Co., and in charge of the Dale mine of that firm, has resigned his connection with the company and will engage in the mercantile business.

Joseph Pursglove and T. K. Maher, of the Pursglove-Maher Coal Co., have just returned from Logan County, West Virginia, where they inspected a piece of coal land. They are satisfied with the property and will probably close for it in the next two weeks.

Col. Harvey M. LaFollette, who was president of the LaFollette Coal, Iron & Ry. Co., at LaFollette, Tenn., prior to the appointment of a receiver on Dec. 23 last, and who has since been making his headquarters in New York, spent several days recently at LaFollette, Tenn.

H. C. Hequembourg has resigned as general purchasing agent of the American Locomotive Co., effective Nov. 15. It is not the intention to appoint a successor at this time, but until further notice the purchasing and storekeeping departments will be under the jurisdiction of Leigh Best, vice-president of the company.

John Whelan, Jr., formerly with M. A. Hanna & Co., of Cleveland, and general superintendant of the Massillon Coal Mining Co., of Massillon, O., has resigned these positions and gone with the Copen Creek Coal Co., as vice-president and general manager. This company has mines at Webster, Braxton County, W. Va.

W. P. Bross, general salesmanager for the Midland Coal Co., Kansas City, accompanied by U. A. Ralston, a salesman for the company in northern Kansas, is making a trip through the company's mines at Liberal, Minden and Pittsburg, Kan., for the purpose of learning how many cars can be expected for use this winter.

J. M. Roan, chief mine inspector of Ohio, was called to the Hocking Valley recently to settle a dispute over the weighing of coal at Mine No. 207 of the Sunday Creek Co. The company had been weighing the coal by building a bin under the scale and weighing the lump first and the fine coal second, with the same scales. This plan was approved by Mr. Roan.

Dr. W. A. Lynott, of Scranton, has recently been appointed a member of the medical and specialist staff of the Federal Bureau of Mines, by Doctor Holmes. Doctor Lynott was recommended for the position by a number of Philadelphia specialists with whom he practiced. He reported for duty on Nov. 1 at Pittsburgh and will have charge of the eye division of the medical bureau.

Erskine Ramsay, vice-president of the Pratt Consolidated Coal Co., was seriously injured, Nov. 7, suffering concussion of the brain caused by striking his head against the side of a barge. Mr. Ramsay, along with about 25 guests of the Pratt company, was at the shipyards at Holt, Ala., to celebrate the launching of the first barge by the company on the Warrior River. Mr. Ramsay stayed in the barge while it was being launched, and as it struck the water it tilted upward, throwing him against a beam. While his injuries are serious, it is stated that he will recover. He is one of the best known coal men and engineers in the country.

John Girdler, a coal dealer in Beverly, Mass., received congratulations Nov. 11, on the occasion of his one hundredth birthday. Mr. Girdler was born in Manchester, Mass., in 1814 and after an active business career in fitting out and managing vessels engaged in the Newfoundland fisheries he entered the coal business in Beverly in 1861 at an age when some men retire. He has since then been continuously in that business and on the same wharf, a prominent factor in the trade of that vicinity. Mr. Girdler enjoys excellent health and were it not for his slightly impaired eyesight he says he would be in as good condition as five years ago when he was giving close attention to every detail of his business. As it is, he stays at his office through the morning of each business day and takes a lively interest in market conditions and in what wholesale coal salesmen have to tell him. His friends wish him continued health and prosperity.

CONSTRUCTION NEWS

Ebensburg, Penn.—Active preparation for the manufacture of mine cars was recently begun at Colver. The shops of the company have been renovated and rearranged for that purpose, and some of the new machinery is already placed.

Massillon, Ohio—The Baltimore & Ohio R.R. has started to build a switch to Charlotte Mine No. 27 of the Massillon Coal Co. at Pigeon Run, which will soon be opened. Operations are expected to start Dec. 1 with 250 men.

Cleveland, Ohio—O. C. Barber, former "match king" and "millionaire farmer" of Summit County, is interested with Daniel Willard, president of the Baltimore & Ohio R.R. Co., in a Cleveland, Ohio, company which will spend more than $9,000,000 in reclaiming land and building vast coal and ore docks on the Cleveland lake front.

Floodwood, Ohio—The announcement is made by the officials of the Hocking Power Co., which is building a large power plant at Floodwood, that a portion of the plant will be completed by Dec. 1, when current will be sold. The work of constructing the service lines to carry the current to surrounding mines has been started. The company will furnish current to light 11 municipalities.

Buffalo, N. Y.—The Wickwire Steel Co. has filed with the Erie County Clerk a mortgage for $2,500,000 issued by the Bankers' Trust Co. of New York, the proceeds of which is to be used to enlarge its iron plant on the Niagara River between Buffalo and Tonawanda. A new wire works and byproduct coke plant are planned. The project is not new but it was supposed that nothing would be done till business revived.

West Union, W. Va.—The opening of new coal lands in various parts of West Virginia at present is calling for the construction of several railroads for the private use of the coal companies, which later may become a part of the general transportation system of the state. This has happened in a number of instances in the past, both in coal and timber land developments, and is usually a part of the plan of the companies in constructing new roads for private use.

Harlan, Ky.—M. P. Dotson, a capitalist of Wise, Va., and Pasadena, Calif., has been constructing a railroad from Ages to Evarts, a distance of about four miles. This road connects with the Louisville & Nashville at Ages. It is reported that it has been turned over to the L. & N., and that the engineers of this corporation will complete it. The finishing of this short line will open a market for some of the best coal in this field. It is thought that this is he beginning of a line that will connect with the Louisville & Nashville R.R., probably at either Big Stone Gap or at Appalachia, Va.

Huntington, W. Va.—C. W. McNulty, of Huntington, has been awarded the contract for the construction of the new central power plant of the Logan County Light & Power Co. at Logan. The building will be of fireproof construction throughout and the smokestack will be of brick 200 ft. high. Construction work will be started immediately and pushed as rapidly as possible with a view to having the power system in operation by Sept. 1, 1915. The turbines to be installed have already been contracted for and will have a capacity of 10,000 kw. The transmission line will extend to every mine in the Logan coal field with a total length exceeding 60 miles.

Fayetteville, W. Va.—The Virginian Power Co. is installing new electrical equipment in all the mines of the New River Co. The contract has been made with the central station company for a supply of alternating current, and the equipping of the mine with new machinery is under way. The equipment supplanted by the new electric power is to be sold. Two hundred and fifty and 550 volts have been standard in these mines since they were first electrified, and to save expenses these two voltages are being retained for haulage. The heavy pumping and ventilation equipment will be driven by 2300-volt current, and the lighting will be changed from 250 or 550 volts direct current to 110 volts alternating current.

NEW INCORPORATIONS

Joliet, Ill.—The Dermy Coal Co. has increased its capital stock from $100,000 to $200,000.

Cleveland, Ohio—The McCurtain Coal Land Co. has been organized with a capital stock of $50,000, to handle coal lands. Those interested are C. M. Horn, Paul J. Bickel, E. L. McCloskey, I. L. Evans and J. B. Putnam.

Nelsonville, Ohio—The B. R. Coal & Mining Co. has been incorporated at Nelsonville, Ohio, with a capital stock of $10,000. M. E. Pike, E. M. Patterson, F. W. Postle, A. L. Peters and Ralph Merchant are incorporators.

Fort Smith, Ark.—The Blue Ridge Coal Co., of Fort Smith was recently chartered with an authorized capital stock of $30,000. The officers are J. B. Jordan, president, C. E. Warner, vice-president, and H. P. Warner, secretary and treasurer.

East St. Louis, Ill.—One of the largest of the local coal carrying roads, the East St. Louis & Suburban R.R., has reduced its capital stock from $14,000,000 to $1,000,000, according to papers filed with the secretary of state in New Jersey. The company has reincorporated in Delaware with a capital of $12,000,000.

INDUSTRIAL NEWS

Columbus, Ohio—The report of the Hocking Valley Ry. for the month of September, 1914, shows a falling off of $51,000 in gross earnings from the figures of September, 1913. The net income was $169,634, or a decrease of $26,110.

Huron, Ohio—Supt. Gilmore, of the Wheeling docks at Huron, Ohio, is making arrangements for the accommodation of several lake freighters that will go into winter quarters at that place at the close of the navigation season.

Fayetteville, W. Va.—The Kanawha Coal Operators' Association recently held its annual session in Cincinnati, electing officers and discussing policies for the ensuing year. The reports of officers were heard and approved, the meeting being purely routine.

Louisville, Ky.—Delegates to the winter meeting of the Kentucky Mining Institute, which will be held here next month, will represent mines in which more than 30,000 miners are employed. The Engineers & Architects Club will hold joint sessions with the Institute.

Columbus, Ohio—Persons who have been given short weights in coal are requested to communicate the facts in the case to Fred C. Albrecht, sealer of weights and measures, and he will investigate all such complaints. This request is made to further the campaign against short weights claimed to be prevalent in many parts of Ohio.

Buffalo, N. Y.—The principal office of the J. B. Jenkins Coal & Coke Co. has been moved from Cincinnati to Buffalo by W. H. Hufstader, the vice-president, who left the Buffalo agency of the Pittsburgh & Buffalo Co. last year to take the new position. By the present arrangement the Jenkins company will sell the Pittsburgh & Buffalo company's coal in the Buffalo territory.

Sydney, N. S.—The Dominion Coal Co.'s combined collieries, Nos. 2 and 9, recently made a remarkable record. The ouptut of No. 2 for the single shift was 3961 tons, while No. 9 yielded 2087 tons. This made the combined total of 6048 tons for the shift. Both pits are worked by the same organization and the coal is hoisted through a common shaft. It is believed that but few mines in the world have ever passed the 6000-ton mark in a single shift.

Harrisburg, Penn.—The production of anthracite coal during October was heavier than that for October of last year despite the drouth which rendered mining difficult. The official statistics of shipments over 8 railroads announced by the Bureau of Anthracite Statistics, show 6,644,476 tons. The shipments in October of last year were 6,338,194 tons. However, production as a whole is still over a million tons less than during the first 10 months of last year.

Youngstown, Ohio—The establishment of a municipal coal yard in this city is being agitated by members of the city council, on the ground that such a business could supply fuel cheaply for city purposes, and could also take care of the annual charity coal distribution made by the city, as well as sell cheaply to the public. The plan has arisen in connection with charges made against a number of dealers of selling short weight, which have not so far been substantiated.

Jefferson City, Mo.—During the next four weeks the Public Service Commission will take charge of a test weight car operated by the Federal Bureau of Standards, and will test all master scales in the state and also every railroad scale. This will be the first governmental test of railroad scales in the state, and it is expected to lighten the troubles of the Commission from the continued complaints from shippers of coal both within and without the commonwealth as well as the consumers.

Lexington, Ky.—The output of the mines of the Consolidation Coal Co. in Letcher County is now between 70,000 and 90,000 tons a month as compared with from 90,000 to 110,000 tons for last year. The whole output for the country will be decreased probably from 200,000 tons, a normal average, to 100,000 tons monthly, until early spring, when, it is hoped, the market will open up again. All over the section the operators are relying on little besides domestic trade and have cut their production accordingly.

Toledo, Ohio—The Royal Collieries Co. has moved its general offices from Jackson, Ohio, to Toledo and is located at 1046 Ohio Bldg. E. W. Ervin is general and sales manager of the concern and Eben Jones, of Jackson, Ohio, president. The concern, which was recently reorganized, has mines in the Jackson Hill field of Ohio and also owns the Kentucky Gem mine at Offut, Ky. The concern also owns coal lands in that section and is planning to open up new mines which will triple the present output from the Kentucky fields.

Baltimore, Md.—Dismissing the suit of James C. Cobey and other stockholders of the Fairmont & Baltimore Coal & Coke Co. for the appointment of a receiver for that firm, Judge Dawkins in an opinion handed down Nov. 4 in the Circuit Court exonerates Alvin P., Howard and Irving Adams from all the charges made against them in the bill of complaint. It was alleged that the Messrs. Adams owning a controlling interest in the Fairmont & Baltimore Coal & Coke and other companies had conspired to defraud the complainant and the Fairmont company by selling coal mined by the latter to the Hamilton company at a price below market value. It was alleged that $30,000 had been lost which made the Fairmont company insolvent.

St. Louis, Mo.—Over 150 coal men of St. Louis and vicinity made a tour of inspection of the largest gas plant in the West, station A of the Laclede Gas Light Co., here, last Saturday afternoon, after which they were taken in a special train to the extreme southern limits of the city to view the huge new plant of Koppers byproduct retorts. The first battery of ovens is about completed but it will be the middle of the coming year before they will be put in operation. The entire party was taken back to the Century Boat Club where a banquet was tendered them and entertainment furnished. The inspection was made under the direction of the M. W. Warren Coke Co. of St. Louis, Western representatives of the Consolidation Coal Co., and the speakers of the evening were Secretary Woods of the Warren Co., W. F. Heinecke and E. J. Wallace of St. Louis.

Coal Trade Reviews

General Review

Anthracite marking time pending more seasonable weather. Bituminous operators becoming discouraged at the long delay in the expected improvement. Shortage in ocean freights.

The recent cold snap has caused a mild rush for hard coal and some difficulty is experienced in getting certain specific sizes but as a rule stocks are plentiful and the movement prompt. The current trade is showing a marked tendency to drag and the market lacks its customary fall snap. The situation hinges almost entirely on the weather, as is evident by the sharp activity in the dealer trade as a result of the recent low temperatures. Mine operations are still somewhat restricted.

Although the bituminous agencies continue optimistic as to the future, it is noted that many of them are beginning to question when the turn will occur. Some slight improvement was reported at certain isolated points during the week, but it is difficult to see any general movement in that direction. Spot business is at a minimum, while stocks continue at the maximum and with large volumes standing at some of the terminals, it is evident that much demurrage is accruing. Even the high grade coals which seldom suffer in a heavy market are beginning to feel the effects of the heavy pressure. But developments of a constructive nature are not entirely absent; some renewed inquiries for foreign shipments have developed and the market cargoes, so much in evidence recently, have been practically all cleaned up.

Ocean freights are looming up as an important factor in the situation. There is an authoritative estimate that the British Government has 1500 steamers under charter, which, together with the fact that practically all the German shipping is interned in neutral ports, has resulted in a shortage in vessel tonnage, causing a sharp advance in rates.

The current week witnessed a final winding up of Lake shipping out of the Pittsburgh district, and operations are down to 50% capacity; an attempt on the part of some of the producers to establish a new circular has met with only partial success. The closing of Lake shipping has caused a sharp restriction in Ohio also. With plentiful transportation facilities, and the surplus coal from the Lake trade, a demoralized market might be anticipated, but the situation has been unexpectedly well maintained so far. Prices are suffering and the production is much curtailed with many mines closing down entirely rather than flood the market. Southern operators are already beginning to anticipate the usual competition with the coals released from the Lake trade and prices are lower and very irregular. The fall business is so slow in opening up that the outlook is regarded as most discouraging.

A better tone to general business has created a more hopeful spirit in the Chicago market, and prices have been exceptionally well maintained in view of the adverse weather conditions. Considerable coal was shipped from the mines on consignment, in anticipation of colder weather, and this has proved a heavy burden to the market. Buying is confined more particularly to the domestic grades.

ATLANTIC SEABOARD

BOSTON

No change in the generally depressed market, although a better foreign demand is expected by some. New England stocks large. Pennsylvania coals on demurrage are offering at low prices. Georges Creek shippers secure some foreign business. Anthracite continues dull.

Bituminous—The week has developed no change in the generally depressed situation. A renewed foreign inquiry for special grades has encouraged a few of the shippers but the tonnage is relatively small and there cannot be said to be any favorable turn in prices at Hampton Roads. The Pocahontas and New River agencies have about despaired of finding any market coastwise for the present and the number of offerings the past few days has been noticeably less. A large volume of coal is still standing at all the terminals, the dumpings lately having been insufficient to materially reduce the accumulations of other weeks. Some heavy demurrage charges must have accrued during October.

Minimum prices continue to be heard, but the amount of spot business actually placed has been negligible. Stocks in this territory have been so large all season that with most plants it has been a physical impossibility to take on even the coal that was contracted for. The market cargoes lately offering at the various Eastern distributing points have now been practically all absorbed and delivered prices are somewhat steadier in consequence. Mills, however, are cancelling orders and the outlook for fall business is not encouraging.

There have been further reports of Pennsylvania shippers with distress coal on their hands at New York and Philadelphia. Prices on first-class Cambria County coals have receded to the lowest level since the slump in April, 1912, and it may be that quotations will drop still further. The dullness of the bunker trade has an unfavorable effect all over the market.

Georges Creek is sharing in some of the off-shore business that has lately come up, judging from the number of foreign ships at the Curtis Bay piers. The New England demand is as light for this grade as for all the others.

Anthracite—The cooler weather is expected to cause a better demand on the companies but at this writing the trade is unusually dull. Many of the anthracite barges are available for the bituminous trade.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.85@1.45	$1.15@1.50	$1.67@1.77	
Philadelphia*.....	2.10@2.70	2.35@2.70	2.92@3.02	
New York*.....	2.40@3.10	2.65@3.05	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.50@2.75
Boston†.....	.....	.....	.....	3.45@3.73
Providence†.....	.....	.....	.....	3.30@3.68

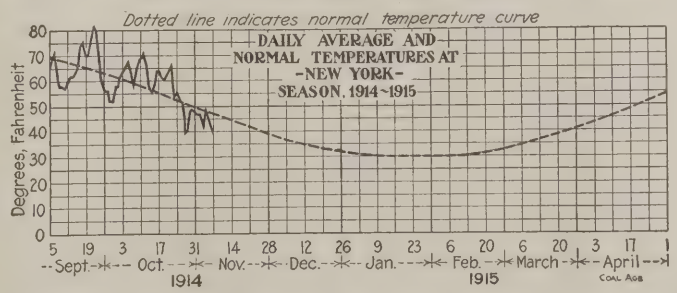
* F.o.b. †On cars.

NEW YORK

Bituminous still awaiting an improvement in basic conditions. Trade slow and heavy. Large stocks of anthracite on hand and business slow but the general tone is excellent.

Bituminous—The raising of the embargo at South Amboy toward the close of last week seems to be the only encouraging development in the local situation. Operators continue optimistic regarding the future, but many of them are becoming uneasy over the long delay. Undoubtedly the situation hinges on developments in industrial lines, more particularly steel, any improvement in which, will be quickly reflected on other industries.

An excellent bunkering trade is having a steadying effect upon the situation, one of the important companies engaged in this business reporting the largest tonnage in its history last month. This is accounted for by the heavy export movement of grain, which has reached to such proportions that vessel tonnage is relatively short and in urgent demand. The heavy orders from abroad for various manufactured articles



including munitions of war, are also having a beneficial effect, it being noted that some plants are going on full time operations and a few on double time.

The technical position of the market is quite favorable considering conditions. Supplies are plentiful but still within reasonable limits and though low prices are occasionally noted, it is evident that not much coal is coming down on speculation, operators holding their production down rigidly.

The market is quotable on about the following basis: West Virginia steam, $2.50@2.60; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The hard-coal trade has slowed up somewhat as the result of the long continued mild weather, but a few more seasonable cold snaps will soon readjust this phrase of the situation. At the present time the main objectionable condition in the anthracite trade is the large stocks which are the inevitable result of the record breaking production last month, and the light consumption incident to the mild weather.

Plenty of stove coal is available, for the time being at least, at the regular circular and it is now in as free supply as most of the other grades. A continuance of the recent cold snaps will also bring about an active situation on pea and egg coal, when the apartment house demand gets fully underway. Even as it is dealers are now experiencing a mild rush and this will be gradually accentuated as the season advances. As a rule the steam sizes are weak and in poor demand.

The New York hard-coal market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.00@5.35	5.30	4.90@5.30
Stove	5.35	5.25	5 30	5.30
Chestnut	5.60	5.45@5.60	5.55	5.30@5.55
Pea	3.55	3 45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.70@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.70@1.80	1.75	1.40@1.75

PHILADELPHIA

More seasonable weather creates an improvement in anthracite. Domestic sizes in good demand, and better call for steam grades. Bituminous trade still apathetic, with little prospect for any improvement.

Anthracite—More seasonable weather the past week brought calls from the house holders, which depleted the stocks of the dealers to the extent that there were increased calls on the wholesale operators. Stove and chestnut seem to be leading the van at present, while egg is showing a tendency to drag. Individuals are now concentrating their efforts to move egg at liberal concessions from the circular, and the large companies find themselves rather hard put to get rid of this size, in conjunction with the others. There seems to be a better call for pea, buckwheat and rice, particularly the former. This indicates that the small house holder is coming into the market, as pea coal is looked on as a domestic fuel, and is used largely for that purpose.

Prices at Tidewater about as follows:

	Circular	Individual
Broken	$4.75	$4.60 @ 4.70
Egg	5.00	4.65 @ 4.75
Stove	5.00	5.10
Chestnut	5.25	5.00 @ 5.10

Bituminous—Nothing favorable occurred during the past week that could be construed into the supposition that the bituminous trade was on the upward trend. Prices still continue low, even for the better varieties, with the demand considerably less than the supply. Extended cold weather may create a better demand, but the industrial depression continues, and improvement along these lines is the only salvation.

BALTIMORE

Colder weather creates a better feeling in anthracite. Soft coal conditions not at all satisfactory. Prices on the better grades are suffering.

More seasonable weather has come to aid the hard-coal dealer. Many householders have been forced to buy and most of the dealers have received fair orders the past week. The stocks on hand remain liberal, however, and in addition a prompt movement is reported. Some dealers have trouble in getting through special sizes as desired, but it is at no time serious. From now on about an average winter, or perhaps a little better than average, should be experienced by the hard coal dealer, though lack of employment that has hit many small homes may make some difference.

There is not much encouragement in the bituminous situation. Operating interests of West Virginia, Maryland and Pennsylvania all report a poor demand for fuel of all grades. In the past the better coals have usually held up in periods of stress, but the present depression has apparently hit all about alike. West Virginia three-quarter gas coals are selling around 85c., with slack about 50c., this latter being the only grade to show a gain in the past two or three weeks. Western Maryland coals are offering to the trade at from 75 to 85c. Pennsylvania off qualities are on the market at from 95c. to $1.10. Best coals are still maintained around $1.35 to $1.40.

HAMPTON ROADS

Movement for the week shows up well. No change in prices. Total dumpings for October 981,507 tons.

Dumpings over the piers at Hampton Roads for the week show up well. Some large cargoes have gone coastwise and the foreign movement has been good. Although Custom House records showing foreign clearances are not available it is understood that some heavy cargoes have gone to Rio de Janeiro, Montevideo, Genoa, Naples, Cardenas, and Port of Spain. Even though there is still a small excess of coal on hand above normal, suppliers are making no reduction in price on any of the various grades and there is no prospect of any cut being made; in fact the outlook is for a heavy movement during November and there may even be a slight advance in price on some of the grades.

The total dumpings at Hampton Roads piers for the month of October amounted to 981,507 tons of which quantity the Norfolk & Western dumped from Lamberts Point 436,647 tons, the Chesapeake & Ohio Ry. from Newport News 295,926 tons and the Virginian Ry. at Sewalls Point 248,934 tons. A comparison of figures for October of this year with the same month of last year shows that both the Virginian and Norfolk & Western fell down somewhat in their dumpings while the Chesapeake & Ohio made a fair gain. The total dumpings for October 1914 are about ten thousand tons ahead of the movement for the same month last year and although this gain is small there is some satisfaction in knowing that it was made under very different market conditions from last year.

OCEAN FREIGHTS

British Government believed to have 1500 steamers under charter. Vessels scarce and rates advancing rapidly, with the market hardly quotable.

It is almost impossible to quote rates on coal from this country to foreign ports with any degree of accuracy at the present moment, as the freight market is advancing daily owing to the increased demand for steamers for grain, general cargo, time charter, etc., and the scarcity of available November tonnage. We believe that the British Government now has under charter 1500 steamers.

Mediterranean rates we would quote at from $4.80@6, but owners favor grain under present conditions. Early last week we had a neutral steamer offered for coals from a United States port to Montevideo at $3.72, which was a very reasonable boat on the market, but since then the Dutch steamer "Hercules," 1372 tons net register, has been chartered to load coal at Baltimore for River Plate at $4.08. To the West Coast of South America, steamers are available at reasonable figures, as a few owners desire to place their boats in this position, and we would quote the rate to Valparaiso at $4.32, with 750 tons a day for discharging.—W. W. Battie & Co.

COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Sunlight		Baltimore	Calais	349	
Mary F. Barrett		Baltimore	Galveston	1564	
Geo. H. Ames		Norfolk	Savannah	378	
Isle of Jura	British	Baltimore	Genoa	2485	
Dustin G. Cressy		Baltimore	Mayport	726	
Chas. H. Klinck		Philadelphia	Biddeford	4444	$0.95
Nonetta M. Porcella		Baltimore	Bangor	466	
Thomas H. Lawrence		Philadelphia	Rockland	323	0.90
Farmand	Norwegian	Philadelphia	Caribbean	861	
Margaret Haskell		Baltimore	Portsmouth	1870	

Note—Steamers are indicated by **bold face** type, all others being schooners.

LAKE MARKETS

PITTSBURGH

Some sellers have named new circular prices at $1.20 for mine-run, 10c. reduction from last season's prices, and are openly quoting prompt at a further reduction of 5c., but with scarcely any buying at any price. Lake shipments about over. Operations at not over 50% with prospects of 25 or 30% within a fortnight.

Some of the operators have announced new season prices, but others have refused to do so, regarding present conditions so poor that no circular could be maintained, and they are nominally quoting on the old basis—$1.30 for mine-run—expecting to name real prices about Apr. 1. The new schedule as announced by some operators is as follows: Slack, 85c.; nut and slack, $1.05; nut, $1.15; mine-run, $1.20; ¾-in., $1.30; 1¼-in., $1.40. For spot lots they are quoting 5c. less on mine-run and screened coal, but do not name corresponding

prices on slack and nut, prompt quotations being: Mine-run, $1.15; ¾-in., $1.25; 1¼-in. $1.35. There is no inquiry for contract coal so that the prices are practically nominal. As to prompt, there is occasional buying in a small way, but it is not probable that the prices quoted will generally obtain in the market during the next few weeks, because of the large surplus of productive capacity.

Slack for prompt shipment has continued to firm up, with the approaching end of the Lake shipping season, and in the past few days it has been firm at 60c., although selling at 50c. a fortnight ago and at as low as 40c. a month or six weeks ago.

This week has seen practically the end of shipments in the Lake trade, though a few belated lots may go forward next week. The insurance expires Saturday, Nov. 21.

The Pittsburgh district is operating at an average rate of not over 50% at the outside, and many mines are closed entirely or operating only one or two days a week. Within a fortnight production is likely to be down to 25 or 30% on account of the cessation of Lake shipments. There is a slight improvement in domestic demand, but the manufacturing demand is tapering off still more, and is not more than 50% of normal.

BUFFALO

Tone of the bituminous market not improved. Mines running very slow. Small prospect of activity this fall, on account of heavy overstock. Anthracite doing well.

Bituminous—Some operators in the Allegheny Valley state that they are now running scarcely more than two days a week and that it is difficult to sell even this reduced output. This is an extreme view of the situation, but it shows how deep the despondency is. But in spite of all this the bituminous trade is making a little money, at least where it is possible to mine the coal at moderate cost, and for that reason the operators refuse to take the off-hand advice of disinterested friends and shut down for the winter. They know full well that the working capacity of the bituminous mines is far beyond the needs of the country but it only takes a short period of car scarcity to advance prices and put them on their feet again.

So the output is kept up to the limit of the consumers' storage capacity in anticipation of the inevitable swing of the pendulum to the other extreme. In the meantime there must be waiting as there is considerable coal on track yet. Quotations are kept as near the spring circular as possible, some coal still selling on the basis of $2.80 for best Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with slack more active of late than sizes. Allegheny Valley sizes are quoted 25c. lower than Pittsburgh.

Anthracite—The trade is fair, perhaps even better than should be expected, considering the very warm weather so far this fall as indicated by our temperature charts.

The Lake movement keeps up well, considering the amount already on the Upper-Lake docks and it looks as if the shippers would go on till the lakes are closed by ice, as they usually do. Shipments for the week, according to the custom-house report, were 120,000 tons, covering ten receiving ports, which shows that the smaller Lake towns are laying in their last supply for the season from that source.

TOLEDO

Warm weather causes a restriction in the trade. Market heavy, but a better feeling prevails.

Warm weather has again caused a relapse in the domestic coal trade, which had improved materially during the brief cold spell. The steam trade has not been greatly improved, although dealers are hopeful that conditions will be better in a short time. Lake business continues, though it is far from being as heavy as it should be at this season of the year. There is no coal on track in this section, as it has practically all been cleaned up. Prices remain the same, but dealers seem to be holding closer to the list.

CINCINNATI

Continued mild weather has prevented a revival in domestic business. Steam demand still weak owing to industrial conditions. Prices holding well in view of the adverse conditions.

This section has been experiencing probably the mildest fall weather for several years. As a result few domestic consumers have as yet felt any need for fuel, and those who postpone their buying until cold weather are yet to be heard from. This fact, in connection with the practical certainty that most of the smaller dealers are not at all heavily stocked, makes it probable that the next cold snap will revive the domestic market very sharply. This will also help the steam business somewhat as there has been little call for screenings for heating purposes so far.

As to industrial demand there is practically none. The few manufacturers who have benefited by the war are greatly outnumbered by those whose foreign markets have collapsed entirely, and the industrial depression seems to be unimproved. Considering these conditions, prices are holding up very well indeed, the amount of distress coal offered being unexpectedly small.

CLEVELAND

Coal on track at the opening of the week aggregated 500 cars with a limited market, but no cutting of prices. It will take a week to clean up the market. The retail trade continues good.

Receipts over last Sunday, with what coal was carried over, amounted to 500 cars, mostly slack. The Pennsylvania R.R. had 260 cars; the B. & O. 150; the Big Four, 40; the Nickel Plate, 20; and the Wheeling 30. Not to exceed 60 cars were coarse coal. Operators and jobbers last week filled up the local trade and the market was limited as a result.

Very little of the coal on track was consigned. Most of it was brought in on contract or sent in to clean up mine tracks where Lake coal is being made. This week practically closes the Lake shipping season and jobbers and operators are working to divert shipments to northern Ohio markets away from Cleveland.

Panhandle, Youghiogheny, Goshen, Cambridge, No. 8 strip vein from Ohio mines, West Virginia No. 8, Fairmount, Hocking, and Pomeroy slacks were on track. Hocking was held at $1.50, which has been the current price for the last few weeks, while the others were quoted at $1.65 to $1.70.

The domestic trade is holding up well and sales are steady, but not of real winter proportions. Pocahontas and other prepared coals are not easily obtained. They are held firmly at quotations and there is enough demand to absorb the present production.

The Northwestern Fuel Co. shipped its last coal from Lorain and Toledo this week and will use only one boat for storage coal. Most ships leaving Lake Erie for Upper Lake ports are carrying storage coal. There is less coal being shipped now than in the middle of July and there is nothing to indicate there will be the customary rush the last two weeks.

Quotations for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.75	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.75	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1¼ in.	.....	$2.40	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$1.95@2.00	$1.95@2.00
Mine run	2.75	2.25	1.95	1.85@1 90	1.90
Slack	2.40	1.65@1.70	1.65	1.65	1.65

COLUMBUS

Mild weather and the final slowing down in the Lake trade has caused a further slump. Steam business is still quiet and the market will be a weather proposition from now on. Small sizes are growing stronger.

The coal trade in Ohio is quiet. The domestic demand is small, due to continued warm weather, and the steam business is also slow. This, coupled with the fact that the Lake trade is nearing the end, appears to affect every phase of the market. Prices are suffering and the prospects for the future are not as bright.

Production is being considerably curtailed by the high temperatures and lack of steam demand, and many mines have been closed down almost entirely. On the whole the production in the Hocking Valley has been about 65% of the average, and in the strictly domestic fields even lower. Jackson and Cambridge reports not more than 40%, and in the Pomeroy Bend field the output is about 75% of the average.

Lake trade is on its last legs. The greater part of the final shipments are now loaded, and while some coal will be put on vessels for storage up to Dec. 1, this will not be sufficient to affect market conditions to any extent. The docks of the Upper Lake ports are congested and the interior movement is not large. The Lake season was not a good one from any standpoint.

Steam business is slow in every way. Buying on the open market appears to be one of the rules, and contracts are not being readily renewed. Railroads are taking a larger tonnage.

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Re-screened lump	$1.55	$1.65	.....
Inch and a quarter	1.50	1.55	$1.40
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.10	1.10
Nut, pea and slack	0.35	0.40	0.35
Coarse slack	0.25	0.30	0.25

COKE

CONNELLSVILLE

No current transactions of note, but some inquiry for next-year furnace coke. Prices unchanged, with production and shipments decreased further.

Practically no furnace coke sales have been made for November. Three or four inquiries have developed for first half or all of next year, and as low as $1.70 is claimed to have been quoted for the six months. Nearly all contracts expire with this year, but consumers are not likely to be in a hurry to make fresh contracts. We continue to quote: Prompt furnace, $1.60; contract furnace, $1.75; prompt foundry, $2.15@2.50; contract foundry, $2.35@2.50, per net ton at ovens, the contract quotations being for the very best grades.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 31 at 205,964 tons, a decrease of 23,555 tons, and shipments at 207,004 tons, a decrease of 7128 tons.

BUFFALO

Little doing in coke, as the furnaces are running slow and many are shut down.

Prices are supposed to be at the bottom, where they will remain till there is a genuine stir in iron. It is expected that a revival will take place as soon as the lull has lasted long enough to permit business in general to take a long breath. Predictions of wholesale failures are not now heard and the European war cannot prevent us from consuming a large amount of iron. Coke prices remain on the basis of $4.25 for best 72-hr. Connellsville foundry, with stock coke $3.30.

BIRMINGHAM

There is absolutely no business being done in furnace coke, and foundry coke is in only slightly better demand.

CHICAGO

Coke is quoted at: Byproduct, $4.95; Connellsville, $4.75@4.90; Wise County 72-hr. (select), $4.25; gas coke, $4.25; furnace coke, $4.40@4.65.

THE STEEL INDUSTRY

Shrinkage in production continues, and November output will show a scaling down from October. Our pig-iron statistics show how the industry has been receding. In October, production was 1,783,045 tons, or 57,518 tons a day, against 1,882,577 tons in September, or 62,753 tons a day. The October rate was the smallest since January, 1911. The net loss in active furnaces in October was 18, there being 158 in blast as November opened, with 53,253 tons daily capacity, against 176 furnaces and a daily capacity of 60,427 tons one month previous. Many steel works furnaces have been blown out and the recent increases in pig-iron stocks of the steel companies are likely to add more furnaces to the idle list. Export trade in wire products is still good and there is fresh inquiry for barb wire. Horseshoe works will be able to run full until February on European orders.—"The Iron Age."

SOUTHERN

LOUISVILLE

Lake trade closing down, and this coal will soon be diverted to the Kentucky markets. Prices lower and very irregular.

The improvement in the domestic demand, due to the low temperatures two days in succession, was only temporary. Industrial requirements seem to be even less than heretofore, while the shipping season on the Great Lakes is closing, and coal which was required there will soon begin to compete in Kentucky markets.

Prices are irregular and probably even lower than in October. This is accounted for by the fact that operators who have contracts for their high-grade coals are being forced to give their screenings away to get rid of them. The range of prices is very wide and is governed by the exigencies of each shipper's case and the conditions he has to meet. Lump coals are selling anywhere from $1.50 to $2.35, round from $1.10 to $1.75, and screenings all the way from nothing to 25 and 30c. and on up to 65c., according to grade; all prices are f.o.b. mines.

BIRMINGHAM

Lump market slightly improved but steam business is quiet. Bunkering trade a disappointment.

The past two weeks has shown little change in the Birmingham coal market. Business on lump coal may be a shade better, but the demand for steam fuel is so quiet, that it handicaps filling lump orders. While some steam coal is being shipped to Gulf ports for bunker purposes, this tonnage is not as large as had been expected, and the Birmingham operators are rather discouraged over this fact.

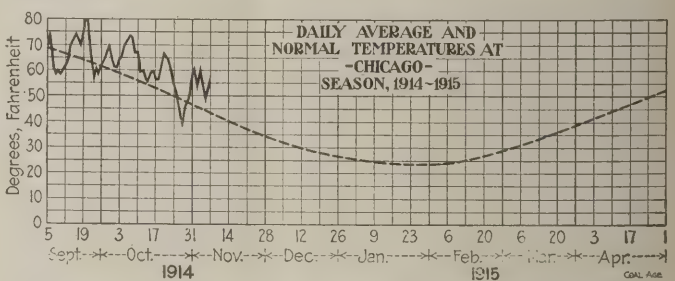
Many of the mines are closed down, and few are working more than three or four days per week. Blacksmith coal is holding its own; this grade has been more uniform both in price and demand for the past twelve months than any other grade, quotations ranging from $2 to $2.25 per ton f.o.b. mines for the better qualities. No immediate improvement is in sight on the lump and steam business.

MIDDLE WESTERN

CHICAGO

General dullness prevails. Summer weather lessens demand for domestic sizes. Anthracite market quiet. Prices of screenings rising, due to smaller production.

The only encouraging feature in this section during the past week has been the improvement in the demand for steam coals. This symptom of better conditions, which everybody in the trade is hoping for and which bids fair to lead to further advances in the near future, is said to be due to two causes. First, a material reduction in shipments, largely due to operators unloading screenings at the mines to be reloaded later when market conditions warrant. Second, a better tone in general business conditions in the Central West. Several manufacturers, particularly in Chicago and St. Louis, report the receipt of large orders for goods from foreign sources, and some idle plants have recently been reopened.



Chicago yards are full of coal, but a cold snap of any duration would soon change the situation radically. The colder weather only continued for a few days and made but little impression on the domestic trade. Prices for domestic sizes are holding astonishingly firm considering the weather conditions. Eastern coals seem to have benefited more from the fitful spell of cold weather last week than others, but have again resumed their former listlessness.

Franklin County coals have somewhat weakened this week; there is an over-supply of all sizes, and some coal has been moved at prices ranging from 15 to 20c. per ton under list.

There has been some reduction from circular quotations in the price of anthracite, but the tonnage moved is relatively small.

Prevailing prices are as follows:

	Franklin Co.	Springfield	Harrisburgh	Sullivan	Clinton
Lump	$1.75	$1.50@1.75	$1.50@1.75	.....	$1.40@1.75
4-in. lump.	.....	.....	.....	$1.50@1.75	.....
Steam lump	.....	.....	.....	.....	1.20
2½-in. lump.	.....	.....	.....	1.35@1.60	.....
1½-in. lump.	.....	.....	.....	1.25@1.35	.....
Mine-run	.....	.....	1.10	.....	1.10
Egg	1.60@1.75	.....	1.50@1.75	.....	.....
6x3-in. egg.	.....	1.35	.....	.....	.....
Nut	.....	1.30	1.40@1.75	.....	.....
No. 1 nut	1.60@1.75	.....	.....	.....	.....
Screenings	0.50@0.75	0.35@0.75	0.40@0.75	0.45@0.65	0.35@0.50

Hocking Valley 1¼-in. lump, $1.40@1.60; mine-run, $1.25.

New River and Pocahontas lump and egg, $2.25; mine-run, $1.35@1.40.

Somerset Smokeless lump and egg, $2.15@2.25; mine-run, $1.20@1.40.

INDIANAPOLIS

Indiana trade more cheerful. Some factories reopening and others are increasing forces. Mild weather makes a very poor market for domestic grades. Mine operations generally unchanged.

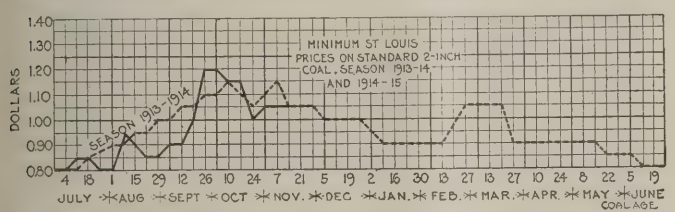
The weather is much against the trade. With the temperature well above normal as noted on the accompanying charts, the trade and prices are about on a par with the summer level. Slack has improved considerably, No. 4 selling at 80 to 90c. and hard to get on account of the light output of lump. Buyers who would ordinarily be taking eight to ten cars at a time at this season of the year are now ordering only two to three cars. The money situation has tended to reduce the size of orders and trading is largely on a cash basis.

The running schedule of mines has not changed much. Most of them are making half-time but some are doing better. The competition in the open market is keen, with resultant low prices made on occasions. Railroad buying is only moderate. There is considerable slowing down in the demand for coal from the large buildings in cities, the necessities being small in warm weather. These purchases are about one-third of what they are in normal fall weather. Buyers offer the minimum price for the free coal now on the market.

ST. LOUIS

Prices seem to have touched antirreducible minimum. Considerable coal on consignment. Number of mines shutting down.

The local market is practically at a standstill. Prices seem to have gone as low as possible and summer conditions exist. The only improvement the past week was in high-grad screenings, which increased a little in both price and demand. Not only is the steam market demoralized, which has been the case now for several weeks, but the domestic trade is also in a somewhat deplorable condition.



Anticipating cold weather, several of the operators shipped coal to different reconsigning points, with the result that there is an unlimited amount of coal on consignment. Continued warm weather has caused the retailers to shut off purchasing almost entirely; they are unable to take any of the coal, even at prices far below what that now in their bins cost them.

The prevailing wholesale prices are:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.30	$1.05@1.10	$1.15@1.20
3-in. lump	.....	....	1.40	....	.....
6-in. lump	$1.40@1.75	....	1.50	1.25@1.35	1.30@1.35
Lump and egg	1.85@2.15	$2.25	.....	....	1.35
No. 1 nut	1.30@1.45	....	.....	0.75@0.80	.....
Screenings	0.40@0.50	....	0.80@0.85	0.15@0.25	0.20
Mine-run	1.05@1.10	....	.....	0.75@0.80	.....
No. 1 washed nut	1.50@1.60	2.25	1.60	....	.....
No. 2 washed nut	1.25@1.35	....	1.35	....	.....
No. 3 washed nut	1.05@1.15	....	.....	....	.....
No. 4 washed nut	0.95@1.05	....	.....	....	.....
No. 5 washed nut	0.20@0.25	....	.....	....	.....

Retail prices are: Franklin County and Carterville, $3.50; Mt. Olive, $3; Standard, $2.75; Pennsylvania chestnut, $8.50; egg and stove, $8.25; grate, $8; Arkansas anthracite, $7; West Virginia smokeless, $6@6.50.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for September and the first nine months of this year and last year were as follows:

	September		9 Months	
	1914	1913	1914	1913
Phila. & Reading	1,092,056	1,232,367	9,961,608	10,736,917
Lehigh Valley	1,391,144	1,162,850	10,941,943	10,834,778
Cent. R.R. N.J.	892,386	906,525	7,452,435	7,701,931
Del. Lack. & West.	990,570	895,252	8,128,793	8,253,236
Del. & Hudson	678,104	625,049	6,032,697	5,928,124
Pennsylvania	611,593	593,800	5,308,918	5,204,132
Erie	773,866	709,400	6,943,394	6,828,702
Ont. & Western	214,757	212,951	1,942,269	2,132,259
Total	6,644,476	6,338,194	56,712,057	57,620,079

SOUTHWESTERN TONNAGE

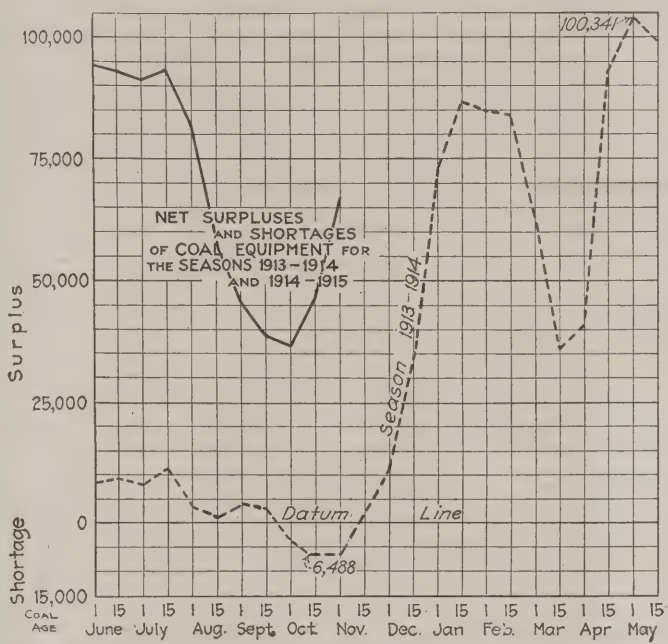
The following is a comparative statement of the Southwestern tonnage for February and March of the years 1913 and 1914:

State	February		March	
	1913	1914	1913	1914
Missouri	260,586	259,270	259,270	263,593
Kansas	414,413	492,304	492,304	501,841
Arkansas	130,888	113,354	113,354	165,037
Oklahoma	297,004	257,162	257,162	296,484
Totals	1,102,891	1,122,090	1,122,090	1,226,955

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

THE CAR SITUATION

The net coal car surplus on Nov. 1 was 67,345 as compared with 46,635 on Oct. 15. Detailed statement arrived too late for publication in issue and will appear next week.



FOREIGN MARKETS

ENGLAND

Trade heavy and unchanged. Vessel rates stiffen up.

The London coal trade continues slow. Prices are stationary, but with a tendency downward. Factories have bought for forward deliveries rather more freely, but the depot trade is weak.

Dear tonnage and high freights continue to act as a drag upon trade. On the Tyne this burden is acutely felt, the volume of business being very limited.

During the week the Miners' Federation of Great Britain has discussed the question of the relief of soldiers' and sailors' dependants, and the necessity for a state scheme dealing with unemployment, which is becoming serious.—"Colliery Guardian."

Oct. 23—Strong conditions are well maintained and there is a great scarcity of Admiralty List descriptions for early loading. Dry coals also are not easily obtainable, but Monmouthshire large and Cardiff smalls are in ample supply at present. Quotations are approximately as follows:

Best Welsh steam	$5.04@5.28	Best Monmouthshires	$4.02@4.08
Best seconds	4.56@4.80	Seconds	3.84@3.96
Seconds	4.38@4.56	Best Cardiff small	1.86@1.92
Best dry coals	4.92@5.16	Seconds	1.20@1.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage and for cash payment.

Freights—Chartering is fairly active and rates steady at approximately the following figures:

Gibraltar	$1.68	Venice, Ancona	$3.00	Singapore	$2.64
Malta	1.68	Alexandria	2.40	Las Palmas	1.68
Marseilles	1.76	Port Said	2.28	St. Vincent	1.80
Algiers	1.56	Aden	2.40	Rio Janeiro	2.94
Genoa, Savona	1.86	Colombo	2.46	Monte Video	2.52
Naples	1.92	Sabang	2.46	Buenos Ayres	2.76

Coal Contracts Pending

Contract No. 4—Boston, Mass.—Rhode Island Co. is in the market for 90,000 to 100,000 tons of Pocahontas, New River, Georges Creek, or Somerset run-of-mine. Shipments are to be made in about monthly proportions for a year, and the point of delivery is Providence, R. I. All communications should be addressed to J. H. Sanford, Purchasing Agent, New Haven, Connecticut.

Contract No. 6—New York—The Connecticut Co. is in the market for 22,000 tons of a good grade, low volatile, low ash, low sulphur bituminous coal for 10 months, Nov. 1, 1914 to Sept. 1, 1915. Shipments are to be as required f.o.b. boats, to be placed by the company at New York loading ports. Bids should be submitted to J. H. Sanford, Purchasing Agent, New Haven, Connecticut.

Contract No. 7—Zylonite, Mass.—The Berkshire Street Railway Co. is in the market for 21,000 tons of a good grade, low volatile, low ash, low sulphur bituminous coal for 10 months, Nov. 1, 1914 to Sept. 1, 1915. Shipments are to be as required and price to be made f.o.b. cars at mines for Tunnel Power plant at Zylonite, Mass., B. & A. R.R. Bids should be submitted to J. H. Sanford, Purchasing Agent, New Haven, Connecticut.

Contract No. 8—Portland, Ore.—Proposals for furnishing and delivering about 5000 tons of bituminous coal for use on the Dalles-Celilo Canal construction work will be received at the U. S. Engineers' Office, Portland, Ore., until 11 a.m., Nov. 27, and then publicly opened. All communications should be addressed to Major of Engineers, Jay J. Morrow, U. S. Engineers' Office, Portland, Oregon.

Contract No. 9—Fort Wayne, Ind.—The Municipal Light, Heat & Power Co., of Fort Wayne, is in the market for 20,000 tons of screenings. Deliveries are to be made in hopper bottom cars during the next year. Address the Municipal Light, Heat & Power Co., Fort Wayne, Indiana.

Contract No. 10—Chicago, Ill.—The Chicago Coated Board Co. is in the market for 300 tons of screenings per day. Deliveries are to extend over a period of one year, and to be made at Chicago, Ill. Address the Chicago Coated Board Co., 420 E. North St., Chicago, Illinois.

Contract No. 11—Portland, Maine—The Portland Gas Light Co. is in the market for 30,000 tons of Penn Gas, Westmoreland, or any good grade, three-quarter screened, gas producing coal for delivery between Mar. 1, 1915 and Mar. 1, 1916. Shipments are to be as required, about in equal monthly proportions, to wharf through one bridge, Portland, Maine, ample water alongside. All communications should be addressed to C. H. Tenney & Co., Managers, 201 Devonshire St., Boston, Massachusetts.

Contract No. 12—New York—The National Guard of New York is in the market for 2600 long tons of anthracite buckwheat No. 1, for use at the various armories in the Boroughs of Manhattan and the Bronx. Prices quoted should be delivered. Security aggregating 30% of the total amount involved in the contract will be required, together with an initial deposit of 1½% of the amount bid. Bids will be received at the office of the Mayor, City Hall, until 3:30 p.m., Nov. 16. All communications should be addressed to Armory Board, Room 6, Basement, Hall of Records, Manhattan, New York.

Contract No. 13—New York—Sealed bids or estimates are requested by the Department of Water Supply, Gas and Electricity for furnishing, delivering, storing and trimming coal. Security aggregating 30% of the total amount involved in the contract will be required, and the bidders should state the price per unit for each item contained in the specification. Different sections of the contract run to Dec. 31 of the current year, and to July 1, 1915. The bids will be received until 2 p.m., Nov. 16. Copy of the contract and specifications can be had on application to the Department. All communications should be addressed to William Williams, Commissioner, Department of Water Supply, Gas and Electricity, Room 2351, Municipal Building, Borough of Manhattan, City of New York.

Contract No. 14—Panama, C. Z.—Sealed proposals will be received by the Panama R.R. Co., until 12 o'clock noon, Nov. 24, for furnishing all or any part of the company's requirements, estimated at 500,000 tons of coal, as required during the year ending Dec. 15, 1915. Coal is to be of the best quality steaming, semi-bituminous, mine-run, with at least 40% lump, dry and free from slate, sulphur, dirt and other impurities, suitable and acceptable for use in stowage in the bunkers of steamers operating in tropical waters and susceptible of being stored in the climate of Panama without danger of fire through spontaneous combustion. Prices are to be quoted f.o.b. any loading port the contractor may designate on the Atlantic or Gulf coast, and the contractor will be notified on the twenty-fifth of each month of the amount required for the succeeding month. The contract will be awarded on a heat unit basis with a standard of not less than 70% fixed carbon and 14,700 B.t.u. per pound of dry coal. Bidders must state the commercial or trade name of the coal, together with the designation of the bed or beds and exact location of the mine from which they propose furnishing the coal. All bids must be accompanied by a certified check for $1000 and, upon formal execution of the contract, the company provides that security not to exceed $30,000 shall be required for the faithful performance thereof. Payment will be made 30 days after presentation of bills of lading signed by the captain of the collier accompanied by certificates of the companies operating the coal piers, indicating the number of cars and weight of each car load of coal dumped into the colliers. Contract form and specifications can be obtained on application to R. E. Rutherford, Assistant Purchasing Officer, Panama Purchasing Dept., 24 State St., New York.

COAL CONTRACTS LET

Contract No. 2—Norfolk, Va.—This government contract, previous notices, including bids of the various companies, having been published in this column, has been awarded to the Smokeless Fuel Co., under a guarantee of 14,800 B.t.u., at $2.63 per ton.

FOREIGN

Guayaquil, Ecuador, South America—La Compania de Alumdrado (Lighting Company) is in the market for 3500 tons of gas coal. Prosepctive bidders should state the specific gravity, weight per cubic foot, and space occupied by one ton of gas coal. Give approximate analysis, including moisture, fixed carbon, sulphur and ash, and a commercial analysis showing the gas per ton of coal, gas per cubic foot of coal, illuminating power of the gas in standard sperm candles, value of one cubic foot in grains of sperm, sperm value per ton of coal, coke per ton of coal (good quality), coke per cent. of coal, ash in coke, sulphur eliminated with the volatile products, sulphur in the coke, tar per ton of coal. Quotations should be c.i.f. Guayaquil. Address The Manager, Compania de Alumdrado, Guayaquil, Ecuador, South America.

South America—An American consular officer in that country has transmitted detailed information relative to tenders which will be received, until Nov. 1, for the supply of coal for government steamer service. American coal dealers who are interested should apply to the Bureau of Foreign and Domestic Commerce, mentioning item No. 14,016 for the reserved information.

South America—Supplementing a previous notice, the Bureau of Foreign and Domestic Commerce at Washington states that details regarding a certain inquiry from South America have been forwarded to the department, and that complete information, including blank forms on which to submit bids for supplying coal under the conditions specified can be had on application. All inquiries should mention item No. 14,048, and be addressed to the Bureau of Foreign and Domestic Commerce, at Washington, D. C.

Santiago, Chile, S. A.—Bids are wanted on 300,000 tons of coal a year during the next three years, according to press reports. The coal is to be used on the Chilean Railway. All communications should be addressed to the Department of Materials, Santiago, Chile, S. A.

Latin America—An American minister in Latin America has transmitted, by telegram, information relative to the coal market in his district. Full particulars may be had on application to the Bureau of Foreign and Domestic Commerce and its branch offices, by referring to their item No. 14,133.

COAL AGE

Vol. 6 NEW YORK, NOVEMBER 21, 1914 No. 21

Here is a little incident that happened during the depression of 1907. It's worth repeating now as a warning, because of the present unfavorable condition of the soft coal industry.

A MINE SUPERINTENDENT was given orders by his general manager to bring his cost sheet down to a certain figure or shut up shop. The figure in question was the contract selling price of the coal. At the time the contract had been closed, the mine was running full time and the price obtained left a fair profit per ton of coal; but during the depression, orders were gradually cancelled until the output had to be reduced about 50 per cent. Naturally, the mining cost began to climb and the general manager found himself facing a loss on every ton produced.

The superintendent realized immediately the manager's predicament and explained the situation earnestly to all of his subordinates; between them they made some substantial reductions, but in spite of all of their efforts, they still found a difference of about 8c. between the cost of coal and the contract selling price. Now it happened that 8c. per ton was the exact cost of yardage advancement for the mine, and this fact arrested the superintendent's attention and eventually led to his undoing.

He suggested to the manager that they might at least break even if he could discontinue for a few months all yardage advancement.

He explained further that when market conditions became normal again, he could gain back the exhausted yardage reserve by double shifting all narrow work.

This appealed to the manager, and the superintendent was patted on the back.

But at the end of a few months, market conditions did not improve. This time the manager suggested taking chances and insisted on holding back on narrow work a few months longer.

To make a long story short, when market conditions did again become normal, the superintendent found that, with the working places available, he could not get over 60 per cent. of the output required, and at best it would take him several months to effect a noticeable improvement.

He explained conditions fully to the manager.

The manager fussed and fumed and insisted that it was all a great surprise to him and always wound up by persistently maintaining that he had been misled by the superintendent from the beginning, else he would have frowned on such a course at once.

RESULT

The Superintendent found things so unpleasant that he resigned.

MORAL

It's so very easy to overrun a credit account.

Buildings and Breaker of the New Loomis Colliery

By F. K. Brewster*

SYNOPSIS—The Delaware, Lackawanna & Western R.R. Co. is developing a new tract of virgin coal in the Susquehanna Valley. This article deals with the construction of colliery buildings and breaker, all of which are modern and erected with a view to permanence and fireproofness.

The Loomis Colliery of the Delaware, Lackawanna & Western R.R. Co. is located in Hanover Township, Luzerne County, Penn., about one mile from Nanticoke, on the east side of the Susquehanna River.

It is an extensive development on what was formerly known as the Dundee tract, and the Dundee shaft, which was first opened in the fifties but abandoned a few years later on account of gas, modern ventilating devices not being then available, is part of the new mine.

The Loomis tract adjoins three other mines of the Delaware, Lackawanna & Western, the Truesdale, Auchincloss and Avondale.

Two shafts have already been sunk to the Hillman vein, and the No. 1 slope has gone to No. 5 vein. No. 3 shaft is now being sunk, and thus the Loomis will be developed by four shafts and a slope, with perhaps an additional opening later. The development will extend over a long period of years.

The buildings of this colliery were designed primarily for permanence and fireproofness, but attractiveness of design has not been lost sight of. The result is at once pleasing to the eye and proof against time and the elements. The plans were drawn in the office of F. J. Nies, Delaware, Lackawanna & Western architect, Hoboken, N. J. Brick and concrete were employed throughout from foundation to roof, while considerable reinforced work is to be found. In two engine houses concrete girders 5 ft. in depth at the center by 47 ft. in length carry the roofs and ventilating monitors, while in the stable the roof girders are 39 ft. long.

A pleasing architectural feature of the buildings is the presence of decorative blocks of concrete set in the brick on the sides of windows and doors. Furthermore, diamond disks of concrete and brick have been placed between windows, which have also been designed large and with arched crowns for adequate lighting.

Soldier courses of brick on end, just above the foundation water tables, and also between windows and at the roof line, break the monotony of plain brick walls and add to the general appearance. The cornices of the larger buildings are of reinforced concrete, overhanging the walls, and provided with protective parapets above the roofs. These were poured at the same time as the slabs and girders, and are monolithic with them.



General View of Surface Plant at New Loomis Colliery.

The group of buildings thus far consists of 14, in addition to the breaker and washery annex. These are the boiler house, three engine houses, a lamp house, a blacksmith and machine shop, an office and storehouse, an oil house, a fan house, an ice house, a lime and cement house, a stable, a wash house, and a powder house.

The Boiler House Is Convenient

The boiler house is a building 51 ft. 5 in. by 102 ft. 5 in. with basement, air duct and subways. Eighty feet of its length is used for the boiler room proper, which has three vertical-type boilers of 300 hp. each, built by the Erie City Iron Works. Directly in front of the boilers are the reinforced coal pockets, fed from the washery annex by a scraper line, with convenient bottom openings in front of the fire doors.

*1527 Gibson St., Scranton, Penn.

A temporary conveyor is now employed to feed the coal pockets. This will continue in use until the annex is put in operation.

The boilers and furnaces rest upon concrete foundations built to form ash hoppers and chutes to the subway. Fires are cleaned by dropping ashes through trap doors, just inside of the fire-doors into the hoppers beneath. From thence the ashes move by gravity through the chutes into ash cars in the subway. From here they are hauled by dinky locomotives to the dump. This avoids all accumulations of ash dirt on the main floor and all wheelbarrow work.

In the west end of the building are located the pumps and feed-water heater, while underneath the floor is the fan room with engines and fans for supplying forced draft through the air duct to the fires. Damper doors, with shafts, chains and levers enable the draft to be regulated by the firemen on the main floor.

Provision has been made, both in the location and size of the stack, which is 12 ft. in diameter and 125 ft. high, for the extension of the building eastward and an increase in the number of boilers used, as the need develops for the same.

A locker room, with toilet, wash sink and shower bath for the comfort of the men employed completes the equipment.

The boiler house, in common with the other buildings of the plant containing steam pipes, has a roof of hollow-tile blocks, with small concrete beams between, and a 2-in. slab of concrete over all, plastered with cement plaster on the under side. This treatment, it is believed, will reduce condensation and dripping to a minimum. A ventilating monitor with windows operated by chains from the main floor carries off gases and steam.

Engine houses Nos. 1 and 2, located about 100 ft. from Nos. 1 and 2 shafts, respectively, are identical in design, and conform to the general lines of the boiler house as to foundations, walls and roof. Both have hollow-tile roofs and monitors. They each contain 34x48-in. duplex simple Corliss engines, operating a 14-ft. double conical drum, each half having a rope capacity of 1500 ft. Each machine is equipped with powerful steam brakes and a Welch overwind preventer which, when a dangerous speed is attained, or when a cage goes too high, automatically shuts of the steam and applies the brakes. These hoisting engines were built by the Vulcan Iron Works.

The headframes of Nos. 1 and 2 shafts are of steel, 85 ft. high, and will eventually be equipped with automatic dumping cages, so that cars may be hoisted and coal dumped directly into the main receiving hopper midway between the shafts. This main hopper will also receive coal from Dundee shaft, No. 3 shaft, and No. 1 slope. A main conveyor will carry all coal thence to the top of the breaker, where it will be delivered to shaker screens and rolls for preparation.

The Stable Is Well Planned and Sanitary

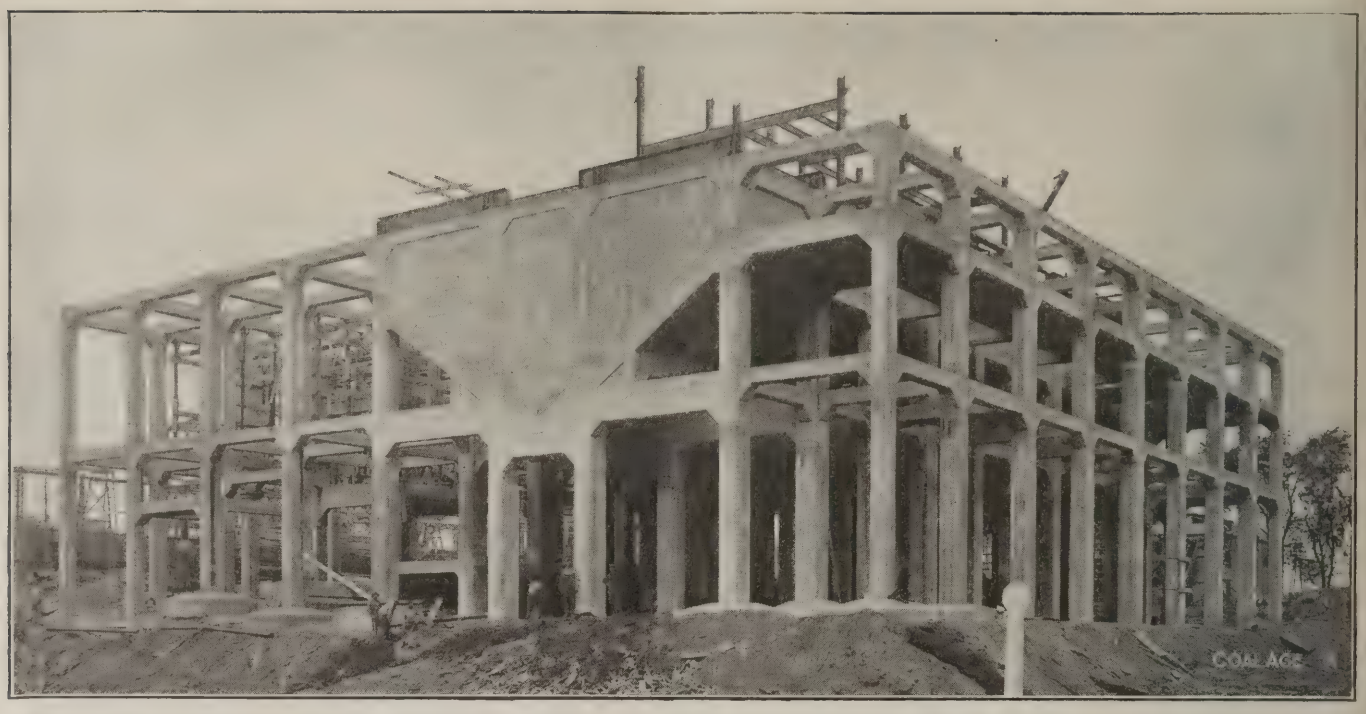
The stable is a brick and reinforced-concrete building, in the basement of which double stalls provide room for 26 mules, while upstairs are a loft and granary. The basement is well lighted, and the walls, floor, stall partitions, feed boxes and mangers are all of concrete. A middle passageway lengthwise of the building is used for distribution of hay and grain. This is wide enough to allow employees to avoid danger from vicious mules. The stalls are paved with cork bricks laid in sand on concrete and made tight with cement grout. This makes a comfortable standing and stamping place, which slopes slightly to the rear, where a concrete gutter affords ample drainage.

An added feature is the longitudinal ventilating flue placed just beneath the floor of the loft, with a vertical shaft to the roof at one end. This maintains good ventilation of the basement and greatly reduces the stable odors common to such places. The building is unusually dry, clean and warm. The cornice and roof are similar to those of the other large buildings, except that no tile were here used in roof construction.

The wash house, situated near the stable, deserves a better name than the colloquial "shifting shanty," for it is a good-sized building, adequately warmed and venti-



Showing Power House, Steel Headframes and Large Mule Barn



Reinforced-Concrete Portion of Loomis Breaker

lated and equipped with shower baths and lockers for hundreds of miners.

The storehouse and offices are in one building, near shaft No. 1. This has brickwork, roof and cornices similar to that of the other main buildings. Outside loading platforms at the elevation of box-car doors, the edges of platforms being protected with 6x6x3/8-in. angles anchored to the concrete, are provided.

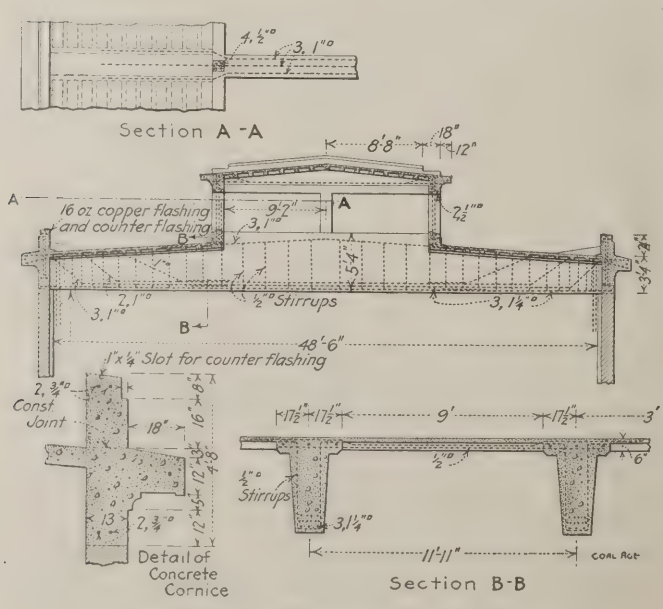
The remaining buildings of the group are smaller, have gable roofs and eaves, while cornices are placed at two ends only. The roofs of all buildings are covered with Johns-Manville asbestos built-up roofing applied to concrete slabs. Copper flashing was employed at all angles of cornices and monitors.

The concrete was mixed at one central mixing plant, and transported in side-dump cars by mule power to the different buildings. When roofs were being concreted it was dumped into a hopper at ground level, thence into a bucket suspended from one end of a revolving T-arm at the top of a gin-pole, and when hoisted to the right elevation the T-arm revolved to a position so that the bucket could be dumped on the roof. As much as 85 yd. per day have been thus placed, with a comparatively small gang of laborers. W. H. Gahagan, of Brooklyn, was the general contractor for all these buildings, except the fan house.

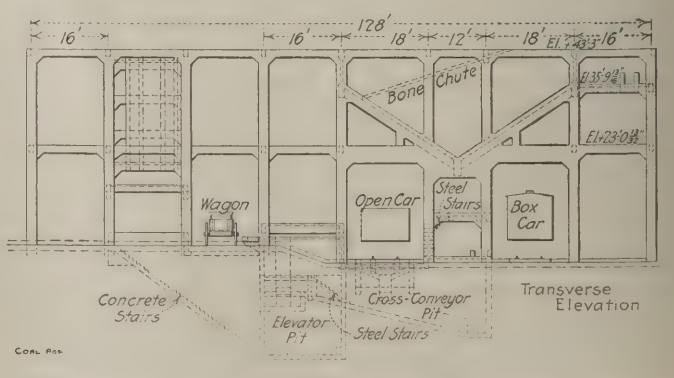
Concrete for foundations was mixed in the proportions of 1:3:5, and for roofs and all other reinforced work, 1:2:4.

The Breaker

The Loomis breaker, when completed, will be the most modern, best lighted and one of the largest owned by the Delaware, Lackawanna & Western R.R. Co. In construction, it is a combination of reinforced concrete and structural steel, and it is believed the result will be more satisfactory than the use of either material exclusively. The reinforced construction extends from the footings to the top of the coal pockets, an elevation of 43 ft. 3 in. above datum or track level at the center of the breaker. Above this the steel work is built up to a total height of



Details of Engine-House Roof



Elevation of Loomis Breaker Concrete Base

169 ft. 4 in. above datum. The size of the breaker is 125 ft. 8 in. by 129 ft. 8 in. outside to outside of columns. It is designed to prepare 3500 to 4000 tons of coal per day, and will probably exceed that amount.

One of the most striking features of the breaker is the glass siding, consisting of Fenestra sash glazed with ¼-in. wire glass, which totally incloses the structure and gives to it the distinction of being a "daylight breaker"—a new departure in Delaware, Lackawanna & Western design.

The reinforced portion of the building contains 2680 cu.yd. of concrete and over 500,000 lb. of reinforcement. Corrugated bars of 50,000 lb. elastic limit were used in beams and columns, and the American Steel & Wire Co.'s tri-mesh reinforcement was used in floors.

Eighty-nine concrete columns, varying in cross-section from 20 in. square to 36 in. square, carry the coal pockets and steel work above. These columns are joined together by two sets of tie-beams, 18 in. square, at mid-point and top, reinforced top and bottom. Furthermore, at all columns these beams have 18-in. corbels on lower side, insuring greater rigidity and greater shearing strength.

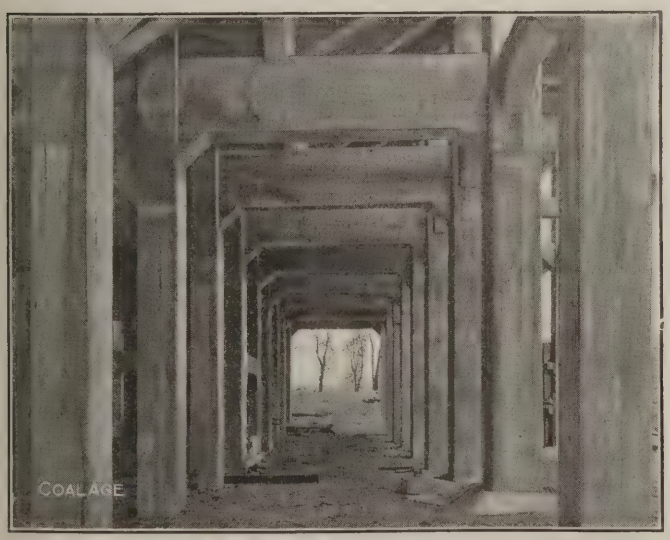
The column bars are hooped with $\frac{5}{16}$-in. wire, spaced every 10 diameters of main bars. That is, if a column has 1-in. bars, the hoops are 10 in. apart. All column bar "cages" were framed on the ground and hoops wired to bars before placing in a vertical position. This method resulted in economy of time, rigidity of bars and greater ease of handling, derricks being used to erect and hold the parts in position while the splices were thoroughly wired. All splices are of 40 diameters length.

The percentage of reinforcement in columns normally varies from 1 per cent. to 1½ per cent., and only exceeds the latter amount in the center columns of the coal pockets, where the size was restricted to give side clearance on loading tracks.

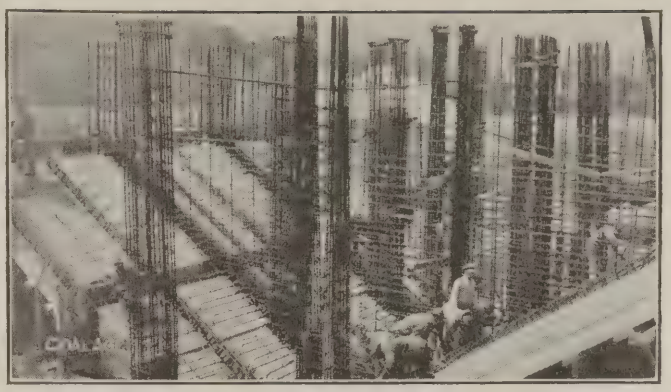
Excavations Were Carried to Solid Rock

All excavation was carried to solid rock, in some cases as much as 32 ft. below ground surface, and the columns were built on top of reinforced footings properly doweled to receive the vertical rods of the columns.

A large elevator pit and a cross-conveyor pit, with reinforced walls, are sunk 20 ft. below datum, with hop-



A near View of Columns and Beams under Coal Pockets



Showing Coal Pockets under Construction

pers to receive lip screenings, condemned and bony coal which it may be found desirable to hoist to the top of the breaker for crushing and rescreening.

Transversely the breaker is divided into sections *A, B, C*, etc., to *I;* and longitudinally into bents 1, 2, 3, etc., to 9.

Two loading tracks pass under the pockets between bents 2 and 3 and 4 and 5, with a grade of 1.4 per cent. toward the loaded yard. In order to maintain uniform head clearance for cars, the main beams of the coal pockets are built to a similar grade. The apex of the pockets is between bents 3 and 4, and on either side are the openings in the pocket slabs from which cars are loaded.

There are ten pockets, two each for egg, stove, nut, grate and pea coal, with a total storage capacity of 3000 tons.

Pocket Construction

The main beams of the pockets are 18 in. by 3 ft. 11 in. in section, heavily reinforced with 1-in. bars and ⅜-in. stirrups. The partition walls are 8 in. thick, doubly reinforced horizontally from column to column, so that the filling of any pocket with coal, when the next one is empty, will be taken care of. The pocket slabs are 9 in. thick near the apex, and 8 in. thick above. They are reinforced with ⅝-in. rods, alternate rods being bent up over intermediate beams.

All pocket slabs will be covered with 3-in. plank, laid on sleepers and protected with a sheathing of malleable iron plates. These plates not only cover the bottom, but are carried up the partition walls, to prevent the coal from wearing away the concrete.

Construction joints are normally in the center of beams, but in the longitudinal beams of the coal pockets it was found impossible to place joints at the center, owing to the junction of the sloping beams at that point. These joints were therefore offset 24 in. and special diagonal reinforcement was introduced to care for the shear stresses.

All columns were usually poured to the bottom of the corbels of the beams next above, and then allowed 24 hr. to set before these beams were poured. But in this matter also a discrimination was made in the case of columns on bents 2 and 5, which were allowed to stand for about two hours and were then completed to the top of the pocket slab, in order to make the job monolithic. No cracks have developed.

All concrete was machine mixed in proportions of 1 : 2 : 4, and no stone was used that could not pass a 1-in. ring. The stone was also required to pass a test of 90 per cent. insolubility in dilute hydrochloric acid as a precaution against the corrosive acids of mine water.

Reiter, Curtis & Hill, of Philadelphia, had the contract for the concrete work.

The superstructure of the breaker is of steel, Bethlehem H-sections being used in columns, I-beams and channels for floors, and angles for diagonal bracing.

Mild steel is specified for the structural members and an allowable unit stress of 16,000 lb. in tension is called for. The columns are designed by the formula

$$p = 16{,}000 - \frac{70\,l}{r}$$

in which

p = Allowable compressive stress;
l = Length of column, and
r = Radius of gyration.

About 1000 tons of steel are employed in the structure. In addition steel towers and angle trusses carry the sloping main conveyor line from the coal-receiving hopper to the top of the breaker. This will be a 10x60-in. flight conveyor with two strands of 2-in. monobar chain.

There are many floor levels in the steel work to facilitate operation, but all these will be concrete slabs on steel beams. No more wood than is absolutely necessary will be introduced. Protective railings and machinery housings will guard employees as much as possible. "Safety first" has been constantly in the minds of the planners.

The Guerber Engineering Co., of Bethlehem, has the contract for steel work. The breaker will not be ready for operation before the latter part of 1915.

The total cost of the breaker and all buildings will exceed a half million dollars.

Merging the Interests of Coal Exporters

The Latin-American Trade Committee, recently appointed by Secretary Redfield, has submitted a report, making suggestions and recommendations for furthering our export trade in South America.

After discussing financial questions, the suggestion is made that, instead of individual merchants and manufacturers maintaining individual representatives at considerable expense, associations be formed in each line of business that would send out one or more representatives to look after the interests of such associations. This seems to be a wise and practical suggestion and its consideration is recommended to coal operators and sales agencies.

The idea is not entirely new to Eastern coal men; it was taken up in 1911 by the president of a large Eastern, New River sales agency, and came near to being put in operation at that time, in regard to the New River coal field; but the plan failed owing to internal disagreements among those interested. The present would seem to be an excellent time to take up the matter again.

To illustrate, an association of Pennsylvania operators and sales agencies, having both steam and locomotive coals suitable for export, could maintain a consolidated foreign-sales agency at a small expense to each member. One man could be designated to look after the steam coals and another, the locomotive and gas coals, the maintenance expense to be divided in proportion to the output tonnage of the several companies merged.

I will not go into any of the details of such a plan, but its advantages may be broadly summarized as follows:

1. It would relieve the pressure on the domestic markets to take more coal than they actually need; or, in other words, the plan would take care of any overproduction, which is fast becoming a vital question.

2. It would do away largely with the handling of coals by competitors or their business associates, something that has always been a detriment to coal and its sale.

3. It would result in maintaining better average prices for coal, as a natural result of securing wider markets and an increased demand.

4. By increasing the export of coal, it would help to throw the balance of trade in our favor.

5. It would give the mines steadier operation, which means reduced cost of operation.

6. It would also reduce the cost of selling the coal.

7. It would mean a greater development of the coal fields, and make easier the securing of capital for improvements and development.

8. It would bring about a closer business relationship between operators and agencies, and tend to stop price cutting.

9. It would enable the railroads to give better car service, by keeping a larger percentage of their equipment on their own lines, besides tending to reduce cost of transportation.

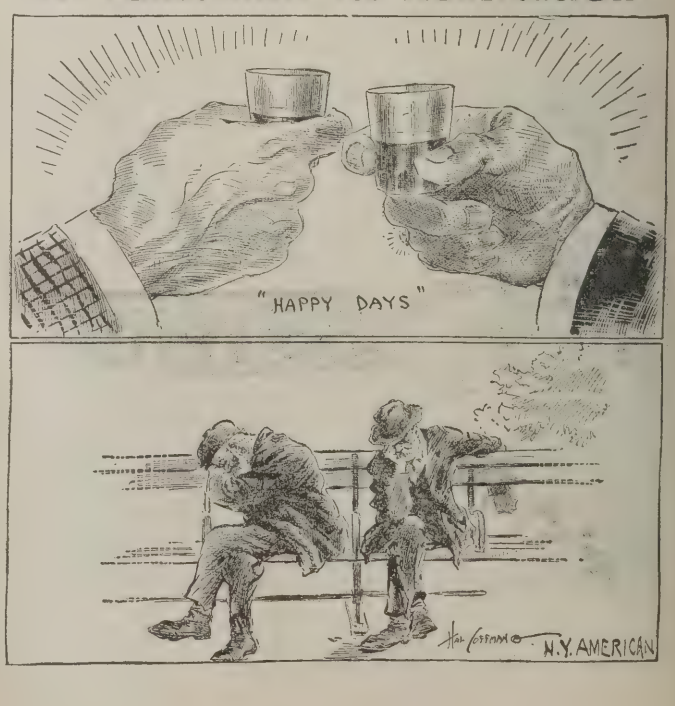
10. The members of such an association would obtain a wider knowledge of foreign-trade conditions, coals and transportation, and would learn the value of properly preparing and mining their coal.

11. It would have a tendency to reduce ocean freights, owing to the movement of a heavier tonnage and a steadier demand for ships, thus turning the currents of trade our way.

12. The question of foreign credits and banking facilities would be more easily handled.

Finally, it would assist this country in getting into closer touch with other countries, by learning to know other people, their needs and customs, a thing that cannot but broaden our influence in world politics, as well as make us better fitted to handle our own affairs. Coal operators, it is for you to say; let us have your criticisms. Why would not such a plan be both feasible and profitable?

A Toast and Its Realization



Colliery Lubrication

By Edwin M. Chance*

SYNOPSIS—Oils of good quality can often be purchased on specification at a better price than can oil of lower quality by ordinary merchandizing. This is well known to the large buyers for export or domestic use, but not understood by the industrial purchasers. The best way to contract is for an oil similar to sample and not for one having simply certain physical characteristics.

Colliery lubrication is the one problem connected with the production of coal upon which the progressive mine executive has probably the least accurate information. This condition has grown from two main causes—first, the apparent cost of lubrication is relatively small when compared with that of many of the other items combining to form the cost of the production of a ton of coal, and second, the great oil companies have systematically pursued a policy of silence and have rather fostered the belief that the science of lubrication is a sort of "Black Art" and that its deep mysteries can be fathomed only by the initiated.

If a careful inspection be made of the lubrication supplied to the average coal-mining company a rather unsatisfactory state of affairs will be found to obtain. It is probable that either oils of fair grade are supplied at an unreasonably high price or if the mine operator has succeeded in securing low prices from the oil companies the very dregs of the market will be found to have been foisted on him. And in some aggravated cases high prices are being paid for extremely low-grade products.

The Undiscriminating May Get Oils from Asphaltum Crude

The reasons for these unsatisfactory conditions are not far to seek. In the first place the mine official coming into direct contact with the problem of lubrication is at a hopeless disadvantage, as an offhand inspection is his only means of judging the quality of the product supplied and moreover there is too often a tendency at the main office to consider lightly the complaint of the man in the field on this score.

The markets supplied by the great oil refiners can be divided into two classes, the first being the discriminating and technically controlled domestic and export trade. In this class and especially when the oil is purchased for export the quality of the product supplied is carefully controlled by a thorough technical examination. The second class is the domestic trade as typified by the coal-mining industry.

Now enormous quantities of asphalt-base crudes are refined annually, with the production of a great amount of relatively low-grade lubricant, while the production of high-grade Pennsylvania-type lubricating oil is relatively small. It is clear then that as these better-quality oils are most readily salable in the markets mentioned under the first classification, they will be but reluctantly supplied to the markets of the second type or if furnished to such markets will be sold at a price far above that at which they could be purchased if a full knowledge of the trade were brought to bear.

The question then arises, how can these conditions be so met that a really high-grade lubricant, well adapted to meet colliery conditions, can be secured at a reasonable price? To this end, two things are essential: An accurate knowledge of the requirements of colliery machinery and an expert familiarity with the testing, refining and properties of lubricants. With this knowledge an intelligent opinion can be formed of the relative values of various oils for a given purpose, and by a system of competitive bids the purchasing agent can be assisted in securing the best and cheapest lubricants. This plan, however, entails a modified form of purchase based upon specification.

Prejudice against Specifications

Now the literature of the subject is filled with more or less violent attacks upon the system of purchasing oils under specification. These attacks generally take the form of quotations from contracts drawn by those who, not being thoroughly conversant with oil technology, have embodied glaring anomalies in their specifications. They are paraded before the oil consumer, and an attempt is made to deduce from such errors the fact that a specification is but an uncertain criterion of the quality of a lubricating oil.

Then too, the case is frequently cited in which an oil of a certain character has been specified for a given purpose. It is then shown that one radically different in nature would meet these conditions equally well. The inference is that this being true the specification is worthless. For example, we will assume that a Pennsylvania neutral with a gravity of 30.5 deg. and a viscosity of 200 has been specified for engine lubrication. It will then be shown by the critic that a paraffin oil with a gravity of 24 deg. and a viscosity of 300 will meet these conditions. Whereupon an attempt will be made to convince the consumer that, if two oils so different in constants will meet the same conditions, the specification must be of little value.

Specification Is for Oil of Certain Type

Now the aim of a specification is not to describe every oil that will meet a given service, but to specify a certain oil which has been chosen for this work. Thus while the Pennsylvania neutral and the paraffin oil may both meet the conditions of the actual service in question, still, for reasons having weight with the chemist preparing the specifications, the Pennsylvania neutral oil was desired. If the paraffin oil had been wanted a specification would have been prepared that would require such an oil to meet its conditions. Thus the contention that a single specification will not cover all the oils that will give excellent service under a given condition is not valid.

In the ultimate analysis a specification is nothing more nor less than a scientific description and like any other description may be faulty, if the person making it is not familiar with the object described. To my mind a weakness in the preparation of oil specifications lies in the fact that they are given too much weight. Such specifications should be prepared solely for the guidance of the oil refiner in submitting samples and should be so prepared as to indicate accurately to him the nature of the oils desired.

*Consulting chemist and engineer, Wilkes-Barre, Penn.

By the guidance of specifications so drawn he will be in a position to supply samples of the products sought. When such samples have been received from a number of sources they can be submitted to a critical examination by a chemist and engineer thoroughly familiar with both the oil trade and the requirements of colliery lubrication, and the set of oils meeting the conditions best both in price and quality can be adopted.

Specifications Remade so as to Prevent Substitution

Upon the acceptance of such a set of oils, the samples themselves should automatically become the standard and should supplant the original specifications. In this way many of the real difficulties besetting the path of the intelligent purchaser of lubrication are removed. For example, we will assume that the specification originally called for a dynamo oil of 180 viscosity. There are a number of recognized instruments in general use for the determination of viscidity but we will consider here only the Tagliabué and Saybolt viscosimeters. Not only do these two instruments differ in their values for the same oil but those of the same make vary among themselves to a marked degree. Thus the refiner may submit an oil in good faith but because of the lower reading of the testing chemist's viscosimeter, this oil may not meet the viscosity requirements of the specification.

This oil, however, will probably compare favorably with the oils submitted by other refiners under the same specification. Suppose that the testing chemist finds the viscosity of this oil to be 165 as given by his viscosimeter. Now if the other oils submitted by refiners upon the specification of 180 average about 165, there is a strong presumption that the testing chemist's viscosimeter is reading 15 points too low. Assume then that this oil is accepted. It is clear that deliveries during the life of the contract giving a viscosity of 165, upon this viscosimeter, will be satisfactory.

Assume, however, that a complaint has arisen, a delivery has been condemned and the services of an outside testing laboratory have been secured. If the umpire chemist reports the same viscosity upon the condemned sample as upon the sample submitted with the bid there can be no question that the delivery should be accepted even though the actual figures may be in error. Thus samples of deliveries tested during the life of the contract can always be compared with the original oil, and in case of a dispute there can be no doubt whether the oil is of the same quality as the sample originally submitted.

Determinations of Chemists Differ

It is only too true that the same oil when tested by different chemists will give decidedly different values. Hence, an oil may meet a given specification when tested by one chemist and may fail absolutely to pass the same specification when tested by another. If, however, we have a sample of the original oil for comparison these variations disappear to a large extent, as the question then involved is not whether the oil meets a given specification but whether it gives the same values as the sample originally submitted.

As a matter of fact a large proportion of the lubricating oils exported, and also of the oils supplied to jobbers in this country, are sold directly upon a rigid specification. The refiner supplies the jobber or the foreign house with the values for the flash, fire, gravity, viscosity, etc., of his oils and the contract is awarded and deliveries made upon this basis. This fact, however, is scrupulously kept in the background by the before mentioned critics of such a method of selling lubricating oils.

Colliery Needs Are Peculiar

Another factor to be considered in securing efficient lubrication is the fact that the requirements of colliery machinery are different from those of the factory or general power plant. The oil trade has developed various classes of oils to meet general power-plant and industrial requirements, but these oils, unfortunately, do not always satisfy the more exacting demands of colliery machinery. For example, many of the steam-consuming units in and about the anthracite mines are supplied with steam by long pipe lines. The steam is thus very wet and frequently low in pressure when it reaches the cylinder. Hence, a different cylinder oil from that in general use is required to meet such conditions.

Another special use is that for pump-plunger lubrication. Many of the greases supplied for this purpose are worthless when used upon the plungers of mine pumps, for they are usually soap-thickened and decompose rapidly in the acid of the mine water, losing their consistency and at the same time their lubricating and protective value. Did space permit, the number of instances in which lubricants giving admirable service under normal power-plant conditions have proven themselves to be most inefficient at collieries could be considerably lengthened. Enough, however, has been stated to illustrate the point.

When we consider under what adverse conditions colliery machinery must function, the conclusion that the best obtainable lubricants are none too good becomes even more evident. For the first cost of these lubricants is lower than that of oils such as are usually supplied when the consumer throws himself upon the mercy of the oil company, and the saving in wear and tear, the increased amount of work that can be done, and the freedom from time-consuming stops are incalculably great when these high-grade oils are employed.

Value of Good Car Oil and Pump-Plunger Grease

As an example, we might consider the question of car oil. It is true that a large proportion of this oil purchased by a coal company never reaches the car journal but is used principally to lubricate the road bed. For this reason it has been assumed that the cheapest possible oil should be purchased. This assumption might be correct were the cost of high-grade car oil excessive. This is not true, however, for an excellent Pennsylvania car oil can be secured at a very reasonable price.

When such an oil is used not only will the mules and mine motors be able to handle more cars to the trip, but the wear and tear on wheels and journals will be materially diminished. Moreover, it is an axiom that it is the tired mule that is injured and I have no doubt that in the long run the costly injuries to mules can be to a certain extent diminished by efficient car-wheel lubrication.

Pump-plunger grease has always been considered to be one of the materials for which it is unwise to pay a good price. As pointed out before, the usual grade of this

material is unsuited by its nature to withstand the service for which it is intended. Now the cost of repacking the water end of a large mine pump is so great that it would seem wise to do everything possible to make this work as infrequently necessary as possible. Fortunately, at a very small additional first cost it is possible to secure a pump-plunger grease which, being unaffected by the sulphuric acid and soluble sulphates of the mine water, meets the conditions admirably.

There are many oils upon the market, selling at from 50 to 75c. per gallon, which are supposed to possess certain marvelous properties, undetectable by the chemist and only to be observed with the eye of faith. These oils as a general rule are purchased by the proprietor of the brand or trade mark in question in bulk, from the refiner in the open market, and are usually standard products. They generally acquire their miraculous properties merely by the application of a gaudy label or brand and the expenditure of much money in advertising.

This type of lubricant for colliery use is most commonly seen among the compressor oils. I know of one such lubricant, dispensed by a large and reputable oil company under an attractive brand name at a high price. It is an acid-treated paraffin oil which when heated to a temperature of four or five hundred degrees Fahrenheit decomposes rapidly with the production of much tarry matter. This oil was used in the lubrication of a large new air-compressor installation with the result that the valves carbonized and stuck badly, seriously impairing the efficiency of the plant. Finally the air receiver exploded. Whether this accident was due to the compressor oil is open to conjecture.

It is too often the practice about the mines to use the ordinary engine oil in the compressor. This practice should be condemned, as a really good compressor oil can be obtained at a price but two or three cents above that of the engine oil.

The same principles apply to the purchase of cup and car-journal greases, and it is certain that the same or even greater economies can be secured in purchasing this as in the buying of lubricating oil.

These principles have been applied to the purchase of the lubricating oils and greases of a number of coal companies with a saving of from 25 to 35 per cent. in the first cost of lubrication and a still greater though not easily determined saving through the enormously increased efficiency of the lubrication secured. There has been another source of saving in addition to these two. With the high-grade lubricants, not only is the cost per gallon reduced, but the total number of gallons of oil used for any one purpose is cut down, as these high-grade oils, gallon for gallon, supply lubrication for a longer time than those which are inferior.

The Coal Miner

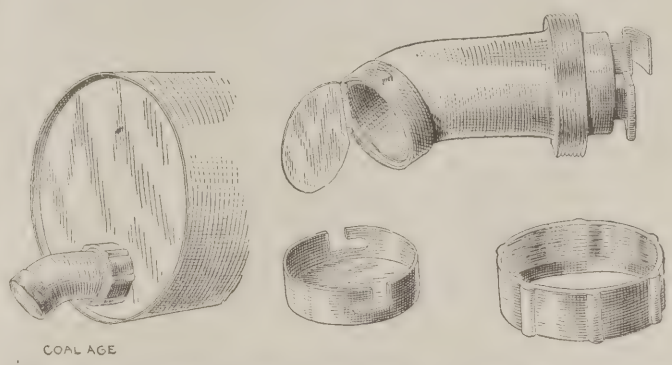
———He must work in gas and see in the dark,
The music he hears is the air drill's bark,
It isn't no picnic in the park,
It isn't no cinch he's stole!
He's carpenter, plumber, machinist, yes,
A sort of surveyor, too, I guess,
A little of everything more or less,
The miner who digs the coal!

—Berton Braley, in "Illustrated Sunday Magazine."

A Safety Powder Tube

The accompanying illustration shows an improved form of powder tube that can be quickly attached to the opening of an ordinary powder can or detached therefrom when not required. When attached to the can this tube serves not only the purpose of a spout by which the powder can be easily poured out of the can into a cartridge; but, at the same time, the tube forms a convenient handle for carrying the can and protects its contents from exposure to the air and from accidental ignition by sparks dropping into the can.

The tube is the invention of John H. Jones, of the Jones Manufacturing Co., Oakland City, Ind., who has recently patented the device, which is now on the market. The illustration makes clear the operation of the tube, which is secured to the powder can by two lugs. One of these lugs forms a fixed projection on one side of the tube, while the other is attached to a spring that enables it to be snapped or sprung into the opening of the can.



Showing Safety Tube Attached to Powder Can and the Detached Parts

The fixed lug is first inserted into the hole in the can, after which the other is sprung into place by a gentle pressure.

When the lugs are in place, the tube is firmly secured to the can by screwing down the coupling, as when tightening a union joint. For the purpose of detaching the spout from the can, a small opening is left underneath this coupling and immediately over the spring that secures the spout to the can. To detach the tube, the coupling is unscrewed and a nail or other small instrument is used to push back the spring while the spout is withdrawn from the can.

A hinged lid closes the mouth of the tube and protects the contents of the can from the danger of sparks dropping into it. A screw cap, shown in the illustration, is also provided and fits over the mouth of the tube when the can is not in use. This tube is made out of composition metal that resists the action of the mine air and corrosion by dampness. It will last a lifetime and is claimed to save a miner enough powder in six months to equal double the price of the tube. The device is simple, cheap and lasting. It supplies a long-felt want in coal mining. The security furnished by the tube against possible accident in the handling of powder when filling a cartridge, is well worth the price of one dollar asked for the tube. As a practical means of preventing such accidents to miners at the face, it should appeal to all operators, superintendents and mine foremen, who should urge its general adoption by all miners in their employ.

West Virginia Coal Exhibit at Panama Exposition

The coal-mining industry of West Virginia will be well represented at the Panama Exposition in San Francisco next year, and arrangements to make the exhibit as attractive as possible are now under way in the smokeless fields. Several thousand feet of moving-picture films have recently been made in the Pocahontas field, which will represent one of the greatest subjects of the kind ever produced. The mining operations will be shown in varied and interesting forms, as well as demonstrations of life-saving crews, pictures of outcropping seams of coal, panoramic views, etc., the whole reproducing life motion pictures of the production of coal in this great field.

Then the Norfolk & Western R.R. officials have arranged to picture the shipment of coal over their lines from the mines to the seaboard, the loading of the coal in sea-going vessels at Lambert's Point, and the vessels laden with West Virginia coal putting out to sea. It is the intention also to have a film showing vessels laden with West Virginia coal entering and passing through portions of the Panama Canal. At the Exposition these pictures will be shown each day in connection with the state's coal exhibit.

It is expected that this exhibit at the Exposition will have the effect of advertising the coal industry of West Virginia on the Pacific Coast and establish a permanent business through the Panama Canal with that section.

The Cost of Anthracite Mining

If the preparing of anthracite for market after it is mined were conducted as a separate industry, it would require a capitalization of at least $100,000,000. The entire capital invested in anthracite mining in 1909 was $246,700,000, according to the returns of the Bureau of the Census, but that many of the companies are undercapitalized is shown by the fact that the value of the output in 1911 was $175,189,392 and in 1912 it was $177,622,626. The total value of Pennsylvania anthracite produced in 1909 was $148,957,894, and the total gross expenses of anthracite mining that year were $139,110,444. Fully twenty per cent. of the cost of mining and preparing coal comes after it enters the breaker above ground.

There are about 300 of these breakers in the anthracite region of Pennsylvania, and their average cost is $200,000. Some of the larger and more elaborate ones of steel and concrete cost $300,000, $400,000 and even $500,000. Their chief function, in contradistinction to their name, is to keep from breaking the coal into small sizes, because the larger sizes are more desirable. The coal bill alone for the steam plants of these breakers would amount to over $10,000,000 a year, as it is now necessary to burn over 12 per cent. of the anthracite mined in order to run them.

Depreciation Costs Are Enormous

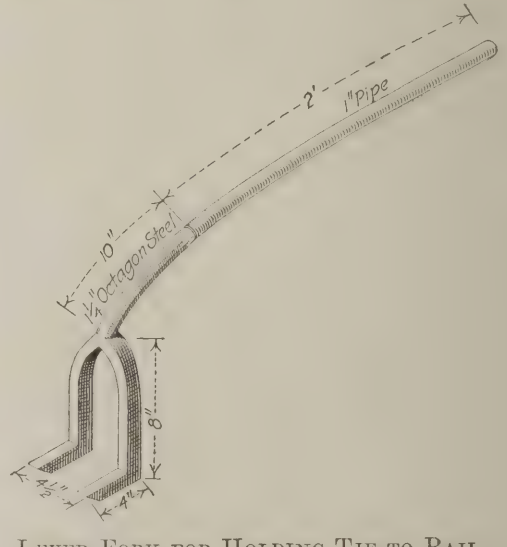
The depreciation costs in anthracite preparation, if it were separated from actual mining, would be enormous. The life of a wooden breaker, especially where water is used, is from eight to ten years, at the end of which time the repairs have been so many that it is an entirely new structure. The action of the water which, in the anthracite region, contains a large proportion of sulphur, eats away the iron of the machinery in a year or two, so that it has to be replaced.

The machinery in breakers is subject to severe and heavy shocks, to excessive wear, to vibration and to the action of the sulphur water mentioned above. In wooden breakers, shafting and drives get out of alignment through the uneven settlement of the timbers, bringing tremendous strains on the machinery and increasing the amount of power required to drive it. Many of the wooden breakers have caught fire and burned to the ground in the last twenty years, causing a direct loss of $100,000 to $200,000 and eliminating the possibility of profit for many months thereafter.

As a separate industry, in fact, it would be difficult to make the preparation of anthracite pay, and it would be necessary to allow a wide margin of profit. And yet this industry is at the present time an integral part of the anthracite mine operators' efforts to prepare their coal for market, sorted into the standard sizes and ready to burn, and to secure a fair price for it. This supposition concerning the manufacture of anthracite as a separate industry may throw some light on the wholesale price of anthracite and why it has been necessary to increase it slightly on two occasions in the last ten years to meet increases in taxation and wages.

Rail and Tie Holder

In laying or repairing mine tracks, it is not always possible to have the rails resting upon all the ties before spiking, due to the unevenness of drift and crosscut floors, says the *Engineering & Mining Journal* in its issue of Oct. 31, 1914. To overcome the difficulty of spiking under such conditions, the tool shown in the accompanying illustration was devised. One end of a 2-ft. length of 1¼-in.



Lever Fork for Holding Tie to Rail

octagon drill steel was split for 1 ft. and shaped into a fork, the end of each prong for a length of 4 in. being bent forward at a right angle; the other end of the drill steel was drawn out so that it would just slip into a piece of 1-in. pipe; this pipe serves as a handle and lever. By placing the fork over a rail and slipping the prongs under a tie, the latter may be held up firmly against the rail while being spiked.

The Labor Situation

The tobacco-raisers' night-riding in Kentucky seems to have induced a similar form of violence among the miners in the west of the state, in that important center of mining—Muhlenberg and Hopkins Counties. Henry Allen, who had taken part in the night-riding, was under indictment. It was believed that he would confess or had confessed, so the night-riders lynched him. These men term themselves the "Possum Hunters," and their violence is directed at those who hire negroes or nonunion men. They have murdered men and boys, beaten women and fired houses. Helpless negroes have been dragged from their houses at night, tied to trees and beaten almost to death with rawhide whips and switches.

Citizens Arm Themselves Against "Possum Hunters"

The citizens of Earlington, Madisonville and Carbondale, like the operators of Colorado, have been compelled to form civic guards. At the first mentioned town, a blockhouse has been built and provisioned. A guard is kept in this, night and day.

About three weeks ago, a band of at least a hundred men invaded the village of Carbondale in the small hours of the night and shot up the town, killing an 11-year-old negro boy and riddling several houses with bullets. The parents found the dead boy after the marauders left. The federal troops are expected and, indeed, seem sorely needed.

Attempted Organization of Fairmont District

An attempt is being made to organize the Fairmont district of West Virginia. It was hardly anticipated that this section would be singled out for attack as its competition had not been felt in the union districts. It had been quite openly stated that Logan County would be the next center of labor trouble, but it appears that Fairmont is selected.

The alleged wrong to be redressed is the payment by car instead of by weight, while the main concession sought is the union check-off. There are 25,000 miners in the region, most of whom are employed by The Consolidation Coal Co. Thomas Haggerty addressed a meeting urging union activity at Flemington, W. Va., on Nov. 13. On the 16th he is due in Philadelphia for a three-day session of the international executive board.

Coshocton District of Ohio Is Still on Strike

The miners in the Coshocton district of Ohio have just refused to accept the recommendations of the joint scale committee as formulated early in the past week, the vote being 265 to 220. W. H. Hawkins, the head of the operators' organization, has declared that all the propositions of the operators are withdrawn. President Thompson, of the miners' organization, declares that the miners are willing to permit their proposition to stand, and that they will sign a contract on that basis with any operators who will accept it. The joint-scale convention adjourned sine die on Nov. 13. Thus all the miners in the district will remain idle, except those at the Davis mines in Conesville and at the Tyrone mines, which have been operating for some time.

The bone of contention was not the scale proper, as the mining rate was acceptable to both parties. The difference arose over the pushing of cars from the neck of the room to the face and out again when loaded. The men are unwilling to perform this service.

Eastern Ohio Operators Look to West Virginia

In the eastern Ohio district, the expected conference of operators and miners failed to materialize. The long-drawn-out strike continues, and the operators seem disposed to buy coal lands in West Virginia, where such severely restricting obstacles to profitable mining do not exist.

The Discharge of a Pit Committee in Kansas

It was thought that when the miners of districts 14, 25 and 21 met in Kansas City, in September, and ratified the new joint interstate agreement, there would be no more trouble. However, the usual dissensions have again sprung up. The discharge of three members of the pit committee of the Cherokee & Pittsburg Coal & Mining Co., located at Pittsburg, Kan., is the most recent cause of dissension. The men demand that the discharged officials be allowed to return to work. This strike affects about 2000 men, all of whom walked out, after cleaning up, taking their tools with them. The company is willing to put the matter before a board of arbitration as laid down in the agreement; however, the miners refuse to do this. A section of the agreement anticipates for such a situation, and provides that during the settlement of disputes the men shall continue to work. The section reads:

If the president of the district, or his representative, and the commissioner of the Operators' Association, or his representative, fail to agree, they must either submit the matter to arbitration or refer the case in dispute and the records in connection therewith to the District Joint Board of Miners and Operators for final settlement. Pending the settlement of any dispute, the mine shall continue operation, and all miners, mine laborers and parties involved shall remain at work, except discharged employees.

Explanatory Note—What is meant by final settlement is that the district joint board shall dispose of all grievances referred to it without strike or stoppage of work.

Under this provision the strikers are said to lay themselves liable to a fine of one dollar a day for every day that they are out, since they refuse to return to work pending the settlement of the dispute.

Meeting of the American Federation of Labor

The American Federation of Labor has been meeting in Philadelphia, Penn., and there Mother Jones delivered one of her soul-stirring harangues. If the press is to be credited—and the words sound like hers—she now claims she was at Ludlow when the camp was burned. The principal resolutions from a coal-mining view were those desiring the abolition of efficiency systems by which workmen are speeded in their work, the introduction of legislation placing a minimum of 66⅔ per cent. of the wages paid any man as the rate to be paid relatives of men killed at their employment, and requiring that compensation be paid to children of miners who are accidentally killed till these dependents reach the age of 18.

The Federation also resolved that workmen's compensation laws should be administered by state commissions, and that employers' liability insurance be eliminated from the scheme of workmen's compensation. An excellent resolution to do away with discrimination in favor of unmarried and childless men advocated the passing of laws making the state the beneficiary where men were killed who had no dependents. However, this would not work any benefit where the state is itself the insurer of the workman.

Coming Meetings

The American Society of Mechanical Engineers will hold its annual meeting in New York City, Dec. 1, 2, 3 and 4, 1914. Calvin W. Rice, secretary, New York City.

The American Mining Congress' seventeenth annual session will be held at Phœnix, Ariz., Dec. 7, 8, 9, 10 and 11, 1914. J. F. Callbreath, secretary, Denver, Colo.

The Coal Mining Institute of America will hold its winter meeting Dec. 8 and 9, 1914, at the Fort Pitt Hotel, Pittsburgh, Penn. Charles L. Fay, secretary-treasurer, Wilkes-Barre, Penn.

The West Virginia Coal Mining Institute's winter meeting will be held at Huntington, W. Va., Dec. 9 and 10, 1914. Prof. E. N. Zern, secretary-treasurer, Morgantown, W. Va.

The American Institute of Mining Engineers will hold its annual meeting in New York City, beginning Feb. 16, 1915. Bradley Stoughton, secretary, New York City.

The Kentucky Mining Institute's winter meeting will be held Dec. 4 and 5, 1914, at the Seelbach Hotel, Louisville, Ky. Ivan P. Tashof, secretary-treasurer, Lexington, Ky.

Extracts from a Superintendent's Diary

One of our mine foremen is a born diplomat. If there were only a sufficient number of his type in the business, the trials of mine superintendents wouldn't be worth considering.

If he finds that he is accumulating too much narrow work, he sounds a few of the heading men and soon has them dissatisfied with narrow work and clamoring for rooms. Perhaps in a few months the conditions will be reversed and he is more than apt to have some of these same men suggesting their disappointment with room work and requesting a change back to narrow work.

Our coal varies in thickness considerably in different parts of the mine. Some miners prefer thick coal and others thin; when conditions change in a room after a miner has chosen the room, following careful investigation, as a rule he becomes discontented and begins to grumble. Mr. Diplomat makes short work of such grumblings. The miner who prefers thick coal to thin, after a short talk with this foreman becomes convinced that his preference is not well grounded and the advantage, if ad-

vantage there be, is in favor of the thin coal. And in quite the same manner the miner who prefers thin coal goes away pleased with the place in which he is working.

Then there is the constant variation in the proportion of working places in rooms and pillars. The Diplomat never quarrels with engineers' orders; if it becomes necessary to stop one hundred pillars on one day's notice, he promptly orders them stopped. His men, who declare that they will leave the camp rather than go into rooms, find themselves working in rooms in a few days, and well satisfied at that.

But the supreme test of this man's ability to handle men has just been completed and I doubt very much if he realizes that he has accomplished anything unusual.

At his mine we had always used the entire output of coal for coking purposes. The seam of coal being rather dirty, it has been necessary to crush the coal and then treat it in a washer before sending it to the ovens. If the miners became careless about separating the impurities before loading their mine cars, the waste at the washer would begin to climb, but some variation now and then was always expected and no noticeable shakeup would follow.

Last month, however, conditions became such in the coke trade that it was necessary to discontinue coking operations and the entire output of the mine was thrown on the market as run-of-mine steam coal.

Now steam-coal users are always on the lookout for cars that have a sufficient amount of bone and slate to attract attention, and we almost had our entire contract canceled before we got our bearings.

Then we got busy and found that it would be necessary to change the grade of explosive used, also modify the system of mining. And this was not all; even with all these changes the miners would have to be extremely careful or the coal could not be properly cleaned.

Miners do not take kindly to changes of any sort, and I assumed that they would not meet our views without cutting up considerably.

They did meet our views, however, and they didn't show their teeth.

Truth is, our foreman put the proposition before them in such a way that they followed his wishes without realizing that they were being asked to do anything unusual. And the foreman in turn didn't seem to realize that he was doing anything unusual himself.

The Pacifier

Written Expressly for COAL AGE *By* BERTON BRALEY

WHEN I comes home from work at night
All tired out from minin' coal
An' black an' sweaty to the sight
I ain't th' gladdest kind of soul;
Th' world don't make no hit with me,
I'm mighty weary with my lot,
An' every bloomin' thing I see
Just seems to feed th' grouch I've got.



THE *World Don't Make No Hit with Me.*

I CUSSES at my daily work,
I damns the Pitboss to th' Pit,
I thinks of all th' dust an' murk
Of minin'—an' I cusses it;
I thinks, "Us miners ain't no men,
We're pore dumb beasts that's hitched an' drove;
I starts once more to swear—an' then
I smells th' supper on th' stove!

IT mebbe ain't so very much
(A miner ain't no millionaire)
But when I scents that stew an' such
I—well, I half forgets to swear;
From worries an' from troubles, too,
My thoughts begin to stray an' rove,
An' life assumes a dif'runt hue,
When I smells supper on th' stove!



THEN *I Smells the Supper on the Stove.*

AN' when they brings that supper in
An' wife an' kids an' me sets down,
I finds a sort of pleasant grin
Has chased away my ugly frown;
I puts away all thought of strife,
My appetite I gives the call,
An' thinks, "Oh, well, this miner's life
Ain't nothin' awful, after all!"

Power Department

Coal Waste in Mining Plants

By Henry D. Jackson

SYNOPSIS—In extremely few mining plants are means provided for keeping track of the quantity of water fed to the boilers or the coal that is burned under them. The carelessness prevalent in such plants makes the proposition offered by the central power stations appear extremely attractive.

It seems somewhat like "carrying coals to Newcastle" to suggest to men in the coal-mining industry that they had better take more care in their use of fuel, if they have any interest in cutting the cost of mining, also if they care to prevent being compelled sooner or later to purchase current from the power companies which are fast springing up throughout the coal fields and whose sole reason for existence is the wasteful use of fuel by the people who mine it.

This may appear like a strong statement, but the facts justify it. How many coal plants are provided with any means for weighing the coal used under their boilers? How many are provided with meters or any apparatus for measuring the water fed to their boilers? In other words, how many of them have any idea of the actual amount of water evaporated per pound of coal?

Perhaps it is quite natural that this condition should have existed in the old days when the range between the price of coal as mined and sold was fairly large; but today, when the competition is keen and the margin of profit small, it cannot be said to be good business to have the costs run any higher than they must.

In the East where coal costs in the neighborhood of $4 per ton (the same fuel that is used by many of the coal producers as it comes from their mines), many plants not over 100 hp. in size manage to produce power at a cost of not over 2 cents per horsepower-hour, including all charges. And of this cost the coal represents in the vicinity of 60 per cent.

This means that the coal cost is about 1.2 cents per horsepower-hour. As coal at the mines has a value of about $1, the expenditure for fuel on the same basis of costs would be one-quarter of that in the East, or 0.3 cent; and if the rest of the expenses were in proportion to those in the East, the total outlay for power would be about 1.1 cents. Since the taxes are lower as are also wages, it should be found that even in the smallest coal plants the cost of power should not exceed 1 cent, and should run much lower in the larger ones, especially in those which have to operate in part at night, as the stand-by losses which exist in manufacturing plants would not then occur.

In the larger and better equipped and better managed plants in the East, even better results are possible than those above named; and it is by no means an uncommon thing to find them getting a horsepower-hour for about 1 cent. This being the case, the plants in the coal region should be able to better these figures as coal is there cheap.

That this is not the case, is shown conclusively when many colliery managers are willing to pay over 1 cent per kilowatt-hour to the power companies for current, in addition to the fixed charges on the machinery to use the same, as well as to scrap their present plants or to hold them and continue to pay the interest charges on the old investment. This latter point is one that is frequently lost sight of when power is purchased—that is, the owner forgets that his original investment is still there and eating up the dividends.

Why Is Power Being Purchased?

In the light of what is shown above, why is it that the coal companies are coming to purchase power, if it is not due to their waste of coal or inefficient operation of their plants?

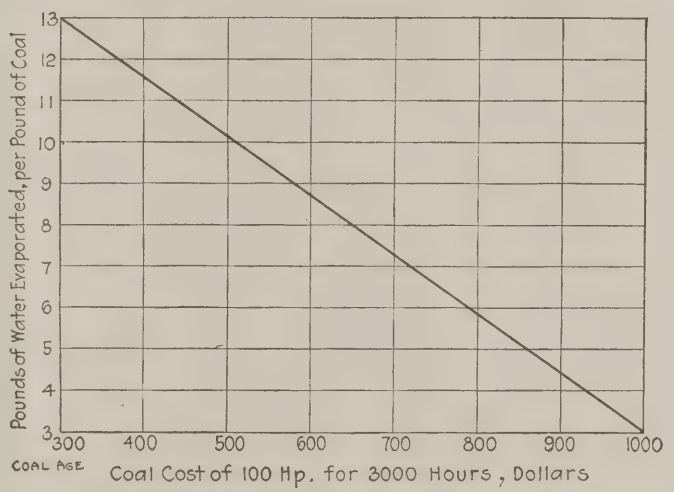


Fig. 1. Cost of Power with Varying Rates of Evaporation

The very fact that coal has a value of but 80 cents to $1 a ton, is one answer. For why spend the money necessary to secure efficient engines and good boilers or feed water heaters or purifiers, or in fact any of the devices to save coal; also why do everything to find out how much coal is burned or how much water is evaporated, if the resultant saving will in any case be small? That this is a mistaken idea, it is my intention to prove, and I hope to be able to show it so conclusively that every plant will take steps to ascertain what it is doing, and if the results are not what they should be, take further steps to find out why and make the corrections required.

In a good boiler, clean and well handled, it is possible to evaporate about 12 lb. of water per pound of coal, the latter possessing a heat content of about 14,000 B.t.u. This presupposes that the fuel is well fired and that the boiler setting is adapted to the coal, for much of the success in burning fuel depends on the proper setting as well as firing. In fact, quite as much heat is wasted

through improper settings as through poor firing, and these two are responsible for the greater part of the waste of coal.

The other waste points are cold water and dirty boilers. Few people who have not spent considerable time in the study of power plants, realize to what an extent waste can develop without its being actually noticed. Neither do they realize that even a small amount of scale or soot or both seriously affect boiler performance, while the effect of heating the feed water is to them but little more than conjecture. All of these items are of as much importance in a plant where the coal costs little, as where it costs much, for they in turn seriously influence the cost of coal, and, therefore, the price at which it may be sold at a profit.

The feed-water heater will effect a saving in fuel of 1 per cent. for each 10 deg. rise in feed temperature. Figure this out for your plant. If the average temperature of your feed water as it comes from the mains or snpply, is 60 deg. F. and you can raise it to 200 deg. by the heat left in the exhaust steam, you have added 140 deg., and by the rule given, you will have decreased the coal needed 14 per cent. besides saving the boilers from dangerous and injurious expansional stresses.

Boilers which are dirty, either inside from scale or outside from soot, are equally wasteful, so that care should be taken to avoid the use of water carrying scale-forming material, either by careful selection of the source or by purifying the water before it enters the boiler.

The use of boiler compounds is, generally speaking, not to be recommended, as this is only treating the disease after it has gotten into the system. The better way is not to allow the disease to enter, by removing the impurities before the water gets into the boiler. Such treatment costs but little and may save much trouble, besides saving considerable in coal, as a very thin layer of scale will reduce the evaporation by a large amount. The same applies to soot. Keep it away from the heating surface or its cost in wasted coal will be large.

Details Are Important

It is only by attention to details that the cost of coal and power can be reduced to a minimum and kept there. But is that attention not justified when the results will pay handsomely? When everything has been done to secure good results, there is no reason why the evaporation should not be in the neighborhood of 12 lb. of water per pound of good coal; with lack of attention and even where care is taken, unless there is some device for weighing the coal and for measuring the water, it will be found that the evaporation is by no means where it should be, so that the very first things required for results are those which will indicate to the owner what is going on in the plant.

It would be impossible in these days of close competition, for a coal operator to guess at what his coal costs and sell it on that basis. He knows pretty exactly what each ton costs and what he must get for it in order to make a profit. To do this, he must know what each step costs and take into account every detail of the work.

The power costs are lumped, and unfortunately in many cases the entire services of the master mechanic and electrician are charged against the station, when much of their time is spent in following up work in no sense connected with the cost of making power. In justice to the plant, such services should be charged up to repairs, maintenance, or wherever they belong, and not to power cost. Then when the power companies attempt to sell current, some real figures will be at hand to compare with those they offer.

It is safe to say that any plant having 500 horsepower in boilers and having use for that amount of steam, with engines of any good make and with the plant operated with any real attention to economy, can produce its own power cheaper than it can buy it, and this without taking into account the fixed charges on the new apparatus that will have to be secured in order to make use of the power when purchased. It must not be lost to sight that the lines of the power company have to run over long distances and are subject to many disturbing factors, any one of which may mean a shut-down to the coal mine, also that the contracts are frequently so worded that there is no redress in case of such suspension.

Central-Station Cost Is Not the Entire Cost

The claim that owing to their size these power companies can produce current at a lower price, may be true, but the cost of power at the central station is not the cost that counts. To this must be added the fixed charges on the lines to transmit the power, also the cost of the power lost in transmission, and in transformation, as well as the expense of the business department for obtaining the business and collecting the money for the power sold.

When this is added to the cost of current at the plant, the total cost of the power must be from two to six times the station cost. Take this into account and consider, "Is it possible that we, without all of these costs to add to our operating expense, cannot produce power at least as low as we can buy it?" If not, why not? And then get busy.

For every 100 hp. of boiler plant, the coal consumption should not exceed 2.7 lb. per horsepower-hour, or 270 lb. with the boilers in good condition and everything about the plant in shape for economy. This means an evaporation of about 12 lb. If things are not kept up, the evaporation may fall as low as 5 lb., which is by no means unknown, and the coal required per horsepower-hour may increase to 6.4 lb., or 640 lb. per 100 hp.-hr., and according to the conditions it may vary anywhere between these limits.

For every 3000 hours' operation of the plant, the coal may vary between the low limit of 810,000 lb. and the high limit of 1,920,000 lb. With coal costing $1 per long ton, the variation will be from $361.60 to $861.10, the difference representing the interest at 6 per cent. on an investment of $8325, or more than the entire cost of a fairly high-class plant.

Considering these facts, is it not worth while taking steps to ascertain what you are doing, and to maintain your plant in the very best possible condition in spite of the low cost of coal, for, after all, this expense for fuel is an important factor in the cost of coal mining and the saving made in it may go a long way toward paying a dividend on your plant.

There are but few coal operations where the boiler plant is smaller than 200 hp., and the majority are much larger. A 200-hp. plant would show a range of double the above figures, and so on, according to the size of the plant. The cost of 100 boiler-horsepower for 3000 hours, with coal

at $1 per ton of 2240 lb., at varying rates of evaporation, is shown in the accompanying curve.

At 12 lb. evaporation, the cost would be approximately $361. At 3 lb. evaporation, the cost is approximately $1000. This is a graphic illustration of the value of knowing what is going on in your boiler plant, for of all places this is the one where the greatest loss can occur without its being apparent, unless the plant is equipped to keep track of the evaporation, which means weighing the coal and measuring the water.

Records Must Be Kept

Results cannot be obtained by letting things go, even with the best of plants, but records must be kept on file showing at all times just what is being done. Not only the quantity of coal and of water must be known, but the feed water must be maintained at high temperature, the boilers kept clean both inside and out, and last of all, the methods of firing must be closely watched so as to see that fuel is not wasted at this point, for more coal can be lost through poor firing than by dirty boilers or cold feed water.

Another point well worthy of consideration is the type of boiler setting employed, for no type of setting is adapted to all kinds of coal. In fact, each character of fuel should have a setting specially adapted to it, as each coal varies so widely in its constituents, that the amount of air required, as well as the height of the boiler above the grate, will vary for good results. High-volatile coal requires a setting with a considerable distance between grate and boiler, and grate bars having big air spaces, also in all probability a large air opening in the fire door so as to allow an excess of air over the fire, in order to properly burn the volatile matter and possibly the fixed carbon.

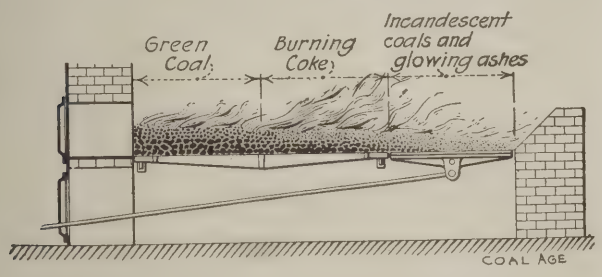


Fig. 2. The Proper Condition of the Fire

Other coals with less volatile will require the grates close to the boiler and fine air spaces, as well as no extra air over the fire, so that for the best results the boilers should be bought and installed with due consideration of the coal to be used.

The average boiler employed throughout the coal region is the horizontal return tubular. This boiler was originally designed for the use of anthracite coal. When modified for the use of bituminous coal, the grates were lowered somewhat. They were not, however, lowered enough for most characters of bituminous or semi-bituminous coal, nor were they adapted to these fuels in many other ways, such as the location and arrangement of the bridge-wall or for the supplying of air over the grates. Furthermore, little attention has been paid to the proper methods of firing for economical results.

Most engineers are aware of the great saving in fuel made by the under-fed type of stokers, but not all are cognizant of the reason for this economy. In the first place, the coal is fed upward to the fire. All of the gases are distilled off, mixed with air also coming through the bed of coal, and passing through the incandescent fuel above, are ignited and consumed, thus utilizing all of the volatile matter which is capable of being burned.

As most of these stokers operate under forced draft, it is quite possible to supply the exact amount of air necessary to burn not only the gases, but also all of the fixed carbon in the coal. This is almost impossible of accomplishment by hand firing with the present arrangement of settings.

It is also to be noted that the larger number of under-fed stokers have the bed of the fire much farther away from the boiler than is the case in the ordinary setting. This also assists in a thorough burning of all the gases, because the latter do not get into contact with the shell of the boiler before ignition.

The Usual Results of Hand Firing

With hand firing, coal is distributed over the fire, the gases are distilled off, rise, strike the boiler, are chilled below their point of ignition and are driven off unconsumed, carrying with them a considerable proportion of unburned carbon in the form of dust. That this is poor economy, has been shown again and again by different types of so called smoke consumers, which do nothing more than properly mix air with these gases and force them over a bed of incandescent coal. The same results could undoubtedly have been obtained by raising the boilers considerably above their present height, and firing properly.

The use of dumping grates, making the last third the dumping portion, would also serve to assist, as by this means cleaning the fire would not mean opening up the entire grate. This last third could always be kept covered with live, full-burning coal, while that on the forward section of the grate would be in process of coking and partially burned. The general condition of such a fire is represented in the ccompanying drawing, which shows the first section of new coal, the second partially burned, and the third section of incandescent coal and ashes.

When this third section is burned out, it is dumped; the second section is pushed back to take its place, the first takes the place of the second, and the first is renewed. By doing this under one-half of the boiler at a time, the most economical results can be obtained. Not only this, but the fire can be forced to a limit not possible under ordinary conditions of firing with the common flat grate.

Another common result from the cost of coal being low is the purchase of engines that are wasteful of steam, the idea being that since the cost of steam is low, it is hardly worth while buying expensive machinery to save it. This is especially true when it comes to the engines operating the fans. How false and futile this reasoning is, can be shown by a few figures; also how this very saving in the first cost of the engines actually entails an actual increase in the cost of the plant as a whole.

For instance, assume the purchase of an engine using 30 lb. of steam per horsepower-hour and of 100-hp. capacity. This engine will use 3000 lb. of steam per hour, and with an evaporation of 6 lb. of water per pound of coal, would require 500 lb. of fuel. If the engine would

do the work on 24 lb. of steam per horsepower-hour, the coal would be reduced to 400 lb., or a saving of 100 lb. per hour. In 3000 hr., the saving would be 300,000 lb., or an equivalent of $134, and for every 6 lb. advance in steam consumption, the increase in coal will amount to $134.

Therefore, it is advisable to purchase an engine which is not wasteful in steam. There is, of course, a limit, and that limit is reached when the saving in steam is equal to the interest and depreciation on the increased cost of the engine.

Many engines are wasteful in their use of steam, either on account of their construction or through neglect, so that 50 or even 60 lb. per horsepower-hour is by no means uncommon. In addition to the wastefulness of an uneconomical engine, there is also an increase in the actual investment by the purchase of a machine of this character.

For instance, if an engine of 100 hp. capacity is purchased, requiring 30 lb. per horsepower-hour, a 100-hp. boiler can easily handle it. If, however, the engine requires 60 lb., it will take a larger boiler to supply this steam. Therefore, it is to the interest of every coal operator to see that a good engine is purchased, in order to keep down the ultimate investment, as well as the operating cost.

This done, it is "up to" the operator for economic reasons, to see that the boilers are run with as little coal as possible, which means care and attention to details, as well as the installation of those devices which will show at all times what results are being obtained for the fuel consumed.

Pump-Motor Troubles

A three-stage pump, driven by a compound, direct-current, variable-speed motor, handling drainage water in a mine, gave trouble by taking too much current and tripping the circuit-breaker in the power house when the speed was increased to give the required head, saws William Salt, in *Power* for Nov. 10, 1914. At first it was thought to be due to stoppage at the inlet of the pump. Accordingly, the casing was opened several times and the parts examined, but they were free and properly assembled.

The machine was a mile from the power house, and had over 300 ft. of lift. The motor was started in the usual manner with full field, the speed being increased by weakening the shunt field until the pump began to deliver water. The slight rise in speed necessary to increase the flow resulted in a heavy increase in current, causing the circuit-breaker to go out.

Several trials convinced me that the trouble was due to a wrong series field connection, for when the motor was brought up to speed by weakening the shunt field, the series field became stronger by the increased current until at a certain load it overcame the shunt field, and, being in the opposite direction, tended to reverse rotation with the results as noted. Accordingly, the series field connections were reversed, after which the machine was put into service and took only normal load current.

In another instance a small three-phase motor driving a centrifugal pump heated excessively when first put in service. An ammeter in the line showed overload current, and, believing the trouble to be caused by over capacity of the pump on account of the nature of the liquid handled, the piping was changed so that a test for head and capacity could be made. This showed the motor to be a little overloaded, but not enough to account for the excessive current.

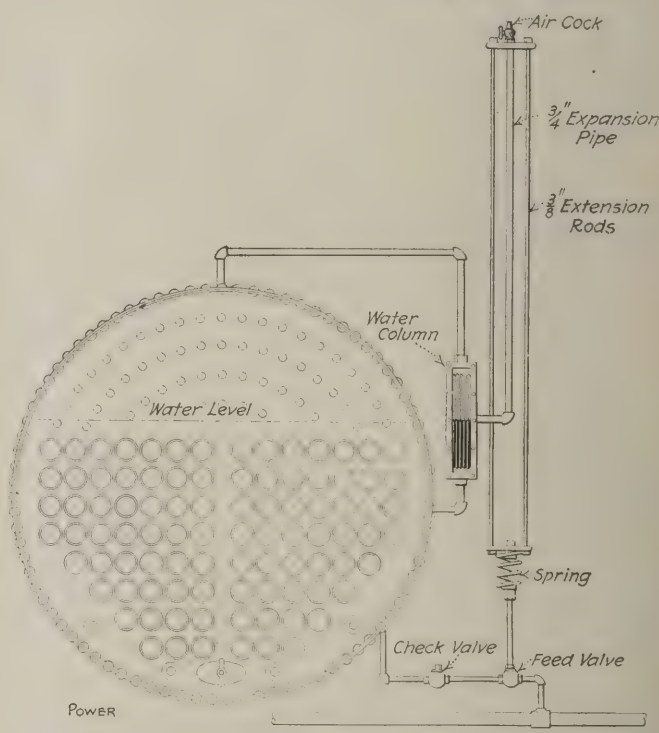
A wattmeter connected in the lines near the motor showed that the trouble was done to the auto-transformer used in starting. All three lines were closed when in the starting position, but in the running position one line was open because of a broken contact finger. This was repaired and the motor operated satisfactorily.

Home-Made Feed-Water Regulator

An engineer called my attention, says Luke Mathier in *Power* for Nov. 3, to his home-made feed-water regulators. He had made them out of odds end ends of pipes and rods about the plant and claims to have the simplest regulator in the world. I do not doubt his statement.

He says they have never fooled him yet and he has perfect confidence in them. The illustration is self-explanatory.

The process is one of balance, the feed valve is maintained in a certain position, feeding gradually and continuously maintaining an almost even level of water in the boiler. When the water lowers below the second gage cock, steam enters the "expansion pipe" and raises the rod, opening the feed valve. When the water in the column gets above this gage, water enters the "expansion pipe" and contracts it, pushing the rod down, thus closing the valve shutting off the water.



Regulator Connected

Electric firing eliminates all accidents due to short fuses and reduces the number of those arising from retarded ignition. The use of self-contained electric detonators eliminates the danger which is always present in the handling of loose primers which are intended to be ignited by a fuse. This method of firing also saves time and labor, as all shots are fired.

Editorials

Wanted: A War Correspondent

It is reported that Judge Youmans, of the U. S. Court, has ordered the reopening of the Bache-Denman properties. The U. S. cavalry forces are to be used to aid in this resumption. At the same time the U. S. forces are invoked to keep mines closed in Colorado. Thus a situation grim, but still ridiculous, has arisen. The nation has two heads, the executive and judicial. One believes itself above the law and the other believes the law supreme. Strange to say, the judiciary has been able to make the executive enforce the laws in Arkansas though the President proclaims a higher law in Colorado.

There is also a night-riding insurrection in Muhlenberg County, Kentucky, and federal troops are liable to be called out to prevent violence on negro and nonunion miners. In Butte, Mont., the state militia is still in control of the mining situation. Though we have a brevet captain of the Illinois National Guard and veteran of the Spanish war on our editorial staff, his military experience has been acquired with the rifle, not the pen, and we may yet have to look for a competent war correspondent.

The War and the Foreign Collieries

The war has already closed the best collieries in France. The fighting is both over and in close proximity to the best coal field in that republic, that is, the field lying between Quiévrechain and Fléchinelle, including such well known mining centers as Lens, Liévin, Béthune, Valenciennes, La Clarence and Courrières. The smaller and unimportant field of Pont-à-Mousson is also suffering the rigors of war.

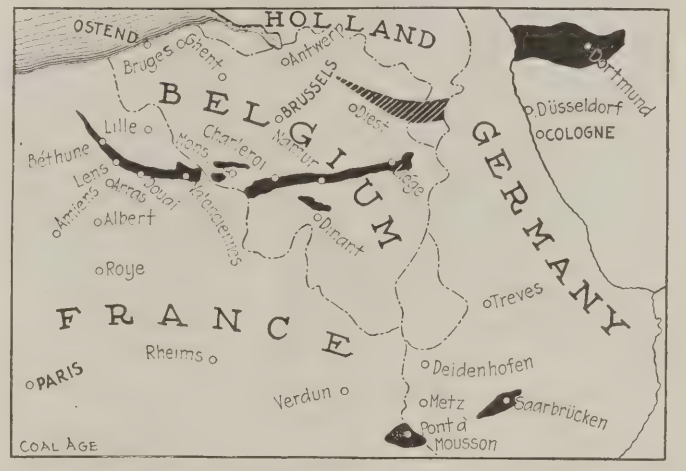
In Belgium, as might be expected, every acre of coal territory is in the hands of the Germans. The main coal field lies along the Sambre to its junction with the Meuse, and is found along the latter river as far as and beyond Liége. It is a continuation of the field in France, but there is another isolated patch of coal also along the Meuse at the town of Dinant.

To mention the towns in these Belgium fields is to cite a long list of the places where the Belgians, British and French made heroic resistance to the valor of the German arms. Thus at Liége the Belgians repelled the advance forces of the German army; at Mons and Charleroi the British, few in numbers, made a brave resistance and a courageous retreat in the presence of a superior force and at Dinant the Senegalese and French captured the heights only to lose them twice. Namur was also a scene of severe fighting.

It is said that the Germans destroyed the mines in Belgium on their advance toward Paris. If so, it was an inexcusable piece of folly, for the output of these mines would be of great value to the invaders. The story is probably not true, but it is quite likely that the French and Belgian mines *will* be destroyed if the Germans withdraw, for it has always been regarded a justifiable act to demolish such property of the enemy as would otherwise help him to continue his resistance. Both North and South in the Civil War destroyed the coal mines of the enemy whenever they could not avail themselves of their resources.

Thus we may expect to find the output of both French and Belgian mines much reduced after the war. We do not regard the Germans as morally justified in destroying the mines on their retirement, because the British have enough coal to make such destruction of the property of the Allies a negligible factor in the war, but we cannot expect the Germans to observe such considerations, as the Allies have seized, as have also their opponents, every ship they could find on the high seas in a manner which would be piratical were it not justified by every precedent in history.

But how about the Teuto-Turk alliance? In the forefront of the advance of both Western and Eastern allies



THE COAL FIELDS IN FRANCE, BELGIUM AND GERMANY

The shaded field in Belgium is extremely deep and at present produces little coal. Its extent and shape are not clearly defined.

are the coal fields of Germany, Austria and Turkey. The western German fields are between the Ruhr and the Lippe in Westphalia and near Saarbrücken. If these should be invaded by the Allies, it is likely they will endeavor to do them the minimum amount of harm because they will by that time be so clearly superior to the enemy that retreat will be unlikely. They will have every interest in preserving the property of Germany, seeing that only by so doing can they collect from that country an indemnity which will make good the tremendous losses of the war.

On the eastern frontier of Germany are the Silesian fields, which are also exposed to the Russian advance, being situated partly in Russia and Austria. Here the outcome of the war will probably be less favorable, because the Russians have been making a different campaign from the other Allies. They have been disposed to press the offensive with mobile troops which move far ahead of their main line. Consequently, these light troops are

liable at any time to sustain a defeat. When they are attacked in overwhelming numbers they retire to the shelter of their main forces, doubtless doing all the damage they can on their retreat. Only assurance of success makes a victor indisposed to destroy property.

It is unlikely that the Germans will destroy their own mines on the eastern frontier because of the certainty that the British can supply all needed coal from England and Wales. On the western frontier they will be equally indisposed, because, owing to the Russian method of warfare, it is quite likely that the Germans may regain tomorrow a fair proportion of what they lose today.

Consequently when the war is over France and Belgium will be found the principal sufferers. The tipples in France are extremely high, some say as much as 200 ft. They serve admirably for rapid-fire gun platforms, for snipers and for wireless stations and doubtless will suffer severely.

The output of Belgium in 1912 was only 25 million short tons, and the two principal mining departments in France, Pas de Calais and Nord, now ravaged by Germany, produced only 33 million short tons in that same year. So that it is hardly likely that the tonnage loss in Europe after the war is over will be greater than the reduction in market demand.

The Turkish field in Heraclea, which produces about 800,000 tons per anum, will be one of the early spoils of the war. It is probable that as the coal outcrops to the surface it can be readily reopened no matter what the Turks may do to the improvements already erected for its exploitation. They will feel little regret in destroying the present plants, as they are owned in France.

However, as we go to press, we learn that the Russians have rendered the coal mines practically unworkable by a bombardment of "Zungulday" (probably Zoongooldak) It is likely, however, that they will be reopened speedily so that the operations of the Turkish fleet will only be temporarily inconvenienced.

The Progress of Germany

In our issue this week, Samuel Dean, an Englishman, writes on his visit to the mines in Germany. It cannot be contended that he is pro-German, but his account certainly must be considered as flattering to the people of Germany. Were Napoleon living, he could hardly be induced to believe that the Teutons alone could confront all Europe.

Mr. Dean, himself, is not disposed to take seriously the remark made by a Frenchman with whom he traveled. The billion dollars paid by France to Germany after the war of 1870 is certainly not the cause of Teutonic prosperity, though such a payment seems an immense amount of money. When, however, we think in terms of nations, billions of dollars roll naturally from the tongue. Thus the revenue of the German Empire amounts to about nine-tenths of a billion dollars. The Germanic States separately collect in addition one and a half billions and the colonies 28 million more. So let us not deceive ourselves, there is something *in* Germany and *of* Germany which accounts for its progress. If we in America can find it and imitate it we shall do well.

Somehow we have never been impressed with the transcendent powers of the Germans as individuals. To us they have always appeared "just people," man for man, very little different in intelligence from ourselves, and not markedly different from the citizens of the island across the North Sea. And we do not see either where Germany has resources in any way superior to our own or those of the British Isles. In fact, we have distinctly an advantage.

We are, therefore, disposed to accept the solution that the excellence of the German colliery plants is due to profits and that profits have been due to syndicates which the government has fostered. Even before these trusts were created, the Germans did not oppose the system of which they were the outcome, and large profits in business were not considered inequitable.

Let us suppose that all business be conducted without profits in America for a number of years and let us grant that the working people save absolutely nothing, but live from hand to mouth. Then if industry is to be enlarged even as fast as the growing population demands, capital must flow from outside.

So, if progress is to be made, it must be, as we recently stated, either by profits or by thrift. We have heard men who made $400 a year say that they could not save a dollar. Others said the same who were making $600, $2400 and $5000. Whatever the wage, the wage-earner seems unable to put anything by.

The people who are saving are the very rich. Some of them are making so much that only by giving their money away can they keep from growing richer and richer year by year. Thus, it is that profits are a surer source of capital than thrift. We leave it to our readers and ask them how many of them who are wage-earners are saving anything which can make a capital fund for the America of which they believe they are good citizens. The capital fund cannot grow where profits are nil and when the wage-earner spends all he makes in securing impermanent possessions.

Perhaps the German way is not well, but we think if it be continued year by year, in a few decades the growth of capital will be such that the workingman can have out of profits, due to increased mechanical efficiency, as much as he would get today where no profits are made, and his employer will nevertheless make enough out of his labor for the erection of plants which would assure continually increased efficiency.

Thus the German laborer may lag a generation in his wage scale, but ultimately, if the wealthy classes do not become corrupt, he will more than gain on other workmen by reason of increased efficiency in operation. Of course, such increased wealth might make those who receive it corrupt, leisurely and incompetent, but so far it seems in Germany for the most part to have done none of these things.

We do not want to advocate unreasonable profits. Rather would we recommend a degree of thrift, based on careful judgment. But he who will not save, must not venture to lift his voice against those who make profits, for such men are the *benefactors* of the nation. We use the word advisedly and as just fresh from its Latin source. Benefactors may not help us out of any regard for us; they may not be citizens whom we respect and applaud, but whether they are good or bad, whether we like or detest them, they are benefactors when they do us good. And those who build up the capital of the nation are such benefactors, condemn them and dislike them as we may.

Sociological Department

An English Mine-Rescue Station

By Edwin Husband*

SYNOPSIS—The coal companies in Europe have large rescue stations which they support for their common advantage. This describes one in the Midlands of England and the methods of training there pursued.

The Midland Counties of England have near Mansfield, Nottinghamshire, one of the first and best equipped mine-rescue stations in Great Britain. At present it serves 150 mines in the counties of Nottingham and Derby, but two new substations are now being built, one at Chesterfield in Derbyshire and the other at Ilkeston in Nottinghamshire. When these are completed all the mines in the two counties will be within 10 miles of a rescue station.

Already over 100 teams of six men have been trained at this station. After the men have been instructed and have passed a rigid examination they are awarded diplomas but are required to come to the rescue station at stated periods for an efficiency test.

The practice building consists of two long circuitous and narrow galleries, in one of which the conditions have been made to resemble as nearly as possible those of a mine where an explosion has actually taken place.

There are small openings over the imaginary roof falls measuring about 21x24 in. Through these, the rescue party must pass, encumbered as they are with their Meco breathing apparatus. They must also take with them on a steel stretcher a dummy, weighing as much as an average man. During the final training the teams are required to stay for two hours without coming out into fresh air in a poisonous atmosphere produced by the burning of hay, straw, shavings and sulphur.

While there the men are required to load a car with brick, push it along a portion of the gallery, build a properly bonded 9-in. wall, set props and hang brattice cloth, then dismantle the work and remove it to another place. During the practice, at a favorable opportunity, the superintendent who carefully watches the team through the windows, rushes in and disarranges the breathing apparatus of one of the students, at the same time calling attention to that fact.

The rescue work ceases immediately, and the men at once turn their attention to the comrade whose apparatus is out of order. The captain carries, strapped to his belt, a small tin can which contains an outfit, to be used only when the breathing apparatus of any of the team is disarranged. He takes out the emergency outfit and connects it to a spare cylinder of oxygen. The mouthpiece of the injured apparatus is removed from the mouth of the wearer and that of the emergency outfit substituted.

All this is done in much less time than it can be described, and so neatly and quickly is it performed, and so well, that the wearer does not experience the least inconvenience by the change. The captain then repairs the injured apparatus, which is then readjusted, and the emergency outfit is replaced in the can ready for use again whenever required.

The course of instruction extends over a period of 12 weeks, and commences with a series of lectures by the superintendent on the various aspects of rescue work. The men are then allowed to wear the apparatus in the galleries and do practice work, but the chamber is not filled with irrespirable gases. During the eighth week for the first time during their training the galleries are filled with noxious gases, and the team is instructed to do nothing but sit still for one hour, after which the men walk about the galleries for an equal length of time. The next lesson consists of rescue work under conditions similar to those which usually exist after an explosion.



Creswell No. 2 Colliery Rescue Team at Mansfield, Nottinghamshire, Eng.

The superintendent's final instructions to each team before entering the poisonous atmosphere are: Keep together. Watch each other's gages, and if any man's apparatus goes wrong, don't put him out, but instead immediately apply the emergency outfit.

The Mansfield rescue station has a fine rescue car, somewhat similar to the one used by the U. S. Bureau of Mines. The building is equipped with a gas-testing machine, constructed under the Oldham patent, changerooms, baths, oxygen storehouse and cylinder-charging machines. There is also a comfortable house for the superintendent where, after practice, each team is provided with a substantial meal. This rescue station is financed by the various companies operating in the two counties, and is governed by a board appointed by these companies. Every man receiving training is paid by the corporation which employs him.

After completing the rescue course, each man is instructed in gas testing and must undergo a rigid examination before receiving a certificate of efficiency for mine-rescue work. This test consists of the art of detecting small percentages of firedamp in the Oldham gas-testing

*Superintendent, Wadsworth Red Ash Coal Co., Helena, Ala.

machine and stating the different percentages to the examiner. It is now one of the British mining laws that all firebosses in order to retain their positions must pass the above named tests once every five years.

Since my visit to this rescue station, the mine owners have decided to use a liquid-air rescue apparatus, termed the Aerophor, instead of the oxygen type, and have built a liquid-air plant, which does not require a skilled attendant. It consists of a three-stage air compressor, the air being drawn through a purifier and compressed to 200 atmospheres. After passing through another purifier, it goes to the liquifier and expansion engine, and is then drawn off and stored in vacuum bottles. The weight of the apparatus, including a full charge of about 10 lb. of liquid air, is 30 lb., and, of course, the load gets lighter as the liquid air becomes used up by the wearer.

The English Language in the Coal-Mining Regions

By James Steelman

SYNOPSIS—English should not be taught to foreign miners as a book language but as a living tongue. The teacher by performing the actions which his words describe, and by inducing the pupil to imitate both words and action, can teach him English even when the instructor is entirely ignorant of the language or languages which the pupil can speak.

Employers are everywhere awaking to the truth that a reasonable amount of money spent upon improving the efficiency of the employees is a good investment, the returns on which are prompt, sure and adequate. We should not be surprised then to learn that coal operators are beginning to realize that, if they can remove from the foreign laborer the handicap of ignorance of English, they themselves will be greatly benefited, so greatly in fact that they can afford to spend time and money on solving the problem presented.

The strained relations that so often exist between employer and employees are undoubtedly due in large measure to ignorance on either side of the conditions under which those on the other side are laboring. A grievance gets under way. It is bound to grow in an atmosphere of ignorance of the facts. Now the basis of a common understanding must depend upon a means of communication. Otherwise, grievances cannot help growing. But, how can the management keep in touch with masses of men speaking many languages, of which English is not one?

Again, the proper conduct of mining operations turns on the men understanding the orders and directions. Their safety depends largely on their comprehension of regulations. Here again, English is the great need.

In short, there can be no doubt that a mine or any other enterprise will run much more smoothly—that is, much more economically—if the men have a grasp on the fundamentals of English; if they understand the spoken word, and the printed rules and regulations. It is just as reasonable to pay money to provide a lubricant here as anywhere else. Of course, it is impossible to express in definite figures just how much benefit there is to the employer. But the matter is sufficiently clear to make it a reasonable proposition for the coal operator to provide for the instruction requisite.

Little Knowledge of English Required

About one-half of the population in the coal regions of Pennsylvania is foreign. Nearly all these foreigners speak something other than the English tongue. A large proportion know little or nothing of the language of the management. How shall it be remedied, if indeed there is a remedy?

It is important to note that the required cure is easily provided. We need to teach foreigners English; but this does not mean that any real grammatical training is at all necessary to meet the situation. The amount of English actually necessary is inconsiderable. Syntactical exactitude, extensive vocabulary, perfection in pronunciation—none of these is required. All that need be sought is to impregnate the foreign workman's mind with a grasp of English which every American child possesses.

This means a vocabulary of perhaps 300 or 400 common words; certain terms belonging to his everyday activities will, of course, have to be included, but it will be a child's knowledge of language, nevertheless. He will not have to know how to parse. It will be an unnecessary refinement for him to learn that he ought to say, "I walk slowly," instead of "I walk slow," or that "which" should not be used when referring to persons. If he has trouble with the pronunciation of certain sounds, and persists in saying "dat" and "winegar" and the like, what of it? His pronunciation of a small circle of words must be good enough to be intelligible, that is all.

A good working knowledge of a small vocabulary will cover his principal requirements. If he is to be taught to read in order that printed directions may not remain unknown to him, it will perhaps be necessary sooner or later that he shall get some idea of spelling. But this will be limited to his vocabulary. Ordinarily, it will be unnecessary to teach him to write more than his own name. When the actual necessities of the case are taken into consideration, it will be seen that the matter is greatly simplified. In fact, the acquisition of enough language to meet modest necessities is quickly possible for untrained minds.

Progress Made among Illiterates in Kentucky

In the United States there are districts where a considerable percentage of the population is unable to read and write. They use English as a spoken language; but reading and writing are beyond their knowledge. Kentucky is a good example. This state is by no means the most illiterate of all; still 12 per cent. of her population over 20 years of age are unable to read and write. Here is a problem concerning men and women. It is not a question of school children at all. Thus it is a difficulty comparable with that existing in the coal regions. In Kentucky, the problem is to teach the printed not the spoken language. No doubt, it is easier to teach an American how to read English than it is to teach a foreigner the same thing. On the other hand, the educational effort in Kentucky does not shrink from dealing with the oldest pupils—persons over 70 and 80 years of age. It is being demonstrated there that even old people can be taught. Indeed, it is being shown that for this only a short period of training is needed.

Two or three years ago, one of the Kentucky school superintendents, Mrs. C. W. Stewart, stirred up her band of teachers and made through them a determined and successful effort to inaugurate evening schools for

the illiterate. On Sept. 4, 1911, the teachers of the whole district of Rowan County, visited the homes of the people in their several neighborhoods and notified them that upon the following evening a school would be opened. More than 1200 persons responded at once. The ages ran from 18 to 86. It turned out that these people were most eager to learn; that nothing in the way of physical difficulties would stop them. The movement spread to other districts. Now Kentucky has for her slogan, "No illiteracy after 1920."

I will give some illustrative examples of the results. A woman 70 years of age was able to write a legible letter after 8 nights of work; a man of 50 did the same after 7 nights; another man, 30 years old, succeeded in the same task after 4 nights. Pupils were accepted who could read and write, but who wanted to make further progress. But in the second term, there were 300 illiterates out of a total enrollment of 1600. The movement is succeeding. It is old enough now to have failed, if there had been some fundamental defect in its conception. It shows that grown people can be interested and taught the most elementary things. It may not be possible in so brief a time to get the same results with a mass of men from foreign countries as have been obtained with citizens in Kentucky, because they have greater difficulties to surmount. But the work is worth doing, even though it may not be possible to do it in a couple of weeks or so.

The Teaching of Foreigners in New York City

In New York City, the problem of teaching foreigners the English language has received much attention. It will readily be understood that with her immense and ever-growing foreign population, New York has been almost forced to attack and solve the question. The Board of Education maintains classes for the purpose and has been doing so for a number of years. In fact, as far back as 1906, a definite method was formulated and adopted. This system seems to differ from that of Peter Roberts described in Coal Age for Aug. 22, pp. 350 to 352. On the other hand, there are prominent similarities. As the New York system has the prestige of proved success behind it, it will be well to learn precisely how it is carried out, so that teachers in the mining communities may have exact knowledge.

In the New York system, a beginning is made by making an appeal to individual self-consciousness and utilizing a point of contact between the pupil's native language and English. I will make this plain by giving a typical example of the manner in which the teacher gets under way. The class is supposed to be assembled, whereupon the instructor calls out the name of some pupil. The name will be alike in English and in the pupil's native tongue. Perhaps no one replies. Nevertheless, the pupil is pretty sure to manifest a degree of self-consciousness. Besides, others in the class will recognize the name and direct their attention to the pupil called.

The teacher will now plainly direct his eyes to the pupil in mind, and say, "Johann Schmidt, stand." As he utters the word "stand," the teacher will get up from his seat and thus exemplify in his action the meaning of this word, which is really the only English word in the sentence. If the pupil fails to get the meaning, or for some other reason does not stand up, still the teacher may be sure that some of the others have caught the drift of things. So he will turn to another name on his list, and say "Antonio Nicoletti, stand." He will now, or else a little later with some other name, get a response. However, the teacher must rise, whenever he enunciates the word "stand." After one response, others will be easy to obtain.

The teacher will give a word of commendation after every success; such as "Good!" "Right!" "Yes!" "That's right!" He will nod or otherwise *act* approval in addition. The situation now is that the teacher and a number of pupils are on their feet. He will now say, "Antonio Nicoletti, sit," and at the same time resume his own seat. If Antonio fails to get the idea, another pupil is addressed; but the teacher in each and every case acts the meaning of "sit" upon speaking the word, at least until a proper response is obtained. We have, in the foregoing, illustrations of one of the fundamental rules of the method: *First the idea, then the word;* or, *Simultaneously act and word.*

Pupils and teacher are now seated. He turns to one of the successful pupils, and says, "Antonio Nicoletti, stand." He goes on, looking at the pupil and pointing to him, and says, "Your name is Antonio Nicoletti." He calls upon another to get up, saying, "*Your* name is Zelig Kaliski." After a number are up, the teacher will say, pointing to himself, "My name is Mr. Brown." Then, looking straight at one of the pupils standing he says, "What is your name?" After some effort, a correct response will be obtained: "My name is Zelig Kaliski." The procedure is then continued, until all have resumed their seats. The words to which particular attention has been secured are: *Stand, sit, my, your, name, is, what.*

Not Only Teacher but Pupils Also Illustrate Words

The foregoing may constitute the first lesson. In a second lesson, the teacher will ring the changes on the words previously learned, particularly the verbs. Thus, he will say, pointing to himself and rising, "I stand." He resumes his seat, saying, "I sit." Then turning to the class, he will address one of the pupils and say, "Antonio Nicoletti, stand"; following the request with another, "Antonio Nicoletti, sit."

Of course, the teacher sees to it that properly responsive actions are given to both requests. Now, he asks Antonio again to stand, he himself getting up at the same time and saying, "I stand." If Antonio says nothing, the teacher urges, "Say, I stand," and persists until success is obtained. The same procedure is followed in teaching, "I sit." But always now the pupil performs the act before or at the time he is required to say the word.

Next, pointing to several pupils one after another, the teacher will say, "Zelig, stand"; "Johann, stand." He seeks to get both action and word. Similarly, with the word "sit." Then, leaving off the name, the pronoun is introduced—"You stand"; "You sit." After exercising along this line for awhile, the teacher will exclaim, "Antonio, Zelig, stand." Then he will follow up this with, "All stand," making some gesture to indicate that the whole class is meant. Then, "All sit."

After spending some time on a review of this character, the teacher will proceed to introduce a new verb. The old must be conveyed first, or at least simultaneously. The old words may be utilized and all unified in a single group of actions. Thus, performing the several actions, the teacher will say, "I sit, I stand, I walk, I sit."

Illustrating Pronouns

A pupil will now be requested to go through the actions and the sentences. Then a number of pupils are asked to act and speak in a group, "We sit, we stand, we walk, we sit." A new pronoun is thus brought in. As the group moves over the floor, the teacher will say, "They walk." The pronoun "you" may suitably be introduced at about this stage. But always there must be the association of action and word.

If possible, the action should be that of the pupil; but it will at times happen that the teacher must be the one to act; especially will this be the case where the word is new. Sooner or later, however, the pupil must have, if possible, his own personal relation to the act, at the same time uttering the word—he must *perform* it or *request* it, or in some way have *to do with* it.

It will be seen that by following this method through several lessons, the nucleus of a vocabulary will be built up. The *sound* of the words will be associated with a real knowledge of the *meaning*. It may be well to stop a moment here and explain the value of having the pupil connect the sound with his own personal activity rather than with that of some other person. Of course, a pupil can learn the meaning of "stand" by *seeing* the teacher or another pupil go through the act; but it will undoubtedly be a harder process and a longer one to associate the sound with the act than if the pupil himself participates.

What one does himself makes a livelier impression than what he sees another do. Consequently, associations based upon such lively impressions will be stronger, more vivid and last longer. No doubt, the fact is due largely to the principle that we are more interested in ourselves than in other people. What *we* do awakens our keen and interested attention. By all means, then, the pupils should be made to go through the acts and otherwise associate themselves with the ideas. The words should be pronounced at the time, so that act and word may connect themselves in the memory.

And Now Prepositions Are Added to the Vocabulary

But let us go somewhat further. In what may be the third lesson, the teacher will utilize the three verbs already learned in adding to the general vocabulary. Thus, he points to an object and says, "The desk." Then, seated at a distance from his desk, the teacher will say, "I stand, I walk, I walk to the desk," suiting his action to the words. Then, "Johann, walk to the desk." The pupil will be encouraged to imitate the teacher, saying and acting, "I stand, I walk, I walk to the desk." In this way a new word or expression is introduced and old ones reviewed. Similarly, "to the window," "to the door," etc., may be brought into the conversation.

Mature persons probably have more difficulty in some respects than children. Thus, the vocal chords of the older people will be less flexible and they consequently will have more difficulty in pronunciation. On the other hand, the mature persons may be expected to have a greater determination.

In New York, a man of perhaps forty acquired in three weeks a sufficient knowledge of English to make a speech and win a prize ($5 in gold). He had been only four weeks in America. His pronunciation was inexact; but it was intelligible, which is the main point. This is an extreme case. We cannot expect continually to repeat this result. For a night class, which meets five nights a week, it will probably require from four to six months to impart the amount of English deemed necessary for a workman's needs.

The Method Is Used in Germany

In Germany, after fourteen weeks' instruction—in this case the pupils appear to have been young persons—such results as the following were secured: The boys were standing when the teacher entered the room. He said, "Sit down." They obeyed, saying as they did so, "We sit, we are sitting." The teacher went to his desk; whereupon, without speaking, by simply looking at various boys, he obtained from them an account of his actions.

Now one pupil, now another would respond to the teacher's look and act, saying, "You are standing on the platform;" "You are going to your desk;" "You are sitting;" "You are taking your pen;" "You are writing your name;" "You are putting the pen on the table;" "You are taking the blotting paper."

At this point, a boy was called up and asked to go to the door. He obeyed, saying, "I am going to the door." One section of the class said, "You are going to the door;" another said, "He is going to the door." Similarly, the following expressions were dealt with: *Opening the door, shutting the door, leaving the room,* etc., etc.

The exercises went on to more difficult matters. The teacher asked, "What are you going to do?" "What are you doing now?" "What have you just done?" The pupil was required to answer; other pupils were required to address him and to speak of him. These exercises related to the three questions as to the immediate future, the present and the immediate past.

The Adverbs Are Also Taught by Illustration

The exercises proceeded after a little, the teacher requiring two boys to rise and walk round the room. Sometimes at the same pace, sometimes with the one boy walking more rapidly. The teacher said, "You must first see it and then speak about it." Such sentences were spoken as these: "You are walking more quickly than your friend;" "You are not walking so quickly as your friend." The two boys were required to place themselves, one before, the other behind, the teacher.

As they did so, either had to state what he was doing. The teacher addressed to the class the questions: "Who is standing in the middle?" "Who is standing before me?" "Who is standing behind me?" The two boys, one being taller than the other, were placed side by side, when such responses to the teacher's questions were made as, "Wilhelm is taller than Johann;" "Johann is not so tall as Wilhelm." Various persons of the verb were introduced: "I am not so tall as Wilhelm;" "You are not so tall as Wilhelm;" "He is not so tall as Wilhelm." This is not all; but it is sufficient to show what may be done in a reasonably short time. It should be borne in mind that in this actual case there was probably more attention paid to the niceties than would be at all necessary with miners learning simple English.

The pole star for the teacher handling such work is, *First the idea, then the word.* Associated with this rule is this other, *Impress the idea by the personal participation of the pupil.* If these companion rules are faithfully followed as far as circumstances permit, then prompt success may be expected, whether the pupils are boys or men; whether they are especially intelligent or not.

The Knoxville Meet

SPECIAL CORRESPONDENCE

"The Interstate Miners' Field Day" held under the auspices of the Society of Tennessee Mine Foremen at Chilhowee Park, Knoxville, Tenn., Oct. 24, was the most successful yet held by the society. Eighteen teams competed in the first-aid contests, and the work was of the highest order. In commenting upon the splendid work done by the first-aid men, one of the judges remarked that some of the work was equal to that expected of a hospital interne.

Several departures were made from previous methods. The field was arranged in the shape of a rectangle, which was itself subdivided into smaller rectangles, each team being allotted one of these. Only five teams were working at once, which, of course, lengthened the time of the entire event but added greatly to the efficiency of the judging. Another innovation was the use of Boy Scouts, who assisted in every way possible. A Scout was assigned to each team, and to the one doing the most efficient work a prize was offered.

The chairmen of committees were as follows: D. T. Blakey, general; H. H. Ashmore, awards; J. R. Williams, publicity; H. H. Braden, first-aid organization; Geo. E. Sylvester, advisory; E. A. Sehorn, field.

The chief marshall and chief usher were Boy Scouts, the chief recorder was W. D. Barton, and the local representative of the Red Cross, and chairman of the board of judges was Dr. S. R. Miller.

H. M. Wilson, engineer-in-charge of the Bureau of Mines at Pittsburgh and secretary-treasurer of the American Mine Safety Association, and E. B. Sutton in charge of the work of the Bureau at Birmingham, Ala., were active in promoting the meet. The Pruden Coal & Coke Co.'s employees' band of 15 pieces from Pruden, Tenn., furnished the music.

The teams competing were as follows: Proctor Coal Co., Lewis Francis, captain, Red Ash, Ky.; High Cliff Coal Co. Joseph Rigsby, captain, Pruden, Tenn.; Pruden Coal & Coke Co., R. C. Speaks, captain, Pruden, Tenn.; Black Diamond Coal Co., Wm. Craven, captain, Coal Creek, Tenn.; Knoxville Iron Co., John E. Woods, Jr., captain, Briceville, Tenn.; Royal Consolidated Coal Co., Ed. Wilkes, captain, Briceville, Tenn.; Stearns Coal & Lumber Co., J. L. Butler, captain, Stearns, Ky.; Black Diamond Coal Co., E. L. Hendren, captain, Coal Creek, Tenn.; Piedmont Coal Co., Geo. Vinsanty, captain, Oliver Springs, Tenn.; Roane Iron Co., J. Phillips, captain, Rockwood, Tenn.; New Careyville Coal Co., J. W. Duncan, captain, Careyville, Tenn.; Stonega Coal & Coke Co., E. Drennen, captain, Big Stone Gap, Va.; Westbourne Coal Co., auxiliary team, Jefferson Hill, captain, Westbourne, Tenn. Among the events were the following:

One-Man Events: Right cheek and right foreman cut and bleeding.

Lacerated scalp on top of head, left hand crushed.

Machine boy while running fell and cut a vertical gash on his kneecap and punctured the palm of his right hand with a machine bit, bright red blood; treat and carry 50 ft.

Two-Man Events: Left collar bone broken, simple fracture of left thigh.

Miner found lying face down unconscious, on a live electric wire, abdomen badly burned; rescue and give treatment.

Left arm twisted around shaft of mechanical post auger. Release arm and dress for two compound and three simple fractures below elbow.

Three-Man Events: Left ear torn off, left shoulder dislocated; compound fracture of left leg.

Head, face, neck, arms and hands burned by gas ignition

Tamping bar blown through right thigh, causing compound fracture, bar remaining in wound.



TEAM OF THE ROANE IRON CO., ROCKWOOD, TENN.



PASSING A LITTER THROUGH AN ARTIFICIAL OBSTRUCTION



THE TEAMS AT THE KNOXVILLE MEET IN PARADE



THE STEARNS TEAM, A BOY SCOUT AND J. E. BUTLER



THE CONTESTING TEAMS AT WORK
Only five teams worked at one time



STEARNS COAL & COKE CO. TEAM
Winners of first prize. Score, 100 per cent.

Four-Man Events: Patient unconscious from gas inhalation, right forearm broken, improvise stretcher and carry 50 ft.

Fingers and left hand lacerated by sprocket wheel and chain, bright red blood; compound fracture of right forearm.

Man is found lying on his back on live electric wires, unconscious, back burned at waist line; demonstrate three methods for his removal; treat and carry on stretcher 50 ft.

Team Event: Burns on face, neck, cheek, back and arms; carry over obstruction.

The first grand prize was $25 in gold, silver medals of the American Mine Safety Association and bronze medals of the



THE FIVE JUDGES WHO DECIDED THE MERITS OF ALL CONTESTANTS

American Red Cross won by the Stearns Coal Co., Stearns, Ky. The second prize was awarded to the Knoxville Iron Co., of Briceville, Tenn., and the Tennessee cup went to the same team. There were about 25 prizes in all.

Bathhouse Hint

BY DAVIS CROW*

In the bathhouses at the mines of the Houston County Coal & Mfg. Co., live steam was used to heat the water for bathing, but the steam in mixing with the current made its flow irregular, causing it to "flutter." We did not wish to take hot water from the boiler at a point below the water level, for, if the hot-water valve were accidentally left open, it might drain the boiler until the water level was dangerously low.

To overcome these objections, a discarded jet pump was used, connecting the steam line from the boiler to the steam connection of the jet, and also connecting the suction end of the jet to the water supply. The delivery end of the pump was connected to the line leading to the bath sprays. We found the arrangement satisfactory, as it gave a steady flow of water, the temperature of which could be easily regulated.

While we use the jet pump in connection with showers, it would serve equally well for tubs or other forms of baths. If a jet pump is not available, a discarded injector or ejector would give satisfaction in its place.

*Engineer, Houston County Coal & Manufacturing Co.

Glen White School

One of the uptodate towns in Raleigh County, West Virginia, is Glen White. Robert S. Gatherum of the faculty of the University of West Virginia is organizing the educational work in this village. At the age of 14 he entered the mines as a trapper-boy. He dug coal for eight years, and then went to the University and graduated as an engineer. He has started a school at Glen White at which will be taught reading, writing, arithmetic, properties of mine gases, ventilation, geology of coal, mining methods, care of safety lamps, physiology, sanitation, etc.

The Benton, Ill., Rescue Crew

The first team of helmetmen on the scene of the Royalton explosion was that of the State Mine-Rescue Station, Benton, Ill. They arrived about 2½ hours after the catastrophe and were able to do most effective work.

From left to right in the illustration the names of the men are as follows: James Towal, superintendent; M. J. Carraher, assistant superintendent; Walter Nichols, assistant superintendent; William Watson; James Thompson; Alex. Marshall, captain; Walter Anderson and Mungo Marshall.



STATE MINE-RESCUE TEAM OF BENTON, ILL., STATION

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 5—I am glad to see suggested, in Coal Age, *the need of a thoroughly practical discussion of existing mining laws and mine regulations. There are many things that require careful consideration and immediate attention in this respect. The most important of these is unquestionably the enforcement of many good mining laws already on the statute books of many states. It might be a leading question to ask, but it is nevertheless a most important one: How many mine inspectors enforce the existing laws? Again, do the mine inspectors, in many states, dare to enforce some of the laws on the statute books?*

It is sad to say that we all know too well the full meaning and import of the phrase so commonly heard spoken, "He has a good stand in;" or "He has a good pull." These phrases are most commonly used in relation to the acknowledged condition of a successful candidate in a state where the appointment of mine inspectors is made by the governor. It is only too true, in a majority of cases, that the successful candidate has the indorsement of and secures his appointment mostly through the large coal companies of the district wherein he resides or is best known. Without reflection on the man's honesty of purpose, it may be stated frankly that, under these conditions, it cannot be expected the appointee on entering office will willingly, or can successfully, oppose the wishes and plans of his friends who secured his appointment. What is the result? *Can the full enforcement of an offensive law be expected under such conditions?*

I give this brief outline merely as a thought in passing to what I consider *a most important law* in coal mining, and one that should be enacted and enforced in every coal-mining state. I refer to the law requiring the examination of mine workings, including all airways, passageways and working places, by a competent fireboss at from 3 to 4 hr. before the time for commencing work in the mine. Such a law should also define, in detail, the manner in which such examination should be made, the means used and the extent of territory required to be examined by each fireboss.

While I am unable and cannot be expected to furnish statistics confirming my belief in this regard, I am fully convinced that many mine fatalities occur every year, which are caused by inadequate mine inspection, at a safe time limit before the hour for the miners to start work in the mines.

My experience, however, enables me to testify to the looseness and incompleteness of the mining law in several states, in regard to the inspection of the mine before the time for the men to enter. This is particularly notable in Indiana and Alabama. In these states, it is a common thing for the fireboss to start his examination of the working places anywhere from 6 to 8 hr. before the time for the miners to commence work. The danger from such loose laws relating to the safe operation of mines is only too obvious. I would ask, Is it possible for a fireboss to tell a man that his place is "O.K." when his examination of that place was made 8 or even 6 or 5 hr. previous? I answer, No fireboss, in a gaseous mine, can truthfully say that a place is "free from gas" 6 or 8 hr. after making his examination. The most he can say, in that case, is that the place contained no gas when he made the inspection.

I could name several accidents caused by miners entering their working places after those places had been O.K.'d by the fireboss and were supposed to be safe for work. Even the excellent editorial, entitled "The Mulga Inquest," Coal Age, Oct. 31, p. 715, furnishes ample evidence that, in *this* case, there was something wrong in the regulations of the mine, to say nothing of the requirements of the state mining law, respecting the manner in which the examination by the fireboss should be made.

I want to say, in closing, the state mining law should require coal companies to employ a sufficient number of firebosses to make it possible for each man to examine carefully all the places in his charge, and to start such examination not more than 2 hr. before the time for the men to enter the mine. While this is but one of the many evils existing in the mines of this country today, it is a feature of mining law that, if corrected, would, with the help of fearless and honest mine inspectors, go far toward reducing the number of mine explosions.

William Crooks, Mine Foreman,
T. C., I. & R.R. Co.

Edgewater, Ala.

Gasoline Mine Locomotives

Letter No. 4—I have read with interest the letter signed "Mining Engineer," Coal Age, Oct. 24, p. 683, drawing attention to the comments of O. P. Hood, mechanical engineer of the Federal Bureau of Mines, in his paper entitled "Gasoline Locomotives in Relation to the Health of Miners," read at the Pittsburgh meeting of the American Institute of Mining Engineers, October, 1914.

In his paper, Mr. Hood makes a few statements that tend to prejudice the mind against the use of gasoline locomotives in mines, although we believe this is not his intention, as he states at the close of his article, that "A wide field of usefulness for these locomotives remains, where it is believed there would be no injurious effects upon health."

In referring to these statements, Mining Engineer says:

> He (Mr. Hood) adds that the percentage of this gas (carbon monoxide) in the mine air will depend upon the amount of gas present in the exhaust, as compared with the quantity of air passing on the haulage road; but he (Mr. Hood) considers that it will be necessary to provide ventilation for the worst condition that can result.

Permit me to say in reply to this statement that no employee of our company will sell a gasoline locomotive to any coal operator before he, as engineer, has made a complete examination of the mine or mines in which the

locomotive is to be used; and if, in our opinion, there is the slightest chance that danger will arise from such an installation and the necessary changes to eliminate such danger cannot be made, we refuse to furnish this type of locomotive.

It is worthy of note that, wherever our gas-driven locomotives have been installed, their operation has been successful. It may also be added that, under gaseous conditions that would prohibit the use of an electric locomotive, the gasoline locomotive may be successfully installed.

Again, in the next paragraph, the following statement is made:

> It is stated that while, under normal running conditions, this gas rarely exceeds 6 per cent. of the total exhaust, the quantity may, owing to a bad adjustment of the carburetor, be increased to 13.5 per cent. It is clear that since such a wide variation in the percentage of this dangerous gas is possible, this fact coupled with the possibility of a slack ventilation on roads or in places where the locomotive may be working, makes it necessary to observe great caution in the use of these machines.

The responsibility for this condition rests with the company and the man running the motor. Where a competent motorman is employed, such a condition should not arise. Also, in a well ventilated and thoroughly equipped mine, it seldom happens that there is any slack ventilation on the haulage roads where motors are in operation.

Another paragraph draws attention to "the possibility of the locomotive running in the same direction in which the air current is traveling, and perhaps with the same speed or velocity, in which case the gas would reach a dangerous percentage in the air to which the engine runner would be exposed." In the same paragraph it is said that Mr. Hood mentions the "danger of permitting a gasoline locomotive to stand idle for any length of time, except in an ample ventilating current, and advises the use of a self-starter on all gasoline locomotives."

In reply to this suggestion, I would say that the addition of a self-starter is generally a source of unnecessary expense and trouble. Such a self-starter is not required on one of our locomotives, which are equipped with a patented cranking device that cannot kick back, no matter how long or how short is the pull given by a motorman in cranking.

Permit me to say, in closing, that this type of locomotive has met with a considerable amount of ill use, abuse and condemnation, simply because it has been *installed under improper conditions* and, again, *forced to operate under overloads.* As stated previously, such unfortunate installations are avoided in our practice, by making a careful and intelligent investigation before the installation is permitted.

G. W. Hamilton, Mining Engineer,
Milwaukee Locomotive Mfg. Co.
Chicago, Ill.

Letter No. 5—In the reading of G. W. Hamilton's letter on Gasoline Mine Locomotives, Coal Age, Sept. 12, p. 440, my attention was drawn very strongly to one point in particular. For some time since, I have wanted to add a few words of caution in respect to that point. In his letter, Mr. Hamilton makes the following statement:

> The further statement that the exhaust from a gas-driven engine vitiates the mine air is not true when this type of locomotive is used for haulage on main or cross-entries, because the exhaust has now been deodorized so that it is not perceptible in a mine where these locomotives are installed. The odor of the gasoline cannot be detected even in the main-return entries of such mines. The only reason that the motors cannot be used for gathering work in rooms or chambers is that the carbon monoxide given off in the exhaust requires to be diluted by an air current in order to render it harmless.

Before commenting on this statement, permit me to remark that this is an age of endeavor along educational lines, in which almost all people engaged in the coal industry are taking part. Operators, technical magazines, colleges, federal and state bureaus of mining and many other organizations are trying to provide a fair measure of both common and technical education that will be adapted to all classes of mine labor, in the hope that all will profit thereby. The way in which the miners themselves are responding and the movement gaining headway is gratifying indeed. This is realized by no one more than by those actively interested in prosecuting the work. Manufacturers of all classes of mine equipment are equally interested in this campaign, and, in general, are active in giving it their support.

What I have to say in criticism of the statement of Mr. Hamilton to which I have referred is written chiefly for mine managers (foremen), miners and all underground employees. I have been prompted to write this comment, on overhearing a recent remark made by a mine foreman, which was something to this effect, "By George, these gasoline locomotives don't give off any gas at all. Why, you cannot smell anything." I want to say that it is the *absence of odor* in the discharge that makes the latter even more dangerous than where the smell reveals the presence of the gas. Because there is "no odor" to the discharge, the sense of danger is largely eliminated; while, on the other hand, the odor when present assists to emphasize the danger that may often exist in the discharge of this type of locomotive.

It should be recognized as a fact that *the absence of odor does not indicate any reduction in the quantity of carbon dioxide* (CO_2) *present in the exhaust gases;* in fact, there may be more carbon dioxide produced, assuming perfect combustion to have taken place. Nor does *the absence of odor* necessarily mean *a less percentage* of the extremely poisonous gas, carbon monoxide (CO). I am informed that *the deodorization of the gasoline does not reduce the quantity of carbon monoxide produced in its combustion; but this is solely dependent on the supply of available oxygen, which must be sufficient to burn the carbon monoxide to carbon dioxide.* In other words, there must be sufficient available oxygen in the cylinder of the engine to enable the complete combustion of the gasoline.

Recognizing, then, that the gasoline locomotive may give off both carbon dioxide and carbon monoxide in quantities that would be dangerous to the health of underground workers, it becomes necessary to confine the operation of these motors not only, as Mr. Hamilton states, to "haulage on main or cross-entries," but I would add, their operation should be confined to such main and cross-entries as are used for the return of the air current or to entries ventilated by an air current that does not pass into the working places of the mine.

The character of both carbon dioxide and carbon monoxide is too well known to make any comments necessary here, further than to say that neither of these gases has any odor, but the presence of either or both tends to vitiate the mine air. While small quantities of *carbon*

dioxide (CO_2), in the air breathed, are not inimical to health or dangerous, it is important to remember that extremely small quantities of *carbon monoxide* (CO) may prove fatal, the presence of 0.1 per cent. of this gas, in air, being sufficient to produce death when breathed for a sufficient length of time. It is quite well known that the effect of carbon monoxide on the human system is cumulative. The gas is quickly absorbed by the hemoglobin of the blood and retained largely until a sufficient amount is absorbed to prove fatal. The affinity of the hemoglobin of the blood for this gas is more than two hundred times as great as that for oxygen.

In all these matters, it is important that we not only keep ourselves well informed of possible danger, but avoid deluding, by careless statement, those whose lives may be dependent on this knowledge.

H. D. Easton, Instructor,
Illinois Miners' and Mechanics' Institute.
Springfield, Ill.

The Foreigner in Mining

Letter No. 9—The criticisms of Charlton Dixon, Coal Age, Oct. 3, p. 561, and J. D. Jones, Oct. 17, p. 643, followed by the general remarks contained in Letter No. 7, p. 644, urging the cultivation of that trait of human kindness that makes the whole world akin, if true, would stamp me as a being wholly devoid of humanity and not possessing the qualities of true American citizenship.

In my article bearing on this subject, Coal Age, Sept. 12, p. 440, I attempted an ethical analysis of the characteristic traits of the foreign element with which I have come in contact and of whom I have had charge. It is a mistake to suppose that such an ethical analysis describes my relation to and treatment of the individual. In endeavoring to find a solution of the vexed problem of foreign labor in mining, it was necessary to analyze the characteristic traits of this class of immigrants, in order to discover if they possessed the fundamental principles on which American citizenship is founded, before attempting to formulate a method for the assimilation of this element. My analysis failed to reveal such principles.

I repeat again, the Latin-European is a product of misgovernment. It is not his fault but his misfortune; and, in this respect, he deserves the sympathy and support of all true men. His assimilation to our social customs depends, however, on his manifesting such a desire. He has inherited a moral fear and perversion of character, by reason of which it is impossible for him to break away from these associations and adopt the principles of American freedom.

Charlton Dixon infers that he must appreciate freedom "having fled the tyranny and injustice of his own country." I would like to feel assured of the truth of the premises on which such a conclusion is based. I would ask, Does the foreigner come to this country actuated by the *desire of freedom* or the *desire of gain?* If his love of freedom is so strong, why are thousands of these foreigners now returning to their own soil, willing to lay down their lives for the country from which they have fled? That he is actuated more by the love of gain than that of freedom is shown by the fact that he remains separated from his family for so many years and sends home good American gold to support the powers that claim him body and soul.

Mr. Dixon doubts "if any mine official can recall a foreigner declaring his belief that earthly rulers exercise their authority by divine appointment." No doubt the answer to such a question would be in the negative. I have asked foreign miners simpler questions than that, which they have answered in the negative, though obviously their answer was contrary to their practical belief. Ask a foreign miner if he believes himself equal to the monarch of his country; and compare his answer with the one you would receive from an American citizen, in response to a question of *his* being the equal of the president of the United States.

Mr. Dixon testifies "to the loyalty of the foreign miner toward his employer," which I have failed to find true in my own experience. I might ask, Does the foreign miner consider the interest of his employer when desiring to take a holiday to commemorate the institutions of his homeland? Is it not a fact that many large plants have been compelled to suspend operations on such days and have worked short-handed for days following such a celebration?

I have been unable to harmonize Mr. Dixon's solicitude (?) for the education and moral welfare of the foreigner, with his statement that "whatever the foreign miner is or is not, we know, certainly, that he is a first-class man for loading coal. . . . Indeed, it would be a calamity if this class of immigration were to be replaced by a more highly educated type." The natural inference to be drawn from these remarks is that the foreigner is a good coal loader, which would not be the case if he were better educated. Therefore, he should be kept in ignorance.

In closing, Mr. Dixon eulogizes the humanity of Mr. Hogarth toward the foreigner. While such sentiments are just, they add nothing to Mr. Hogarth's American and Christian virtues. From personal acquaintance and knowledge, I know Mr. Hogarth to be a man who has the courage of his convictions and who practices what he preaches; and I do not believe that he regards his advocacy of such methods as in any way peculiar to himself, but rather considers them the practical virtues of every true American citizen.

Briefly, then, my argument is that the foreigner naturally possesses all the inherent attributes of his race, nation or class, which fact renders him morally perverted, although he is still capable of mental education. It is no argument to say that our own people frequently manifest similarly depraved moral natures, as I believe it can be shown that such depravity in them is always accompanied by a consciousness of wrongdoing, which eliminates the idea of moral perversion. But, when moral depravity is accompanied with a sense of right-doing, the subject so afflicted is morally perverted.

As a native born American, I hold very dear the principles laid down in the Declaration of Independence and embodied in the constitution of the United States. I regard no man as my inferior or superior, but consider all men "free and equal"; and, on this account, desire to treat every man with courtesy, kindness, consideration, humanity and justice.

I. C. Parfitt,
Asst. Mine Foreman.
Jerome, Penn.

Method of Working Underlying Coal Seam

Letter No. 5—The problem of working a seam of coal 4½ ft. in thickness and underlying another abandoned seam about 40 ft. above it, as presented by Mr. Lyman, COAL AGE, Aug. 29, p. 357, has not met with the response, from COAL AGE readers, that I had expected.

The main difficulty to be encountered, in the case under consideration, will arise from heavy roof falls. It is stated that frequent caves were experienced in working the upper seam, with similar roof strata, these breaks often extending to the surface. On this account, it may be assumed that the upper seam is full of water, which will prove a danger in working the lower seam. In any case, large water feeders may be expected should heavy caves occur. The flow of water from these feeders will vary with the wet and dry seasons.

I well remember a seam worked under similar conditions which was partially flooded and the mine laid idle for nearly two months. The water in that case broke through on the side of a fault, which extended to the old workings above.

From the fact that Mr. Lyman suggests driving the entries direct to the boundary, it may be assumed that the question of the mine paying immediate dividends is not, in this case, of the first consideration. If such is the case, I am strongly in favor of driving the entries, at once, to the boundary. I would adopt the longwall-retreating system, on reaching the boundary.

It will be necessary to timber the roof at the face, well and systematically. It will also be necessary to "take up bottom" or "brush the roof," in order to make headroom on all the main entries, crossroads and levels. The choice between these two methods will depend on the nature of the material in the roof and floor. If the fireclay bottom is liable to give trouble, it should not be disturbed. The material taken from the roof can be used for building material at the roadsides. The stalls should be at such a distance apart as to give a rapid advance of the working face and keep the miner under a new roof.

The first weight, in longwall work, is almost invariably a source of trouble; and a good flow of water may be expected from the upper workings when this break occurs. However, after this trouble has once been overcome, a more gradual settlement of the roof will follow, in operating under this system of mining, and a further inflow of water will be largely prevented. Also, by this method, the effect of the pillars in the old workings above will be reduced to a minimum.

J. E. SPICER.

Cumberland, B. C., Canada.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

PUMPS

Definition—The term "pump" relates to any device, machine or mechanism by which water, oil or other fluid is impelled or forced through a pipe line; or elevated from a lower to a higher level; or air or vapor is compressed into a tank or exhausted from a vessel or chamber. The action, in any of these cases, is termed "pumping;" and the device or machine used is called a "pump."

Classification—Pumps are classified in many ways, according to their style, type, action, mode of construction and use for which they are designed, and other distinguishing features too numerous to mention. The following are the more important classifications:

1. **Style**—Horizontal, vertical, power, flywheel, etc.
2. **Type**—Single (simplex), duplex, or triplex; simple, compound, or triple-expansion.
3. **Action**—Reciprocating or rotary, single- or double-acting, direct-acting, suction, lift, or force pumps, displacement pumps, jets and turbines.
4. **Kind**—Piston or plunger, outside- or inside-packed, etc.
5. **Use**—Air pumps, boiler-feed, sinking pumps, etc.

The above terms are, for the most part, self explanatory. A few, however, require to be defined, in order to make clear their meaning or significance.

A **power pump** is a pump driven by a separate engine or motor with which it is connected by a belt or chain or by gears, in distinction from a **direct-connected** or **direct-acting pump,** in which the steam or air cylinder and the water cylinder or pump barrel have a common piston rod and a common stroke.

A **flywheel pump** is one whose action is equalized and made more uniform through the energy stored in a heavy flywheel. The flywheel is more commonly used on a high-duty **geared** or **power pump;** or a single direct-acting pump when the steam or air is cut off before the end of the stroke.

A **single pump** is one having a single pump rod, regardless of the number of steam or water cylinders.

A **duplex pump** is one having two pump rods and water cylinders so connected as to operate alternately on the water column. In like manner, a **triplex pump** has three cylinders operating uniformly, in turn, on the water column.

A **simple pump** is one in which the steam-end is not compounded, in distinction from a **compound pump** having two steam cylinders operating a single pump rod; a **triple-expansion** with three steam cylinders on one pump rod; or a **cross-compound,** which is a duplex pump having two pump rods and water cylinders, but in which the exhaust steam of the high-pressure cylinder is discharged as live steam into the low-pressure cylinder.

In **reciprocating pumps,** the action is to and fro; while in **rotary pumps** the impellers rotate on an axis.

A **single-acting pump** draws water in one stroke only and discharges it in the following stroke; while a **double-acting pump** draws and discharges water in each stroke of the piston. A **direct-acting pump** is one where the steam and water-ends are in line and connected so as to have a common stroke.

The Coal Age Pocket Book

Suction—In actual fact, there is no such thing as "suction." The term is used, by common consent, however, to describe the effect of atmospheric pressure when exerted against a vacuous space from which the air has been partially exhausted.

A **suction pump** is one that acts to draw water only. In a **lift pump,** the water column is lifted by the upward movement of the piston; while in a **force pump** the water is forced upward or through the pipe line by the piston or plunger, which may be moving in either direction.

The action of a **suction pump** is clearly illustrated in Figs. 1 and 2, where the water is shown to be entering the pump barrel through the suction valve A, in each case, while the piston P is moving upward as indicated by the arrows.

The action of a **lift pump** is also shown in the upper portion of Fig. 1, where the water above the piston P is being lifted by the upward stroke and passes through the discharge valve B into the discharge or column pipe D.

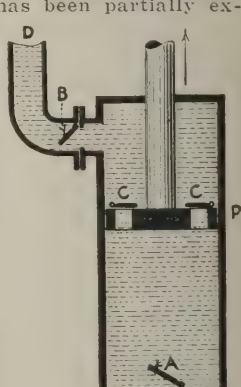


FIG. 1. SINGLE-ACTING SUCTION AND LIFT PUMP

The action of the **force pump** is also shown in Fig. 2. When the piston P moves downward, the suction valve A will close and the discharge valve in the pipe D open. The piston thus forces the water out of the pump barrel into the pipe line or column pipe, from which it is discharged against any head, limited only by the pressure of the steam in the steam cylinder of the pump.

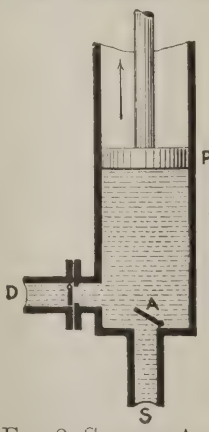


FIG. 2. SINGLE-ACTING SUCTION AND FORCE PUMP

Displacement pumps are a class of pumps in which the water is displaced or caused to move by direct contact with air or steam, the former taking the place of the water and driving it out; and the latter, by its condensation, creating a vacuum into which the water rushes.

A **jet pump** or **injector** is a device in which a jet of steam issuing from a nozzle entraps sufficient air to create a partial vacuum in the chamber surrounding the nozzle. As a result, water fills the chamber and, condensing the steam, is discharged through a tube.

Examination Questions

Mine Foremen's Examination, Held at Price, Utah, Sept. 15 and 16, 1914

(*Selected Questions*)

Ques.—In the event of your firebosses finding danger from gas, bad roof or other causes, what precautions would you insist on their taking to keep workingmen from entering those places?

Ans.—The fireboss should at once fence off the entrance to such place, by putting a suitable danger signal there, to prevent anyone from entering the place unwarned. The same precaution should be taken in respect to all the openings or entrances to the place. He should also make a note of the danger and, on his return to the shaft bottom after completing his examination, he should remove the checks of the men working in those places, holding these and turning them over to the mine foreman, at the same time informing him of the nature of the danger in each working place.

It will then be the duty of the mine foreman to see that immediate steps are taken to remove the danger and to prevent the men working in those places from proceeding into the mine. No miner should be permitted to pass into the mine without having first received his check; and the absence of this from the check board should be sufficient warning for the man not to enter the mine.

Ques.—What is meant by "splitting the air current," and what advantages are derived from such methods?

Ans.—The term "splitting" relates to the dividing of the air current into two or more separate currents, each of which will ventilate a separate portion of the mine or district before returning to the bottom of the upcast shaft.

The advantages to be derived from splitting are, briefly, as follows: 1. The ventilation of the mine is under better control, since it is then possible to regulate the quantity of air passing in each district, according to the existing conditions. 2. Better air is supplied to the working face in each district, since the gases generated in one section of the mine do not pass into another section, but return at once to the main-return airway. 3. A larger volume of air can be circulated with less power than where the air current is undivided. 4. The air travels the working face at a more moderate velocity, thereby decreasing the danger and inconvenience to the workmen, common to a high velocity. 5. Finally, a local explosion of gas or dust occurring in one district is less liable to be propagated throughout the mine.

Ques.—If you were a mine foreman in a gaseous mine, how would you arrange and distribute the air current to insure the greatest safety to life and property?

Ans.—As far as practicable, a gaseous mine should be divided into separate ventilation districts. Each of these districts should be ventilated by a separate split of air taken from the main current. The return air from each district should be conducted at once into the main-return airway. The quantity of air thus supplied to each district should be proportioned to the needs and conditions in the several districts. The quantity of air passing in each district should not be less than 150 cu.ft. per man, per min.; and, in a dusty mine or a mine generating large quantities of gas, not less than 200 cu.ft., per man, per min., should be allowed. The size of each district should be limited so that the quantity of air required, on this basis, will not cause too high a velocity at the working face. This velocity should not exceed 5 or 6 ft. per sec., and is commonly less.

Ques.—There is passing through an airway 35,000 cu.ft. of air per min.; what will be the velocity per second if the size of the airway is 7.5×5.5 ft.?

Ans.—The sectional area of this airway is $7.5 \times 5.5 = 41.25$ sq.ft. The volume of air passing per second is $35{,}000 \div 60 = 583.3$ cu.ft. Therefore, the required velocity of the air current is $583.3 \div 41.25 = 14.14$ ft. per second.

Ques.—What will be the reading of the water gage when the pressure per square foot is 20 lb.? Explain fully.

Ans.—The weight of a cubic foot of water may be taken as 62.5 lb. This weight corresponds to a pressure of 62.5 lb. per sq.ft. when the water is 12 in. deep; or, as we say, for a water column of 12 in. Therefore, the pressure, in pounds per square foot, for each inch of water column, is $62.5 \div 12 = 5.2$ lb. To produce a pressure of 20 lb. per sq.ft. would require a water column (water gage) of $20 \div 5.2 = 3.84$ in.

Ques.—(a) Explain the formula for finding the weight of air per cubic foot, at different temperatures and under different pressures. (b) Find the weight of one cubic foot of air at 60 deg. F., barometer, 30 inches.

Ans.—The formula for finding the weight of a cubic foot of air at any temperature t and barometric pressure B is

$$w = \frac{1.3273\ B}{460 + t}$$

The constant 1.3273 is the weight of one cubic foot of dry air, under a pressure corresponding to 1 in. of mercury column and 1 deg. absolute temperature, of the Fahrenheit scale. This is multiplied by the barometric pressure, in inches of mercury, and divided by the absolute temperature of the air; because, the weight of air per cubic foot increases directly as the pressure and inversely as the absolute temperature. The constant, 460, is the absolute zero of the Fahrenheit scale.

Ques.—If 13 cu.ft. of air, at a given temperature and pressure, weigh 1 lb., how many tons of this air pass through a mine in 8 hr. when the current measures 52,000 cu.ft. per min.?

Ans.—The weight of air passing per minute, in this current, is $52{,}000 \div (13 \times 2000) = 2$ tons. The weight of air passing in 8 hr. is then $8 \times 60 \times 2 = 960$ tons.

Coal and Coke News

Washington, D. C.

While actual governmental measures affecting the coal industry are in abeyance, pending the reassembling of Congress, there have been few occasions when so many large administrative undertakings certain to exert a powerful indirect effect upon the industry were under way and approaching a climax. Both in regard to control of the form of industry, the establishment of new conditions affecting credit, and the favorable regulation of charges for transportation, as well as in several other directions events are leading up to significant changes in the situation.

Prospect for Rate Case

The Interstate Commerce Commission is now quite definitely understood to have finished its deliberations in the railroad rate case, wherein an advance of 5 per cent. was demanded by the Eastern lines. The consideration of the case has been unofficially announced as to take place during the first half of November, the period of the "November conference" which terminated Nov. 16. This signifies, it is understood, the handing down of a decision by about the middle of December.

Despite the lack of any absolutely official announcement on the subject the opinion is still generally and confidently entertained in well informed quarters that there will be little or no disposition to alter the position taken in the former decision in the five per cent. case. The prospect that that decision will stand seems to be strengthened in a material degree by the reliably reported determination not to regard the war and the investment conditions growing out of it as having any immediate connection with the rate question.

The elimination of the war itself and of its probable effect on the sale price of securities from consideration, means that the case is left much where it was at the end of the discussion of last summer. This in fact appears to indicate that the chief argument adduced in favor of reopening the case—the effects of the war and the probable consequences as regards both railroad revenues and railroad credit—had been ignored or ruled out of court. The attitude taken is such as to apparently throw a double safeguard around the prospects of shippers of heavy commodities such as coal.

Trade Commission

The inauguration of the new Trade Commission plan of dealing with the "trust question" within the next few days is expected to exert an important influence upon agreements in the coal industry. It will be recalled that during the early stages of the legislation an effort was made to secure the insertion of special provisions relating to the coal mining business. This was on the ground that mining of bituminous coal was then being conducted upon an extremely close margin of profit so that operators desired to be allowed to enter into agreements, such agreements, however, to be subject to close government supervision and regulation.

Bills to this effect were subsequently introduced but never made much progress. The act as finally adopted, however, contains authority for the Trade Commission to investigate from time to time trade conditions in any branch of business, while elsewhere power is given to secure the taking of steps designed to determine any improper or unfair business or trade methods. The belief now prevails in trade circles that as a result of these powers the new commission will yield to the desires of various coal interests and will make a careful study of conditions in the coal industry which, it is predicted, will lead to the tacit or open sanctioning of suitable working agreements among miners designed to govern the working of the mines, upon a reasonable and equitable basis.

The Banking Legislation

The coal industry among others is looking with interest to the effect of the new banking legislation upon the trade and confidently expects to see it exert a beneficial influence upon the general condition of business. This will be twofold in nature as it will tend to bring about the use of short time paper in the industry itself and in branches of business closely connected with it; while it will release much capital heretofore unnecessarily "tied up" in over-large bank reserves. The effect is expected to show itself in a quickening of industry in many directions, as well as in greater stability of business everywhere and in the elimination of the various shocks to which trade has been subject in consequence of uncertainty of credit and unexpected stoppages from time to time.

One phase of the situation that is of special interest in the coal mining regions is seen in the greater protection of postal savings deposits expected to be secured through the placing of the deposits in member banks by the post office department, thereby securing for them the safeguards established by the system as a whole. Postal savings deposits are made to a large extent by foreigners accustomed to the postal savings systems of European countries. There is an unusually large number of foreign depositors of this class among the miners in the various coal-mining communities in different sections of the United States, and their funds will gain added protection under the new system of banking.

PENNSYLVANIA

Anthracite

Scranton—Under the direction of the Board of Trade, petitions are being circulated through the city to be presented to the various coal mining companies asking that the retail price of coal here be put on the same basis as that in Wilkes-Barre, where the rate averages 20 per cent. lower.

Pottsville—John Evans and William Schreiner, coal miners who had been imprisoned for four days behind a fall of coal, were finally rescued alive. The rescuers, who felt sure that the men could get sufficient air for several days, worked in a limited space, digging desperately in an effort to reach the imprisoned men, the greatest excitement prevailing meanwhile at the mine opening.

Hazleton—Because of the scarcity of water in this section the mine operators are threatened with a situation that will make it necessary for them to close down the mines unless rain arrives soon. It is stated that already eight or nine collieries are in grave danger from a scarcity of water.

White Haven—A force of men has been at work for some time dismantling the Pond Creek Coal Co.'s breaker. On account of the property being flooded out and the continuous litigation between owners of the land and the coal operators, it now looks as if the mine will remain closed indefinitely.

Mahanoy City—The Philadelphia & Reading Coal & Iron Co. has issued a sweeping order that hereafter employees found smoking on the premises either inside or outside the mines will be summarily dismissed.

Bituminous

Cresson—The mines of the Pennsylvania Coal & Coke Co. have been closed because of the great falling off in orders. Officers of the corporation state that there is no truth in a report which has been widely circulated that labor troubles caused the shutdown. There has been no trouble between the company and its employees, the officers state.

Johnstown—The Valley Smokeless Coal Co. recently broke all records for daily output, when a total of 1700 tons of coal per day was mined. There is much interest in the operations of this company, whose mines are nearly within the city limits. Several hundred men are employed by the company. Recently new mining machinery was installed.

Portage—The Blue Bird mine of the Portage Coal Mining Co. has been closed temporarily for repairs and improvement work. While the mine is closed down the Red Bird mine will take care of the normal output of the neighboring workings.

Connellsville—The position of the coke trade at the present time is one of "watchful waiting." While conditions are not improving, they are not getting worse, and production and output hang around 200,000 tons per week, which it is believed is the bottom.

Ebensburg—What is thought to be a new record in coal production for this immediate vicinity was established during the month of October, when mine No. 1, of the Ebensburg Coal Co., at Colver, produced 102,000 net tons. The output all came from a single opening and from a coal measure 3½ ft. thick. Officials of this mine predict that they will have an output of 4500 tons per day by spring.

Pittsburgh—Coal mining is on a somewhat more active basis at present than it has been in the immediate past. This is accounted for by the fact that Lake shipments are being pushed forward before the ending of the shipping season. Furthermore, retail coal men have been buying more freely.

Washington—Alleging that he was injured and disfigured for life in an accident in the Allison mine at McGovern, on Nov. 16, 1912, Frank McCoy recently filed his suit in the courts to recover $25,000 damages from the Pittsburgh Coal Company.

McDonald—Seven mines of the Pittsburgh Coal Co., along the Panhandle R.R. near here, were closed temporarily Nov. 14, affecting about 2500 men. It seems to be the consensus of opinion, however, that the shut-down will be but a matter of a few weeks.

Shankstown—Mine No. 5, of the Greenwich Coal & Coke Co., recently resumed operations after an idleness since May 15 last. About 150 men went to work.

WEST VIRGINIA

Clarksburg—Announcement was recently made that 10 or more mines in this section operated by the Consolidation Coal Co., would be closed indefinitely, general conditions being assigned as the cause. As far as is practicable the miners will be transferred to operative mines.

Bluefield—It is stated that business has shown an improvement throughout this section of the coal field during the past few days. It is alleged that many more men are at work and the production and shipments are much brisker, with the outlook of a substantial increase soon.

Fairmont—Officials of the United Mine Workers of America have again planned to make an effort to organize the coal miners of the Fairmont district. This effort will doubtless meet with resistance and it is feared trouble may follow. It is thought that the first move of the coal companies against the proposed organization will be the securing of an injunction restraining union agents from entering upon the property of the operating companies.

KENTUCKY

Jenkins—The Consolidation Coal Co. has closed a number of mines in this vicinity pending better coal markets. The Elkhorn Mining Co. has also closed several operations at Fleming, Haymond and Hemphill, throwing over 1000 men out of work.

Frankfort—On account of the fact that large numbers of employees of coal mines and other operations in the eastern part of the state have been laid off, the State Board of Arbitration, which is administering the Workmen's Compensation Act, has extended until Dec. 5 the date on which employers may file with the board the reports of payrolls for August, September, October and November.

Lexington—Mining students in the College of Mining Engineering in the State University were recently given a demonstration of the pulmotor and the uses to which it can be put in resuscitating miners overcome by mine gases. Prof. T. J. Barr, of the College of Mining Engineering, conducted the demonstration.

Henderson—The Deepwater Coal Co., it is announced here, will begin operation of the Spottsville mine in January. This is one of the numerous mines in this part of the country which this firm recently took over.

Louisville—Conditions in the western Kentucky coal field, where "possum hunters" were perniciously active some time ago, have quieted down to a degree, though for a time several of the mine owners considered appealing to the governor for troops. The most recent case of disorder was near Central City, where, it is reported, a gang of "possum hunters" a few nights ago "shot up" a negro settlement which was known as "Galilee." No serious damage was done, though it is reported 1000 shots were fired.

OHIO

Cincinnati—The United States District Court has been asked by Aaron A. Ferris, receiver of the Dominion Coal Co., for permission to advertise and sell at public auction a number of the company's old accounts which are rated as desperate and uncollectible by ordinary means.

Columbus—Agitation has been started in many places in Ohio for an increase of the death benefits to be paid under the workmen's compensation law, which at present is limited to $3700. In order to get at the matter properly, a special committee has been named by the Ohio Industrial Commission to investigate the matter and report to the coming session of the General Assembly. In case the death benefits are raised, it will mean a large premium to be paid by coal operators.

Cleveland—Coal operators in Belmont, Jefferson and Harrison Counties anticipate extending their operations in order to be independent of the Ohio coal mining situation. Both the Purstlove-Maher Coal Co. and the Lorain Coal & Dock Co., it is said, are about to close deals for large acreages of coal lands in West Virginia. The latter company is said to be in the market for 20,000 to 25,000 acres of coal property.

Bridgeport—It is stated that actual want and destitution exist among the families of the 8000 striking miners of the 8th Ohio district. It is alleged that hundreds are facing starvation and death from cold and hunger. In many homes the children have scarcely enough clothing to cover them, and many of them are wasting away for want of substantial food.

INDIANA

Terre Haute—The nomination of officers of the United Mine Workers in District No. 11, which includes practically all of Indiana except the block coal field, has been closed and a ballot is to be prepared for the 150 locals having a membership of more than 20,000 for a secret vote next month. Only those persons who have consented to be candidates are on the ballot and the term of office is for a period of two years.

Linton—The Little Giant mine, which has been idle since Apr. 1, has resumed work. It employs 350 men.

Brazil—The official board of district No. 8, Indiana Mine Workers, is backing the miners in a strike at the Mary mine of the Otter Creek Coal Co., northwest of this city. Day men removed portions of the floors of rooms in the mine necessary to the laying of tracks. The miners contended this was their work, at $1.10 a yard. The company agreed to give the miners half-pay for the two weeks which the job took but they demand full pay.

ILLINOIS

Belleville—On account of the open weather prevailing thus far, with no demand for coal, the somewhat extraordinary conditions in the mining country surrounding here, are expected will bring to a crisis a difference of opinion between the miners' organization and several of the members. With no employment, the miners are facing starvation, and there is talk of openly seceding from the union and leasing idle mines to be worked on a coöperative basis, if the union does not give its consent to an arrangement of this kind. This means a price war that will bankrupt every operator in the field that attempts to run his mine on other than a coöperative basis.

Glen Carbon—The fire which started in the pump room of mine No. 2 of the Madison Coal Corporation of St. Louis, on Nov. 8, spread to the boiler house, engine room, and air compressing station, and damaged the property to the extent of about $25,000. This mine was recently dismantled and $70,000 was expended in repairing old equipment and erecting new. It is one of the largest mines in southern Illinois and employs about 425 men, and has a capacity of about 6000 tons of coal per day. It is expected that it will be a month or more before operations can be resumed.

IOWA

Guernsey—It is stated that a 7-ft. vein of coal has been discovered at a depth of 72 ft. in practically the center of town. This discovery was made while a well was being bored for water. This place is 25 miles north of What Cheer, where coal has been mined for years. Speculators are already offering to take options upon the land, while prospectors are at work to ascertain the extent of the field.

COLORADO

Denver—According to the annual report of James Dalrymple, state inspector of coal mines, for the year 1913, increases are shown both in the number of men killed for each 1000 employed and for each million tons of coal produced in the state of Colorado. During the year in question 110 men met accidental death in the mines of the state. It is stated that there has been a steady increase in Colorado in the number of lives lost in the coal mines during the last three years, that is, 1911, 1912 and 1913.

PERSONALS

Dr. R. F. McHenry recently resigned his position as surgeon for the Penn-Mary Coal Co. at Heilwood, Penn.

Dorsey J. Parker, of Alabama, has been probationally appointed by the Secretary of the Interior to be a mining engineer in the Bureau of Mines in Pittsburgh, Penn.

E. D. Glenn, chief clerk for the Cabin Creek Consolidated Coal Co., has accepted the position of chief clerk to J. R. Carey, general superintendent of the Chesapeake & Ohio R.R. Co., with offices at Clifton Forge, Va.

Edwin W. Laubenstein, mine inspector for the Consolidation Coal Co., was recently presented with a watch and chain as a token of the esteem and appreciation of his services by the employees in the company's various mines.

Erskine Ramsey, who was recently injured at Tuscaloosa, Ala., during the launching of a coal barge, and whose injuries were for a time considered serious, is now said to be entirely out of danger.

W. S. Ingraham, of Bristol, Conn., a well known clock manufacturer, has just made a trip of inspection over his mining properties in southern Illinois, comprising several thousand acres now operated as the Illinois Fuel Co., with headquarters at Sparta.

John A. Schroeder, formerly general sales manager of the Hyatt Roller Bearing Co., has resigned, his resignation taking effect immediately. There will be no other change in the personnel of the organization so far as is now known. Mr. Schroeder's successor has not yet been appointed.

Governor Hatfield, of West Virginia, has appointed the following persons to represent the state at the convention of the American Mining Congress, to be held at Phoenix, Ariz., Dec. 7 to 11: J. G. Bradley, E. O'Toole, F. F. Bayles, Percival Smith, Ernest Chilson, W. S. Mandt, Samuel Butler, O. Tibbitts, William Gillis and John O'Brooks.

W. K. Kavanaugh, president of the Southern Coal, Coke & Mining Co. of St. Louis, has just returned from an extended trip on the Atlantic seaboard of South America. The trip was made for the purpose of ascertaining a future market for Illinois coals to move via either rail or water to New Orleans and Mobile. The Southern Coal, Coke & Mining Co. has recently installed a coal dump at East St. Louis, on the Mississippi River.

Dr. Harold B. Dixon, who left England last June to attend a convention of British scientists in Australia, is now on his way home. While stopping for a few days in Canada, he took the opportunity to pay a flying visit to the experiment station of the Federal Bureau of Mines, at Pittsburgh, Penn. Dr. Dixon has done much important work in the study of explosion waves in gaseous mixtures, in connection with mine explosion problems. While at Pittsburgh, a visit was made to the experimental mine at Bruceton, where two explosion tests were made for his benefit. Dr. Dixon expressed himself as greatly interested in the results of these tests. While in New Zealand, he was called upon to assist in the investigation of a recent mine explosion at that point.

OBITUARY

Henry J. G. Melcher, for the past 15 years treasurer of the W. J. Rainey Estate, died recently in New York City. Mr. Melcher was born in Cleveland and was 57 years old. He had been connected with the Rainey Coal & Coke Co. for 30 years, starting in its employ as a clerk. He is survived by his widow, two daughters and one son.

PUBLICATIONS RECEIVED

Department of the Interior, Bureau of Mines. "Hints on Coal-Mine Ventilation." By J. J. Rutledge. Twenty-one pages, 6x9 in., unillustrated.

Department of the Interior, Bureau of Mines. "The Prevention of Accidents from Explosives in Metal Mining." By Edwin Higgins. Sixteen pages, 6x9 in., illustrated.

Department of the Interior, U. S. Geological Survey. "The Production of Coal in 1913." By Edward W. Parker. Two hundred and nineteen pages, 6x9 in., with numerous tables.

CONSTRUCTION NEWS

Bens Creek, Penn.—Work on the $200,000 improvement to be made in the operation of the W. H. Hughes Coal Co., was recently begun.

Barbourville, Ky.—A railroad line is being surveyed from Jellico on the Kentucky-Tennessee border for a distance of 16 miles through coal and timber fields of northern Tennessee.

Beaverdale, Penn.—Improvements which will cost many thousands of dollars are being made by the Beaver Run Coal Co. at this place. A large new tipple with the latest apparatus for the handling of coal is being installed.

Sharondale, Ky.—Contracts have been let for constructing a tipple and several houses by W. L. Bailey, general manager of the Williamson Coal Co., of Williamson, W. Va., and others. They will develop mines in this locality.

Carrolltown, Penn.—It has been announced that the Milson Coal Co. will make a new opening on its tract near the workings of the Carrolltown Coal Co. This is the latest development in this region and the only one for some time past.

Nelsonville, Ohio—The B. R. Coal Co., of Nelsonville, Ohio., which was recently incorporated with a capital of $10,000, will develop a tract of coal land near Nelsonville. S. P. Booth has been elected president and G. D. Ridenour, secretary-treasurer.

Johnstown, Penn.—M. M. Sheesley & Sons recently completed the sinking of the air shaft for the Conemaugh Smokeless Coal Co. near Seward, and headings are now being driven. The shaft is 205 ft. deep, and the output of the mine will be eventually 1500 tons per day.

Scranton, Penn.—Timothy Burke has been awarded the contract by the Delaware, Lackawanna & Western R.R. Co. to strip a bed of coal in West Minooka. This bed runs from 8 to 15 ft. in thickness, but, on account of bad roof it was impossible to mine it, and stripping was decided upon.

Greenville, Ky.—The W. G. Duncan Coal Co. has bought equipment for a machine shop. This also includes electric power generators to be housed in fireproof buildings now nearing completion. A contract for a steel tipple of 3500 tons capacity has been let to the Roberts & Schaefer Co., of Chicago.

Wheeling, W. Va.—The survey of the proposed new railroad line to connect the rich coal district lying between Short Creek and West Liberty, has been completed, and the new line will be built next spring or at least started then. The proposed road will start at Short Creek, branching off the Pennsylvania R.R. at that point. The exact route is yet uncertain.

Bellaire, Ohio—The Johnson Coal Co., which owns and operates the mine at Pike Creek, 10 miles south of this city, has recently completed a number of improvements to its property. These include an air shaft, new boilers, new electric dynamo and engine, and the balance of the mine property has been repaired and placed in first class condition. The mine is now ready to resume work as soon as the strike in the eastern Ohio coalfield is settled.

Berwind, W. Va.—J. J. Boxley & Sons, of Roanoke, Va., have been given a contract by the Norfolk & Western Ry. to grade five miles of roadbed and build a 300-ft. tunnel from Riffe, W. Va., to the Cucumber Branch of Dry Fork of Tug River. This line will open up mining property of the Berwind Coal & Coke Co. The estimated cost of the proposed construction is about $275,000, and the operators who have recently completed another job for the railroad company on Wolf Creek near the Narrows, Va., will push the work immediately. Two steam shovels and 200 men will be employed.

NEW INCORPORATIONS

Pittsburgh, Penn.—The Duquesne Coal & Coke Co. has increased its indebtedness $60,200.

Boston, Mass.—The New England Coal & Coke Co. has increased its capital stock one million dollars, making its present capitalization $1,500,000.

Chicago, Ill.—The Austin Coal & Coke Co. has been organized with a capital stock of $5000 by William T. Carlin, Samuel D. Rosenberg and William H. Holley.

Brookfield, Mo.—The Linn County Coal Mining & Land Co., of Brookfield, has been organized with a capital stock of $4000. The incorporators are Albert Tamm, William H. Ashley and John J. Rafferty.

Springfield, Ill.—The Groveland Colliery Co. has been organized with a capital stock of $15,000. The incorporators are G. W. Solomon, Edward C. Solomon and Peter H. Solomon. The company will mine and deal in coal.

Holidaysburg, Penn.—The Oliver Coal Mining Co. has been organized here to mine coal in Blair and Clearfield Counties. The capital stock is $5000 and the incorporators are all members of the Hewitt family of Holidaysburg.

Liberal, Mo.—A license to do business in Missouri was recently issued to the Liberal Coal & Mining Co., with a capital stock of $35,000. All of the capital of the company is to be employed in Missouri, and the office will be at Liberal.

Beaumont, Tex.—The Vinton Production Co. has been organized with a capital stock of $6500, for the purpose of developing coal, petroleum and other minerals. The incorporators are W. P. H. McFadden, George W. Newman and W. D. Gordon.

New York, N. Y.—The American Consolidated Cannel Coal Co. has been incorporated in Manhattan to do a general coal-mining business. The capital stock is $100,000 and the incorporators are P. I. Hoffman, T. G. Macy, of New York, and J. R. Rose, of Loveland, Ky.

Charleston, W. Va.—The Lone Jack Coal Mining Co. of Iaeger, McDowell County, will have its chief works in the Sandy River district, in McDowell County. It has an authorized capital of $2500 and its incorporators are John Damron, V. T. Strickler, Charles E. Horton, Eva Damron, Callis Horton and Margie Strickler, all of Iaeger.

Charleston, W. Va.—A charter was recently issued to the Dominion Co. of Pittsburgh, Penn. This firm will mine, manufacture, and deal in coal, coke and lumber. Its chief works and business offices will be located in Pennsylvania. The authorized capital is $15,000, and the incorporators are Simon P. Patterson, Charles Alvin Jones, John Hunter, Robert M. Marshal, and George Cahoon.

INDUSTRIAL NEWS

Washington, D. C.—During the month of September there were 195 men killed in and about the coal mines of the United States, as against 173 for the corresponding month of a year ago. Practically all of these accidents occurred underground.

Columbus, Ohio—B. F. Nigh, secretary of the Michigan-Ohio-Indiana Coal Association, announces that a large number of new members are being received daily. There is much interest in organization affairs since the fall season has opened.

Columbus, Ohio—Retail dealers of Columbus are considering the plan of having retail quotations published in the local newspapers along with other market reports. It is believed that this would have the effect of making the market more steady.

Wellsburg, Ohio—The heirs of Josiah N. Scott have recently conveyed to John A. Bell a tract of coal land in Independence Township, coal and surface included, but subject to certain oil and gas rights. The area of the farm was 142.42 acres, and the consideration was $18,514.60.

Cincinnati, Ohio—The receivers of the Cincinnati, Hamilton & Dayton Ry. Co. have published a notice calling upon all creditors to present their claims to the receivers on or before Jan. 1, 1915, at Cincinnati, under penalty of having claims not submitted disallowed by the court.

St. Louis, Mo.—The Heidbreder Coal Co., one of the oldest established retail coal companies in the city, turned its affairs over to its creditors during the past week, and it is understood that the business will be conducted in the future by the creditors, until it is on a paying basis again.

Columbus, Ohio—At a recent meeting of the Columbus Coal Exchange steps were taken to secure heavier sentences on persons convicted of stealing coal from cars. A number of persons arrested recently have been given 5 days in the city prison, whereas formerly a sentence of 30 days in the workhouse was invariably given to coal thieves.

Hazard, Ky.—The Ashless Coal Co., at Lowthair, recently announced the prospective building of another short-line branch of railroad from the Louisville & Nashville to reach a new coal-mining plant on Davidson's Creek, the work of construction to start on or about Dec. 1. A first-class coal-mining plant will be opened, the preliminary work having already started.

Charleston, W. Va.—The State Department of Mines has recently issued a list of fatalities occurring in the mines of the state during the month of October. This shows that 34 deaths resulted from various accidents during that period; 26 of these were caused by falls of roof and coal; three by mine cars and locomotives; three men were electrocuted, one crushed in tipple machinery and one met death by an explosion.

Toronto, Canada—Judge Carpenter, who was appointed as a commissioner to investigate the Hillcrest colliery explosion, in which 180 lives were lost, has issued his report, the gist of which is as follows:

The only solution that I can arrive at, as a result of the whole evidence adduced at the inquiry, is that the disaster was caused by the explosion of gas, the origin and seat of which is unascertainable. This explosion was augmented by the ignition of dust throughout the mine.

Washington, D. C.—The causes of the Colorado coal strike will be sought by the United States Commission on Industrial Relations in a series of hearings to be begun in Denver, Dec. 1. The commission will make no effort to bring about a settlement of the strike, but will limit itself to studying the conflict in its relation to the general problem of industrial unrest. Operators, union officials, public officials, citizens and officers of the militia will be called to testify.

Columbus, Ohio—Application made to the Ohio Utilities Commission for a change in the authorization for the purchase of equipment by the New York Central Lines has been granted. The former authorization provided for 1000 box cars to cost $1,025,000 and 2400 gondolas to cost $2,237,000, the latter for the Toledo & Ohio Central. The amendment provides for the purchase of 2500 gondolas and nine Mallett locomotives for the Toledo & Ohio Central to be used in handling coal.

Cincinnati, Ohio—The proximity of Cincinnati to three great coal fields—those of Kentucky, West Virginia and Ohio—is given as the reason for the fact that power costs less here than in any other city in the country, the price per horsepower year being figured at $13.64. At Buffalo, where electric power generated by Niagara Falls is available, the the cost is $14.96 per horsepower year, while at other cities the cost reaches much higher figures, Cleveland being near the top with a cost of $37.11.

Columbus, Ohio—No announcement has been given out by John S. Jones, the purchaser of the stock of the Sunday Creek Co., as to the future of the concern. Mr. Jones, who is well known in Ohio coal fields, was in Columbus for a few hours last week but no statement was forthcoming. As far as is known the present officers of the Sunday Creek Co. will continue. They are E. A. Cole, president; Stewart C. Gailey, vice-president and auditor; C. J. Andrews, vice-president in charge of sales; H. J. Reese, secretary and treasurer and N. D. Monsarrat, manager of mines.

St. Louis, Mo.—The banquet of the St. Louis Coal Club, held at the American Annex Hotel, on Nov. 11, which 225 coal men attended, was a record breaker for a coal trade gathering in the Middle West. The speaker of the evening was F. S. Peabody, one of the largest coal operators in Illinois, who discussed coal trade conditions as they are today, and delivered a talk on "A Piece of Coal," illustrated with moving pictures, showing the methods of mining at mine No. 3 of the Peabody Coal Co. The second reel of pictures showed the workings of the Nokomis mine of the same company. Other speakers of the evening were T. P. Brewster, president of the 5th and 9th District Operators' Association; Edward Devoy, a prominent retailer of St. Louis, and T. J. Frier, purchasing agent of the Wabash R.R.

St. Louis, Mo.—It is understood that negotiations, which have been under way now for about three months, for the purchase, outright, of 45 mines in the 5th and 9th districts of Illinois and which proposition has been recently taken over by Hugh Murray, a former coal operator of Equality, Illinois, will be put through between now and the 15th of December. If the syndicate which is negotiating for these properties succeeds in getting them, it is understood that at least 8 mines will be dismantled and abandoned. The tonnage of the remaining operations will be restricted so that there will not be a surplus of coal on the market at any time. If this deal goes through, it will be one of the biggest transactions ever recorded in coal mining circles in the Middle West, and will involve between $12,000,000 and $15,000,000.

Salt Lake City, Utah—A decision regarding coal land was recently rendered by the Secretary of the Interior, which will reverse other decisions made in similar cases by the General Land Office, necessitating refunds in cases where land filed on before reclassification has been paid for according to the new valuation. In 1911, W. S. McCormick filed on a quarter section of land in Emery County, which, under the classification at the time of filing, was worth $25 per acre. When final proof was submitted, he paid $4000, the entire amount of the purchase price stipulated, but, meanwhile, a second classification had placed the value at $117 to $135 per acre. The $4000 offered was accepted by the Land Office and held as part payment under the new classification, awaiting the decision of the Secretary of the Interior. The decision holds that McCormick accepted the offer of the government to sell the land for $25, and that the government would be breaking its contract if it refused to sell at this price, providing the purchaser, in making final proof, complied with the regulations of the department. All previous decisions in conflict with this one are recalled

Coal Trade Reviews

General Review

Anthracite shippers are aggressively canvassing for orders but the recent cold snap has steadied up the market. Tidewater bituminous stocks continue at a maximum and substantial concessions are obtainable. Situation generally unsatisfactory.

The recent cold snap the early part of the week had a much needed steadying effect on the anthracite situation which was rapidly slowing down as a result of the long continued warm weather. Tonnage was becoming difficult to move, even under the elastic circular of the individual dealers, and it is evident that the first important break in the market was only avoided by a narrow margin. The situation is still uncertain, with shippers actively canvassing for orders, and it will take considerable cold weather to place the business on a seasonable basis.

In spite of the rigid curtailment at the bituminous mines, the volume of coal at Tidewater continues at the maximum, and more free cargoes were noted during the past week forcing prices down to the low levels again. Substantial concessions are necessary in order to keep the mines working, even on the present restricted basis. In the export trade the movment is being seriously interfered with by the heavy vessel demand for general cargo purposes. But in spite of these discouraging developments the improved sentiment following the recent election still persists and operators are hopeful for the outlook.

While substantial concessions on the old circular are readily obtainable in the Pittsburgh district there is such a meager inquiry that operators see little to be gained by establishing a reduced schedule. With general manufacturing down to a minimum and the Lake shipping definitely closed, the market is entirely dependent upon the domestic demand for any improvement; the colder weather recently has resulted in one or two spurts in this business which, together with an occasional increased demand reported at different points, has given a slightly better tone to the market.

The closing of the Lake shipping and the unusually mild weather has also caused a further restriction in Ohio. Retailers are showing no disposition to order except for forward delivery, and production is at a low point, but a turn in the weather may precipitate a heavy rush for coal since domestic stocks are believed to be at a minimum. Prices in the Southern market are irregular. Domestic coals are accumulating on demurrage as a result of the long continued high temperatures, but there seems to be indications of an increased demand for steam fuel.

There is little of an encouraging nature in the Middle Western market. The domestic coals are weak and competition so keen that prices are touching new low levels. The reaction has been furthered by heavy overshipments in anticipation of the expected cold weather. Conservative observers predict a further decline before there is any general improvement.

ATLANTIC SEABOARD

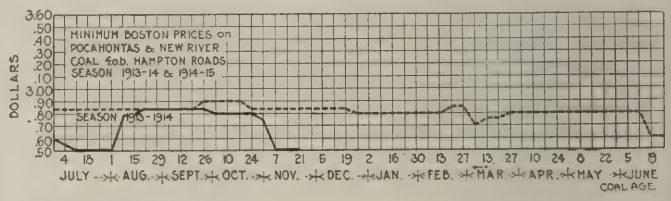
BOSTON

Outlook still discouraging. Some foreign inquiry but bottoms scarce. $2.85 price liberally shaded on occasion, and market cargoes still in evidence. Anthracite also slow.

Bituminous—The volume of Pocahontas and New River at, and en route to Hampton Roads continues at maximum figures in spite of the rigid curtailment that has been in effect now for several weeks. The trade is about as lifeless as ever and there are almost no indications of any improvement in the near future. There has been a further renewal of certain foreign inquiry and it is felt that an increasing tonnage might be going off-shore but for the dearth of suitable carriers.

The coastwise trade shows no change whatever. What demand appears is confined closely to loading tonnage that is on time charters; other than this there is no relief to the prolonged dullness. The past week a few more "market cargoes" have turned up and prices at the distributing points are once more forced down to low levels. The $2.85 price at the Virginia terminals is only nominal and spot sales when made are at figures down to $2.50. The new contracts still open are being held in abeyance because of the softness of the market and the expectation on the part of buyers that a few weeks more may see conditions still more favorable from their standpoint.

Georges Creek shippers are again getting behind on their orders, strange to say, but it is thought this is due partly to the very heavy curtailment at the mines and partly to a renewed call for export. This is a special condition, however, and cannot be said to apply to any other coal in the market.



Pennsylvania grades are having only the very lightest business. Marked concessions are still being made in the effort to keep mines running even if on a greatly reduced basis. Aside from a small contract movement there is little or nothing doing. All-rail the situation is no better than at tide-water.

Anthracite—All the shippers are actively canvassing for orders and the trade is having the first break-down this year. The independent operators have been making every effort to market their coal but even with elasticity of price they are unable to move any tonnage to speak of. Even stove size is now in plentiful supply with several of the companies and it would be a little difficult today to place an entire cargo of stove at any port in New England. There will hardly be any improvement until colder weather sets in.

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.85@1.45	$1.15@1.50	$1.67@1.77	
Philadelphia*.....	2.10@2.70	2.35@2.70	2.92@3.02	
New York*.....	2.40@3.10	2.65@3.05	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.....	.....	.....	.....	$2.50@2.75
Boston†.....	.....	.....	.....	3.40@3.73
Providence†.....	.....	.....	.....	3.20@3.63

* F.o.b. †On cars.

NEW YORK

Bituminous movement badly congested on the Pennsylvania R.R. Market heavy but with an encouraging undertone. Anthracite steady at average levels and in a technically strong position.

Bituminous—Market optimists still consistently adhere to the opinion that there is a strong undertone to the trade, but with the Pennsylvania R.R. so badly congested that the movement to Tidewater is seriously delayed, and with the Berwind-White Co. still embargoed at South Amboy, it is difficult to accept such a hopeful view of the situation. On the other hand, it must be agreed that there is an improved sentiment as a result of the election returns, which manufacturing interests have construed in a favorable light. The impetus resulting from this has not been of large proportions, but it has been along conservative lines, and well maintained. Thus it is noted that some plants which were closed down entirely are beginning to resume operation on a small scale, while others are increasing their working schedules.

The bituminous market is spotty and decidedly irregular. Business is confined almost entirely to contracts, requisitions on which are probably at 60 to 70% normal. Though scarcely any business is being negotiated in the prompt market, prices are quotable on about the following basis: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The cold weather of the early part of the current week started the retail trade moving actively, but it will have to persist for some time before the improvement will be reflected in the wholesale end. As is always the case at this period of the year, it is purely a weather market

from now on. At the moment there is a healthy undertone to the situation, and business is steady at average levels, but it is clear that a serious break was impending had the cold weather not developed.

The outlook for the winter is most optimistic. The sales deparments uniformly report a much reduced buying through the summer months, due no doubt to the scarcity of ready money. At a result, the trade is entering upon the winter business with very little available in the way of emergency surplus, and the situation is replete with grave possibilities. When the cold weather finally drives the consumers into the market, there will be such a rush that it will be necessary to limit the allotments temporarily, and this condition invariably creates much anxiety among the buyers, and causes a heavy run on the sales deparments.

Prices are not quotably changed from last week, which we continue as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.00@5.35	5.30	4.90@5.30
Stove	5.35	5.35	5 30	5.30
Chestnut	5.60	5.45@5.60	5.55	5.30@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.70@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.60@2.25
Barley	1 60	1.70@1.80	1.75	1.40@1.75

PHILADELPHIA

Anthracite trade still lagging on account of unseasonable weather. Bituminous shows some indications of a slight improvement in demand, but not in prices.

Anthracite—It will require considerably more cold weather than has as yet visited this locality to instill the snap into the market that should characterize it at this season of the year. Compared with the corresponding period last year, the trade is commencing to fall behind. The market for stove and nut continues good, and some of the companies are drawing on their stocks to supply the demand for these sizes, but egg is inclined to lag, and offers of as low as 50c. off the circular have been made by some of the individuals to dispose of this size. While this may be the exception, at the same time it points to the apathetic demand for this size, and still further emphasizes the fact that householders have not been called upon to replenish their stocks. Pea seems to be a little improved over the week previous, but buckwheat and rice are difficult to place.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.75 to 4.85
Stove	5.00	5.10
Chestnut	5.25	5.25

Bituminous—The past week has seen some slight improvement in the bituminous situation, but more in the shape of increased demand than in better prices. The standing coal at Tidewater has been considerably reduced, but operators are still rather loth to forward any coal to Tidewater points except on specific orders. Some substantial demurrage bills have been incurred, which has taught the traders to be cautious in the matter of forwarding coal to be sold on arrival.

BALTIMORE

Mine operations still further reduced and careful management now necessary. Demand and prices for soft coals poor. Anthracite brighter. Export trade holds up.

Mine operations, in line with railroads and all other industries, have been still further curtailed during the past week. Some important mines are now running on an average of not more than two days a week. The entire effort is to prevent overproduction at a time when sales are frequently ten to fifteen cents below actual costs.

In the West Virginia regions the demand for three-quarter gas has so far fallen off that the production of slack is now close to the actual needs of the immediate market, and that grade is the one exception in point of strength. While three-quarter is freely offered at from 80 to 85c., and run-of-mine coal around 70 to 75c., slack has moved upward from the recent low mark of 35 to 40c. to around 55c. Steam coals of West Virginia and Maryland are quoted at 80 to 85c. in many cases for less desirable grades. Pennsylvania low grade fuels can be had at 90 and 95c., while medium to best grades are selling at from $1.15 to $1.35.

The anthracite business here as a whole is brighter. Except for steam sizes the local demand is almost, if not quite, up to the seasonal average. Most coal men are now busy with deliveries. Movement from mines to tide and terminal yards here continues good.

In export lines there is a good tonnage moving. A large number of charters have also been announced for late November and December loading, assuring a continuance of a healthy foreign trade for some weeks at least.

HAMPTON ROADS

Dumpings for the week showing improvement. Prices firm. Stocks on hand about normal.

Dumpings over the piers at Hampton Roads for the past week have shown up well and indications are that shipments for the month of November will be considerably above those for October. Foreign and coastwise cargoes have made a good showing during the week and there has also been a fair number of bunker steamers taken care of. Although it is rather difficult to get information as to clearances of cargoes, it is understood that export coal has moved to Cristobal, Havana, Genoa, St. Lucia, Para, and ports in Chile and Peru. The coastwise shipments have been principally to the New England market with one cargo for San Francisco.

Quotations at Hampton Roads remain at circular with some little improvement in the demand for New River and Pocahontas run-of-mine but for the other grades there is only a small inquiry.

Stocks on hand in cars in the various railway yards are near normal. Some of the shippers have evidently been without sufficient coal to supply immediate orders as it is understood that coal has been taken from the storage plant at Sewalls Point to take care of some New England business. Of the coal moving coastwise, Boston and Providence have been about the largest receivers although Portland, New Bedford, Plymouth, and one or two other New England ports have taken fair sized cargoes.

Authoritative announcement of destination of vessels is no longer made but the following have cleared, presumably for the ports noted:

Vessel	Destination	Vessel	Destination
Driebergen	St. Lucia	Berwindmoor	Havana
Luigi Parodi	Genoa	Falk	(Unknown)
Robert Dollar	San Francisco	Denis	Para
Copenhagen	Chile and Peru	Haugarland	Canal Zone
Auchendale	Cienfuegos		

Note—Full cargoes were taken by all vessels except the "Denis" which had only a small quantity.

OCEAN FREIGHTS

Heavy demand for steamers in other lines and few vessels available. High rates prevail.

It is almost impossible to quote probable freight rates as the demand for steamers for grain, general cargo, horses, cotton, etc., continues unabated, and owners seem to be able to secure about any rates they ask on such business. There are a few steamers proposed for Mediterranean coal at rates varying from $6 to $6.60 and also steamers that will entertain coal to Valparaiso at about $4.80, possibly $4.32 with quick discharge guaranteed. Steamers do not respond to rates offered on coal to Brazil and the River Plate, notwithstanding the high offers on grain from the River Plate which should make the outward business attractive. We had no difficulty in closing the few boats that were offered for West Indian coals, although none of these charters have been reported.—W. W. Battie & Co.

COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Edna N. Smith	British	Baltimore	Martinique	735	
Florence Creadick		Philadelphia	Mayport	657	
Helen W. Martin		Philadelphia	Boston	2021	$0.60
Wm. H. Clifford		Baltimore	Porto Rico	1378	
Nor	Norwegian	Philadelphia	Sagua	811	
F. Matarazzo	British	Baltimore	West Coast Italy	1779	
Levnet*	British	Baltimore or Virginia	River Plate	2065	3.96
Commodore Rollins	Norwegian	Baltimore	Guantanamo	962	
Thomas Winsmore		Philadelphia	Charleston	381	1.00
Belgien	Danish	Philadelphia	Havana	877	
Sangstad	Norwegian	Baltimore	Preston and Banes	1459	

Note—Steamers are indicated by **bold face** type, all others being schooners.
*(previously)

COKE

CONNELLSVILLE

Rumors of a wage reduction making prospective purchasers for future delivery more cautious. Market continues extremely flat.

There has been considerable inquiry for contract furnace coke for next year, chiefly, it is believed, because consumers felt the market could not grow much worse, but in the past few days the talk of a prospective wage reduction has made the inquirers somewhat more cautious as a wage reduction

might result in another lowering of prices. No positive confirmation has been obtained that a Buffalo consumer has closed a contract for 10,000 tons or more a month for two years, on a sliding scale based on pig iron. Only small lots of prompt furnace coke have been selling. We quote prices partly nominal as follows: Prompt furnace, $1.60; contract furnace, $1.75; prompt foundry, $2.15@2.50; contract foundry, $2.35@2.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 7 at 211,554 tons, an increase of 5590 tons, and shipments at 203,743 tons, a decrease of 3261 tons, production thus appearing to exceed shipments by 7811 tons. In 33 weeks the net surplus of production over shipments appears to have been 38,377 tons.

BUFFALO

Furnaces running slow or closed down everywhere and coke is still heavy. Ore and pig iron accumulating.

There is too much pig iron in the yards of the furnaces and too many furnaces are closed for the coke market to move yet. Iron men are hopeful, though, for they believe the present period of slow trade is about at an end. The export trade is looming up in raw material so that manufactured goods must soon be added to the list which will do much to relieve the situation, if iron is to be consumed. Prices remain on a basis of $4.15 for best 72-hr. Connellsville foundry, with stock coke $3.20.

CHICAGO

Coke is quoted at: Byproduct, $4.95; Connellsville, $5@5.25; Wise County 72-hr. (select), $5 to $5.25; gas coke, $4.25; furnace coke, $4.50@4.65.

THE STEEL MARKET

The trade continues hopeful but there is no improvement yet. October orders show a steady decline.

The better sentiment in the steel trade, which was evident one week ago, is more generally recognized, but it has not yet affected buying. The decline in orders shown by the Steel Corporation's statement as of Oct. 31 has not been checked, but the nearness of 1915 and the small provision made for the needs of manufacturing consumers beyond December bolster hopes of a turn near at hand.

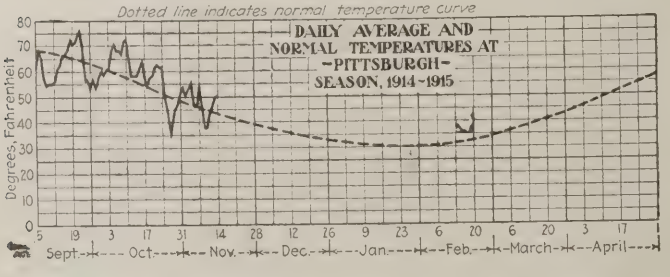
A smaller loss in the Steel Corporation's unfilled orders last month than in September would give more reason for favorable comment had not October operations steadily declined. This week the situation in the Chicago district stands out, with the nearly complete closing down of the Gary works. Other mills there are running single turn and only part time. —"The Iron Age."

LAKE MARKETS

PITTSBURGH

Naming of new circular prices not general. Lake shipments over and production decreasing to below 50%. Retail demand improved by weather.

Producers have been decidedly reserved about making official announcements of circular prices on contracts. As noted a week ago some of the producers have named a new series of prices, but the movement has not become general. The idea seems to be that as there is no inquiry for contracts it is just as well to allow the figment of the old circular prices, based on $1.30 for mine-run, to remain for the present. There is no doubt that most operators would gladly close a contact on the basis announced by some, $1.20 for mine-run.



The market is extremely quiet as to both prompt and contract. Shipments to the Lake trade are now practically over and the district is faced with very light operations for the next few weeks at least, at well under 50% of capacity. Manufacturing demand has decreased somewhat more and the retail demand is the principal dependence of sellers. This week has seen the inauguration of real winter weather, a sort of mild blizzard arriving Monday, and retail demand is materially improved. The market feels the effect of wintry weather more keenly than would have been the case if retailers had not been so very conservative in recent weeks in their purchases. We quote nominal prices on contract as follows, prompt sales being usually made at 5 or 10c. less, with occasionally deeper shading: Slack, 85c.; nut and slack, $1.05; nut, $1.15; mine-run, $1.20; ¾-in., $1.30; 1¼-in., $1.40, per ton at mine, Pittsburgh district.

BUFFALO

The feeling is better as a rule as there seems to be no good reason for the light consumption. Anthracite moving in a satisfactory manner.

Bituminous—There is here and there a bituminous shipper who finds his trade a little better, with now and then a good day and sometimes a whole week, but the demand always drops off again. A stronger market often starts in this so there is a more hopeful feeling; in fact, there seems to be no good reason for a continuance of the light consumption. Export figures are astonishingly large, and there is considerable demand for manufactured goods.

One difficulty is that Canada is doing so little. The Canadian factories are shut down almost as tight as the European. There is less complaint of coal standing on track unsold. Jobbers usually throw back demurrage charges on the mines, which puts an end to such shipments as a rule. The weather is not yet favorable to any coal movement, but it must turn in the proper direction soon and many coal men hold that the upturn cannot be far away. Quotations remain on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with slack more active than formerly.

Anthracite—The trade is quiet so far as wholesalers are concerned but it has seldom ever been in better shape at this time of the year. There has been about a normal amount of it sold and there is no clamor for any particular size. Egg is rather too plentiful but will improve with a turn in the weather. The New England demand is perhaps a little too heavy at present for the good of the Western trade, as it has lately cut down the supply in this direction, but the Upper Lake docks are well stocked as it is. At the same time the movement is steady, the amount reported by the custom house for the week being 140,000 tons, which is a good mid-summer average. The small ports have also been taking coal freely of late, so that all should be well supplied.

TORONTO, CAN.

Trade dull due to mild weather and industrial depression.

The coal trade remains quiet owing to the continuance of unusually mild weather and the financial stringency, which deters many purchasers from laying in supplies ahead of their immediate requirements. Prices for anthracite were again advanced the first of the month, and quotations are as follows: Retail, anthracite egg, stove and nut, $8; grate, $7.75; pea, $6.75; bituminous steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale f.o.b. cars three-quarter lump, $3.78; screenings, $2.64.

COLUMBUS

Dullness prevails in all branches. The Lake business is about over and warm weather is still having an adverse effect on domestic demand. Prices weaker.

The chief feature of the past week was the virtual closing of the Lake trade, which removes the last active department of the business. With unfavorable weather prevailing domestic business is still dull and as there is little demand for steam sizes, the entire trade is quiet. There are no immediate hopes for improvement, although a spell of colder weather would help materially. The tone of this market is not bad, considering conditions.

The Lake season has not been a satisfactory one to Ohio operators. Several valuable months were lost earlier in the year because of the strike. When the scale was finally settled in the Hocking Valley, a good deal of coal was rushed to the Northwest via the Lakes, but the total is only about two-fifths of normal seasons. Eastern Ohio did not share at all in the Lake trade. Some coal will be loaded during the latter part of November to be held in storage at the Upper Lake ports, but a considerable congestion on the docks there has been reported.

Domestic business is still slow, being curtailed by the mild weather. Retailers' stocks are not as heavy as formerly but dealers are not inclined to buy though some orders for delivery in December are being booked at current quotations. On the whole the trade is quiet and collections are bad.

Steam business is slow and there are little hopes of immediate improvement. Some strength has developed in the fine grades such as nut, pea and slack and coarse slack,

ue to the curtailed production of domestic lump. Other rades of steam coal are rather weak.

Production is at a low point. The Hocking Valley district s producing only 40% of normal and the same is reported rom Cambridge and Crooksville. In Jackson only 25% of he normal tonnage is being produced. The Pomeroy Bend istrict is in the best shape with a production of approxiately 80%.

Prices is the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
e-screened lump	$1.55	$1.65	.....
ch and a quarter	1.50	1.55	$1.40
hree-quarter inch	1.35	1.40	1.35
ut	1.15	1.25	1.15
line-run	1.10	1.15	1.10
ut, pea and slack	0.40	0.50	0.40
oarse slack	0.30	0.40	0.30

TOLEDO

Steam buying reduced to the minimum. Shortage of fine oal as a result of the closing of Lake shipping.

Railroads are reflecting the stringent financial condition nd in an effort to minimize expenses are buying nothing eyond their immediate requirements. Factories are nearly ll running light and do not appear to be at all anxious as o the future possibility of securing fuel. They are therefore uying from hand to mouth only, and contracts for future elivery are few and of little consequence.

So warm an autumn, with so little domestic demand, has ot been known in this country for many years. Of course here is some domestic demand, but the actual consumption s light. Slack is holding firm more because of the shortage n production than an increased demand. The cessation of ake shipments cut off a large percentage of the fine coal upply. All demands are being met, however, and it is only question of time until this phase of the business readjusts tself to the new conditions. Coal men are optimistic as a ule and profess to discern a marked improvement as a result f a loosening of the money market, and a general stimulaion in all lines.

CINCINNATI

Warm weather and industrial inactivity cause further estrictions in the market. Prices remain steady in anticipaion of impending changes.

Unseasonably warm weather continues to the detriment of he coal trade. The domestic consumption, considering the ateness of the season, is abnormally low. But there seems o be little doubt that dealers are lightly stocked, and as oon as cold weather begins, operators will find themselves wamped with orders for immediate delivery.

There is a slight improvement in business noted among team users, giving rise to a belief that the situation will mprove before long. Operations are necessarily much retricted, mines running only about three days a week in the Vest Virginia field.

CLEVELAND

Inquiry for certain grades of fine coal has given the trade decided brace, but the coarse coal market is weak. Busiess shows an improvement and sales are larger.

The Consolidation Coal Co. is buying all the Fairmount lack that it can find; jobbers and brokers are selling it at 50 o 55c. at the mines. It is being shipped to Michigan and Vestern trade. Considerable coal has been reconsigned to the ccount of this company. Pennsylvania slack is being held rmly at 70 to 75c. The Carnegie Steel Co. and La Belle ron Works plants in the southern part of Ohio are buying all he Panhandle and Youghiogheny slack they can get. The roduction is light and the supply limited. West Virginia No. operators have sold so much slack they are forced to make repared sizes to fulfill contracts for fine coal.

With these conditions prevailing the current price for fine oal is $1.70 to $1.75 for slack on track Cleveland, excepting locking which is being sold at $1.50@1.55. The out of town rade has been taking larger quantities of fine coal for the ast three weeks and the Cleveland trade is showing a steady nprovement. With 500 to 600 cars of coal on track at the pening of last week and a like number this week, the market s holding its own.

It was cold and windy Sunday and Monday of this week. While no marked inquiry for coal resulted, the weather had a eneficial effect and operators and jobbers refused to let go of he coal on track at bargain prices. They also were enouraged by the larger business of a week ago when the market stood up under an unusually heavy load. Smokeless coals re not in brisk demand and prices are holding firm at slightly ower levels.

The Lake trade is gradually cleaning up. The larger operators have shipped all the coal they will send forth this seaon although there are a number of cargoes to be moved, especially hard coal. The soft coal that is going forward now is all for storage in vessels. The hard coal shippers will load for delivery at Upper Lake docks as late as Nov. 30, the last day of the official season of navigation.

Quotations for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.75	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.75	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1¼ in.	.....	$2.40	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$1.95@2.00	$1.95@2.00
Mine run	2.75	2.25	1.95	1.85@1.90	1.90
Slack	2.40	1.70@1.75	1.65	1.65@1.70	1.65@1.70

SOUTHERN

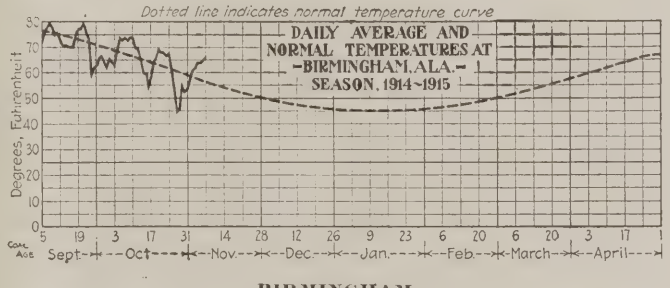
LOUISVILLE

Domestic coals accumulating on demurrage. Steam grades unchanged but more inquiries are noted. Prices irregular.

Though business conditions show indications of immediate improvement, the continued warm weather has seriously affected the domestic market. This is paricularly true in the cities, though in the country sections the demand for domestic sizes is continuing fairly strong. Large quantities of domestic coals are on demurrage in Louisville and other railroad centers.

The market for steam coals is unchanged, though inquiries are said to be increasing and prospects are bright for better business in the near future. Many tons of low-grade screenings have been used as ballast on new railways; there is small market for that grade of fuel, and the operators have been turning it over to the railroad companies to be hauled away. Steam and small sized coals from several sections have no definitely established prices at present.

In a general way block coal may be said to be bringing from $1.75 to $1.90, though there are times when certain operators are glad to dispose of their output at little or no margin over the cost of production. Egg sizes range from $1.25 to $1.40 and nut and slack anywhere from 25 to 70c., according to grade.



BIRMINGHAM

Lump coal less active during the past week. Steam coal quiet though a slight improvement is evident.

Although one or two cool days slightly increased the demand for lump coal, it was only temporary, and with the return of warm weather again the market has taken a slump; there is practically nothing doing in this line, though a few days of cold, wet weather would materially increase the demand. Steam coal is just about the same as it has been for some time. The demand does not seem to increase, and contrary to the expectations of the operators, the bunker business at the Gulf ports is taking only a small tonnage. Prices on both lump and steam coal remain about stationary. Blacksmith coal is moving in about its normal tonnage, and the price is holding up well. There is little doing in the pig-iron business.

MIDDLE WESTERN

CHICAGO

Business further restricted and no improvement is noted. Continuance of mild weather causes additional price reductions. Screenings slightly stronger.

The exceptionally warm weather as shown on the temperature chart last week has caused a further weakening in prices and the market for all sizes is generally in a demoralized condition. Indiana and Illinois mines are curtailing production, and the bottom was again touched in screenings prices, although later they have stiffened somewhat, due probably to the lessened production of lump.

Cessation of activity in the packing industry has also been a large factor in the reaction. Some well informed producers predict that further declines will occur before there is any improvement. With Indian summer prevailing in the middle of November the situation seems about as hopeless as it could be. The domestic demand is weak and the competition for orders to absorb surplus production is so keen that all sizes of lump are being offered at lower figures. A considerable amount of free coal has been thrown upon the market in Chicago with a depressing effect. A number of cars of screenings were sold for freight charges here during the early part of the week, and several shipments sold at 5c. per ton.

The production in Indiana and Illinois is about one-half normal, and even this is more than ample to take care of immediate needs. Some Indiana mines have been closed down during the past week, and will not reopen until colder weather increases the demand. This should help the screenings situation. The Springfield district reports a little better demand for steam coal, and prices slightly increased.

The anthracite situation is very dull, although prices are held firm. The large consumers have not yet stored their winter supply of coal. A large tonnage is on hand in the local yards in case a cold snap should arrive.

Hocking Valley coals show but little activity. A considerable amount of splint coal is on track and the demand is weak with prices low. Franklin County mines are operating 40% normal; prices are off on all sizes except in screenings. Pocahontas remains weak, only contract obligations being fulfilled. Eastern Kentucky coals have been cut as much as 20c. per ton, without increasing orders which shows the folly of forcing the market when there is no demand.

Prevailing prices are as follows:

	Franklin Co.	Springfield	Harrisburg	Sullivan	Clinton
Lump	$1.55@1.75	$1.35@1.50	$1.40@1.75	.....	$1.50@1.75
4-in. lump	.....	.....	.....	$1.55@1.75	.....
Steam lump	.....	.....	.....	.....	1.15@1.20
2½-in. lump	.....	.....	.....	1.35@1.50	.....
1½-in. lump	.....	.....	.....	1.20@1.35	.....
Mine-run	.....	.....	1.10	.....	1.10
Egg	1.40@1.75	.....	1.40@1.75	.....	.....
6x3-in. egg	.....	1.35	.....	.....	.....
Nut	.....	1.25	1.25@1.75	.....	.....
No. 1 nut	1.35@1.75	.....	.....	.....	.....
Screenings	0.45@0.60	0.40@0.50	0.35@0.50	0.40@0.50	0.35@0.50

Hocking Valley 1¼-in. lump, $1.40@1.60; mine-run, $1.25.

New River and Pocahontas lump and egg, $2.25; mine-run, $1.25@1.40.

Somerset Smokeless lump and egg, $2@2.25; mine-run, $1.25 @1.40.

Carterville lump, $1.50@1.75; 6x3 in. egg, $1.50@1.60; No. 1 washed egg, $1.60; No. 2 washed egg, $1.35.

INDIANAPOLIS

Situation irregular, with improvement in spots. Mild weather much against the trade. Mines working half-time on the average.

The November weather has been more like September as will be observed on the temperature charts. This means the minimum use of coal for all purposes and everything depends on the weather situation now.

About the only change in the market is a further sagging in the price of screenings. But the market is far from being back to the record-breaking low prices of a few weeks ago. In the open market slack commands about 50c., which is double the low point of the season. The steel plants at Gary, Ind., are running "on and off," operating one week, closed the next. On the other hand factories at South Bend and other cities have been increasing operations, due to large orders received from European governments.

November, like Ocober, is going to show a material falling off from normal in volume of trade, though a good cold spell will help the situation materially. There is nothing to cause a movement of domestic lump, except the advancing season. Eastern coal is in the same condition as Indiana domestic. Mines are on about half-time. Prices are generally unchanged both at the mines and retailers' yards.

ST. LOUIS

Overshipments in anticipation of cold weather have brought the market to a standstill. Mines working two to three days a week. Weather proposition from now on.

Continued warm weather has brought the coal business to a standstill, both in the steam and domestic markets. Anticipating colder weather, some of the operators shipped out quite a tonnage of coal to reconsigning points, and this coal has the market flooded; dealers' sheds are loaded to capacity and the railroads are making more from demurrage charges than from freight.

In the Williamson and Franklin County field there is practically nothing doing, except on contract coal. The mines are working two and three days a week, and usually have from one to two days' supply of coal on track. There is absolutely no domestic market which has enabled the shippers to take care of the steam sizes, even though there has been no advance in price.

There is no demand at all for anthracite and a considerable tonnage of it is under car service on the east side. There is no smokeless coming in and there is no demand. From this time on it is strictly a weather proposition, and the retailers, while doing nothing now, anticipate a somewhat more regular business in the way of small orders than in past years.

The prevailing wholesale prices are:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.25	$1.05@1.15	$1.20
3-in. lump	.....	....	1.40	....	.....
6-in. lump	$1.35@1.60	....	1.50	1.25@1.35	1.40
Lump and egg	1.85@2.15	$2.25	.....	....	1.35
No. 1 nut	1.20@1.40	....	.....	0.75@0.80	.....
Screenings	0.40@0.50	....	0.80@0.85	0.15@0.25	0.20
Mine-run	1.05@1.10	....	.....	0.75@0.80	.....
No. 1 washed nut	1.50@1.60	2.25	1.60	....	.....
No. 2 washed nut	1.30@1.35	....	1.35	....	.....
No. 3 washed nut	1.10@1.15	....	.....	....	.....
No. 4 washed nut	1.00@1.05	....	.....	....	.....
No. 5 washed nut	0.20@0.25	....	.....	....	.....

KANSAS CITY

Continued mild weather has resulted in the accumulation of a large surplus of coal.

There has been practically no change in temperature and the weather continues mild. The trade is overloaded, and when a ten-cent raise was considered for the first of November it was decided that the market could not stand it. It is feared that unless cold weather does not come within a short time there will be a break in the market, especially in slack. Few of the mines in Missouri, Oklahoma and Kansas are working more than half time. It was thought last week that in case the weather should suddenly turn cold there would be a car famine, but there is an overabundance of cars.

PORTLAND, ORE.

Demand light, consumers neglecting to store for winter. Wood prices lower than a year ago due to the large supply of common labor.

It seemed a few weeks ago as if the coal dealers would have a good business, but the demand for domestic coal is light throughout the Pacific Northwest. This due to the belief that there will be no advance in prices and hence it would not benefit the consumers to store any large quantity. Buying so far this fall is considerably behind that for the same period last season. Wood has been cheaper as a result of a greater abundance of help and this has cut into the coal business to a considerable extent. Prices are the same as Sept. 1 and these will probably be maintained till next spring.

SAN FRANCISCO

The weather has been unusually warm so far this fall, resulting in a light demand for domestic and steam coal. Steam coal is wholesaling at $6.50 and domestic at $7.50, these being considered about normal quotations for this season of the year. There is a fair demand for anthracite, which is selling at from $9.50 to $11, according to the freight rates the shipper is able to secure. The retail dealers are well stocked and are anticipating a revival in the demand within the next week or so.

PRODUCTION AND TRANSPORTATION STATISTICS

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for April and the three months of the years 1913 and 1914:

	February		March		April	
State	1913	1914	1913	1914	1913	1914
Missouri	260,586	259,270	259,270	263,593	204,255	179,723
Kansas	414,414	492,304	492,304	501,841	444,142	378,192
Arkansas	130,888	113,354	113,354	165,037	136,153	87,002
Oklahoma	297,004	257,162	257,162	296,484	246,155	239,443
Totals	1,102,891	1,122,090	1,122,090	1,226,955	1,030,705	884,360

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended, Nov. 1, as follows:

	Surplus	Shortage	Net*
New England Lines	631	0	**631**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn	11,131	0	**11,131**
Ohio; Indiana; Michigan; Western Pennsylvania	32,532	0	**32,532**
West Virginia, Virginia, North & South Carolina	6,904	10	**6,894**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	6,339	0	**6,339**
Iowa, Illinois, Wis., Minn.; North & South Dakota	4,773	0	**4,773**
Montana, Wyoming, Nebraska	824	0	**824**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,535	136	**1,399**
Texas, Louisiana, New Mexico	202	3	**199**
Oregon, Idaho, California, Arizona	2,748	125	**2,623**
Canadian Lines	0	0	**0**
Total	67,619	274	**67,345**

	July 1	July 15	Aug. 1	Aug. 15	Sept. 1	Sept. 15	Oct. 1	Oct. 15
Surplus	91,280	93,509	82,284	56,560	46,141	39,558	37,996	47,217
Shortage	430	292	110	496	66	191	772	584
Net*	**90,850**	**93,217**	**82,174**	**56,064**	**46,075**	**39,367**	**37,224**	**46,633**

***Bold face** type indicates a surplus.
Note—The usual car supply chart appeared last week.

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during July and the first seven months of the last two years, in short tons:

	July		7 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	80,404	72,223	839,103	784,007
Chesapeake & Ohio[1]	1,571	878	10,346	8,771
Erie[2]	765,140	803,264	4,970,188	5,272,103
Pennsylvania[1 3]	719,944	693,545	6,138,175	6,347,822
Virginian[2 1]	100	85	809	221
Total 5 roads	1,567,159	1,569,995	11,958,621	12,412,924
Bituminous				
Baltimore & Ohio[1]	3,089,536	2,738,845	20,645,446	18,973,482
Buffalo, Roch. & P.[1 2]	806,763	634,963	5,367,876	4,496,965
Buffalo & Susq.[1 2]	147,616	87,797	1,051,151	649,106
Chesapeake & Ohio[1]	1,390,703	1,800,351	9,371,471	11,472,359
Erie[3]	9,616	6,706	283,868	46,832
Hunt. & Br'd T. Mt.[1 2]	112,143	70,609	785,938	599,244
New York Central[3]	721,614	720,469	5,190,466	4,644,012
Norfolk & Western[1 2]	2,143,892	2,503,062	13,575,344	15,019,383
Pennsylvania[1 3]	4,551,528	3,966,357	28,833,947	27,521,539
Pitts. & Lake Erie[1 2]	1,130,003	1,098,311	7,431,716	6,556,218
Pitts. Shaw. & North[1 2]	233,664	144,034	1,558,512	1,342,554
Virginian[1 2]	321,626	286,354	2,522,659	2,314,074
Western Maryland	229,391	265,331	1,959,176	1,792,130
Total 13 roads	14,888,095	14,323,189	98,577,570	95,427,948
Coke				
Baltimore & Ohio[1]	391,483	255,650	2,829,371	2,035,511
Buffalo, Roch. & P[1 2]	42,962	21,195	339,887	163,799
Buffalo & Susq.[1 2]	24,604	43,834	180,026	208,637
Chesapeake & Ohio[1]	29,945	25,033	210,483	232,788
New York Central[3]	580	.....	36,207	.....
Norfolk & Western[1 2]	110,709	88,507	951,351	669,175
Pennsylvania[1 3]	1,183,070	847,135	8,569,978	6,075,020
Pitts. & Lake Erie[1 2]	494,053	411,398	4,119,403	3,104,975
Pitts. Shaw. & North[1 2]	.....	.....	9,383	.....
Western Maryland	4,317	3,491	44,410	41,996
Total 10 roads	2,281,725	1,696,243	17,290,499	12,591,901

Total Coal and Coke 13 Roads	1913	1914
January	19,314,523	18,157,998
February	17,594,079	15,446,830
March	17,672,305	20,233,213
April	16,882,326	15,497,444
May	19,015,721	16,523,385
June	18,610,757	16,984,476
July	18,736,979	17,589,427
Total, 7 months	127,826,690	120,432,773

[1] Includes coal received from connecting lines.
[2] Includes company's coal.
[3] Does not include company's coal hauled free.
Note:—The Southern Railway hauled 321,374 short tons of bituminous coal during June, 1914, and 1,947,470 short tons during the six months ending June 30, 1914.

VIRGINIAN RAILWAY CO.

Shipments over this road for September and the past four months, with details of leading operators, were as follows, in short tons:

Shipper	June	July	August	Sept.
Knw., Glen Jean & E. R.R.	32,920	24,084	22,588	36,356
E. E. White[1]	26,073	29,424	34,884	29,654
Gulf Smokeless	21,869	22,294	26,028	22,598
Loup Creek Colliery	20,717	19,139	18,389	13,943
Slab Fork	19,811	20,544	27,523	30,227
New River Collieries	19,244	8,906	17,172	25,475
Pemberton Coal & Coke	17,253	18,212	20,242	18,025
E. E. White[2]	16,253	18,788	21,631	22,646
McAlpin	14,324	14,906	14,447	20,512
Winding Gulf Colliery	13,278	14,268	18,938	20,049
Long Branch	12,454	10,545	17,789	15,557
Bailey Wood	11,707	11,544	13,141	9,845

[1] From Glen White. [2] From Stotesbury.

Gross shipments from all mines totaled 379,113 tons as compared with 361,906 tons last month, 286,354 tons in August and 321,626 tons in July.

FOREIGN MARKETS

GERMANY

Coke used as railway fuel. Resumption of shipments to Belgium. Companies passing dividends.

There have been greatly increased sales of coke, for which the chief cause may be found in the decision of the railway management to try the use of blast furnace coke, in place of coal, for steaming purposes. As the results were satisfactory in every regard, large orders followed, with a corresponding decrease in the accumulating stocks of coke which were beginning to be a source of anxiety to the operators. Further improvement in this business is looked for.

The demand for small sizes continues strong, with deliveries hard to obtain on a large tonnage.

From Duisburg on the Ruhr it is reported that shipments to Belgium, which had stopped with the outbreak of hostilities, had been renewed since the occupation of Antwerp, and have reached important proportions. An improvement of great promise to the entire coal and coke trade is the increase of transportation facilities.

Complaints of the passing of dividends are being made by stockholders to whom this action is a cause of distress, but from the point of view of the management no other policy is conceivable.

The war has already enacted a heavy toll from the younger men who were active in the management of the coal properties of the Empire; and this loss will be an added handicap to Germany in regaining her former position after the close of hostilities.—Translated from the "Frankfurter Zeitung."

The German output of coal during August and the eight months was as follows:

	August		Eight Months	
	1913	1914	1913	1914
Coal	16,542,626	8,477,214	127,318,665	119,187,604
Lignite	7,250,280	4,377,955	56,658,980	56,401,120
Coke	2,747,680	1,522,250	21,418,997	20,127,970
Coal briquettes	507,693	263,275	3,910,817	4,019,897
Lignite briquettes	1,874,830	1,128,616	14,084,566	14,529,090

ENGLAND

Trade dull and lifeless with some collieries closing down. High ocean freights are seriously restricting export business.

The London coal trade continues dull and lifeless. Huge quantities are arriving in the metropolis, and prices are difficult to maintain. The colder weather has slightly improved the demand, but buying is slow. Slacks and small nuts are plentiful. Bakers' nuts are firm. House coals are neglected. Only best hard steams are steady.

Scarcity of tonnage, high rates of freight and war risks insurance continue to remain the order of the day, and, of course, a great drawback to successful business. The inquiry is quite good, and better supplies of tonnage would immediately cause a revival in the export coal trade.

Two large collieries in Northumberland, the Newburgh Colliery and the Pegswood Colliery, have found it necessary to close down.

The question of the recent Minimum Wage Award for West Yorkshire has again claimed the attention of the Yorkshire Miners' Association, who have resolved to urge the Miners' Federation of Great Britain to take immediate action in the matter.—"Colliery Guardian."

Nov. 6—Business is on restricted lines at present owing to shortage of tonnage. It is anticipated, however, that the high rates of freight ruling will attract more tonnage, and on this account most contractors are not disposed to sell for forward shipment on the same terms as for prompt loading. Quotations are approximately as follows:

Best Welsh steam	$5 01@5.28	Best Monmouthshires	$4.02@4.08
Best seconds	4.56@4.80	Seconds	3.84@3.96
Seconds	4.32@4.44	Best Cardiff small	1.86@1.92
Best dry coals	4.92@5 04	Seconds	1.32@1.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage and for cash payment.

Freights—Chartering is more active but orders are more numerous than steamers available, and rates continue to advance appreciably. Rates are today approximately as follows:

Gibraltar	$2.40	Venice, Ancona	$3 36	Singapore	$4.20
Malta	2.76	Alexandria	3.72	Las Palmas	2.28
Marseilles	3.56	Port Said	3.72	St. Vincent	2.52
Algiers	2.70	Aden	3.96	Rio Janeiro	3.60
Genoa, Savona	2.76	Colombo	4.08	Monte Video	2.64
Naples	2 76	Sabang	4 08	Buenos Ayres	2.88

Coal Contracts Pending

Contract No. 8—Portland, Ore.—Proposals for furnishing and delivering about 5000 tons of bituminous coal for use on the Dalles-Celilo Canal construction work will be received at the U. S. Engineers' Office, Portland, Ore., until 11 a.m., Nov. 27, and then publicly opened. All communications should be addressed to Major of Engineers, Jay J. Morrow, U. S. Engineers' Office, Portland, Oregon.

Contract No. 9—Fort Wayne, Ind.—The Municipal Light, Heat & Power Co., of Fort Wayne, is in the market for 20,000 tons of screenings. Deliveries are to be made in hopper bottom cars during the next year. Address the Municipal Light, Heat & Power Co., Fort Wayne, Indiana.

Contract No. 10—Chicago, Ill.—The Chicago Coated Board Co. is in the market for 300 tons of screenings per day. Deliveries are to extend over a period of one year, and to be made at Chicago, Ill. Address the Chicago Coated Board Co., 420 E. North St., Chicago, Illinois.

Contract No. 11—Portland, Maine—The Portland Gas Light Co. is in the market for 30,000 tons of Penn Gas, Westmoreland, or any good grade, three-quarter screened, gas producing coal for delivery between Mar. 1, 1915 and Mar. 1, 1916. Shipments are to be as required, about in equal monthly proportions, to wharf through one bridge, Portland, Maine, ample water alongside. All communications should be addressed to C. H. Tenney & Co., Managers, 201 Devonshire St., Boston, Massachusetts.

Contract No. 12—New York—The bids on this contract, which provides for furnishing 2600 tons of anthracite to the National Guard for use at the various armories in the Boroughs of Manhattan and the Bronx, were as follows: The Meyer-Denker-Sinram Co., $4.25 on buckwheat, $7.65 on nut, and a total of $11,560; John S. Conabeer, $3.95 on buckwheat, $7.44 on nut, and a total of $10,793.50; Henry E. Meeker, $4.39 on buckwheat, $7.19 on nut, and a total of $11,834; Garfield-Proctor & Co., $4.10 on buckwheat, $7 on nut, and a total of $11,095; Thomas F. Farrell, $4.30 on buckwheat, $7.70 on nut, and a total of $11,052. Previous notices regarding this contract have appeared in this column. Address C. B. Rhinehart, Secretary, Armory Board, Hall of Records, New York City.

Contract No. 14—Panama, C. Z.—Sealed proposals will be received by the Panama R.R. Co., until 12 o'clock noon, Nov. 24, for furnishing all or any part of the company's requirements, estimated at 500,000 tons of coal, as required during the year ending Dec. 15, 1915. Coal is to be of the best quality steaming, semi-bituminous, mine-run, with at least 40% lump, dry and free from slate, sulphur, dirt and other impurities, suitable and acceptable for use in stowage in the bunkers of steamers operating in tropical waters and susceptible of being stored in the climate of Panama without danger of fire through spontaneous combustion. Prices are to be quoted f.o.b. any loading port the contractor may designate on the Atlantic or Gulf coast, and the contractor will be notified on the twenty-fifth of each month of the amount required for the succeeding month. The contract will be awarded on a heat unit basis with a standard of not less than 70% fixed carbon and 14,700 B.t.u. per pound of dry coal. Bidders must state the commercial or trade name of the coal, together with the designation of the bed or beds and exact location of the mine from which they propose furnishing the coal. All bids must be accompanied by a certified check for $1000 and, upon formal execution of the contract, the company provides that security not to exceed $30,000 shall be required for the faithful performance thereof. Payment will be made 30 days after presentation of bills of lading signed by the captain of the collier accompanied by certificates of the companies operating the coal piers, indicating the number of cars and weight of each car load of coal dumped into the colliers. Contract form and specifications can be obtained on application to R. E. Rutherford, Assistant Purchasing Officer, Panama Purchasing Dept., 24 State St., New York.

Contract No. 15—New York Harbor—Bids received on the United States Navy contract for 20,000 tons of steam coal were as follows, prices in all cases being delivered f.o.b. suitable lighters or barges alongside at Navy Yard, Brooklyn: American Coal Exporting Co. (14,429 B.t.u.), $3.05; Consolidation Coal Co. (14,533 B.t.u.), $3.38; W. P. W. Haff (14,300 B.t.u.), $3.05; Keystone Coal & Coke Co. (14,600 B.t.u.), $3.11, (14,100 B.t.u.), $3.09; F. P. Long & Co. (14,400 Bt.u.), $3.15; Pennsylvania Coal & Coke Corporation (14,500 B.t.u.), $3.10; Quemahoning Coal Co. (14,300-14,700 B.t.u.), $3.12; J. Tatnall Lea & Co. (14,480 B.t.u.), $3.07; Willard Bros. (14,500 B.t.u.), $3.30; J. H. Weaver Co. (14,567 B.t.u.), $3.25. Archibald McNeil & Sons Co. submitted five bids, with coal ranging from 14,500 to 14,750 B.t.u., and prices from $3.03 to $3.28. Navy Department, Bureau of Supplies and Accounts, Washington, D. C.

Contract No. 16—New York Harbor—The bids received for furnishing and trimming approximately 17,000 tons of bituminous coal required by the United States dredges in New York Harbor were as follows: W. P. W. Haff, Abrams Creek Coal (13,500 B.t.u.), $3.60; Commercial Coal Co., Commercial Bituminous No. 1 (14,200 B.t.u.), $3.60; Commercial Bituminous No. 2 (13,750 B.t.u.), $3.50; Commercial Bituminous No. 3 (14,790 B.t.u.), $3.85; Geo. D. Harris & Co., Inc., Margaret Coal (14,400 B.t.u.), $3.60; New Creek Coal (13,700 B.t.u.), $3.27; Hite & Rafetto, Bird Quemahoning (14,400 B.t.u.), $3.43. Bids were opened Oct. 8. Maj. G. J. Dent, Corps of Engineers, Army Building, N. Y.

Contract No. 17—New York—Sealed bids are requested by the Department of Public Charities for furnishing and delivering anthracite, bituminous and gas coal. Security aggregating 30% of the total amount involved in the contract will be required, and no bids will be considered unless accompanied by a cash deposit of 1½% of the total amount of the bid. The contract covers the period from Dec. 1 of the current year to Apr. 30 of next year, and bids will be opened at 2:30 p.m., Nov. 24. Blank forms and all further information can be obtained on application to Contract Clerk of the department, Room 1034, Municipal Building, Borough of Manhattan.

Contract No. 18—Brooklyn—Sealed bids are requested for furnishing and delivering 560,000 lb. of anthracite pea coal to the 26th Ward Disposal Works, at the foot of Hendrix St., Brooklyn. Bids are to be made on the basis of 1000 lb. and must all be in by 11 a.m., Nov. 25. Security aggregating 30% of the gross amount involved in the contract will be required. Delivery will be as required, and will be concluded previous to Jan. 1. Blank forms and all other information can be obtained on application to the Bureau of Public Buildings and Offices, Borough of Brooklyn, Room 1003, No. 50 Court St.

FOREIGN

Guayaquil, Ecuador, South America—La Compania de Alumdrado (Lighting Company) is in the market for 3500 tons of gas coal. Prosepctive bidders should state the specific gravity, weight per cubic foot, and space occupied by one ton of gas coal. Give approximate analysis, including moisture, fixed carbon, sulphur and ash, and a commercial analysis showing the gas per ton of coal, gas per cubic foot of coal, illuminating power of the gas in standard sperm candles, value of one cubic foot in grains of sperm, sperm value per ton of coal, coke per ton of coal (good quality), coke per cent. of coal, ash in coke, sulphur eliminated with the volatile products, sulphur in the coke, tar per ton of coal. Quotations should be c.i.f. Guayaquil. Address The Manager, Compania de Alumdrado, Guayaquil, Ecuador, South America.

South America—Supplementing a previous notice, the Bureau of Foreign and Domestic Commerce at Washington states that details regarding a certain inquiry from South America have been forwarded to the department, and that complete information, including blank forms on which to submit bids for supplying coal under the conditions specified can be had on application. All inquiries should mention item No. 14,048, and be addressed to the Bureau of Foreign and Domestic Commerce, at Washington, D. C.

Santiago, Chile, S. A.—Bids are wanted on 300,000 tons of coal a year during the next three years, according to press reports. The coal is to be used on the Chilean Railway. All communications should be addressed to the Department of Materials, Santiago, Chile, S. A.

COAL AGE

Vol. 6 NEW YORK, NOVEMBER 28, 1914 No. 22

The Power of Encouragement

WOULD you fight for your Big Boss?—Sure you would. Do you brag about the smart things he does?—Sure you do.

Do you repeat to your wife and your kids what he tells you about his wife and his kids?—Of course you do.

And do you go off and smile to yourself every time he gives you a little pat on the back just to let you know that he appreciates the way you are running things?—Well, I should say yes.

Truth of the matter is (even if you haven't thought about it in quite that light) he's quite a hero in your eyes.

Isn't it strange then that you can't understand why it is that some of the men under you seem to lack enthusiasm.

If you didn't like your "boss" you'd nose about for a new job tomorrow; but the men under you can't throw up their places as easily as all that. They are living from hand to mouth, a good many of them, and they don't have much time to speculate about their likes and dislikes; nevertheless they are human like yourself, and their personal feelings drive them just as yours drive you.

If you, as boss, can't inspire your men to give you the best that is in them, it's a sure bet that your company, to a certain degree, is suffering from industrial paralysis, and the chances are you'll never discover the fact until it is too late.

Just put yourself in their shoes for a few minutes every day and try to picture your big boss dropped down a notch into your place.

It isn't necessary to do your thinking out loud while you're trying this—it wouldn't do, in fact—but you can feel reasonably certain that unless you are able to look back up the line and see why you really are a hero to the men under you, you don't belong where you are, and what's more you will not be there long.

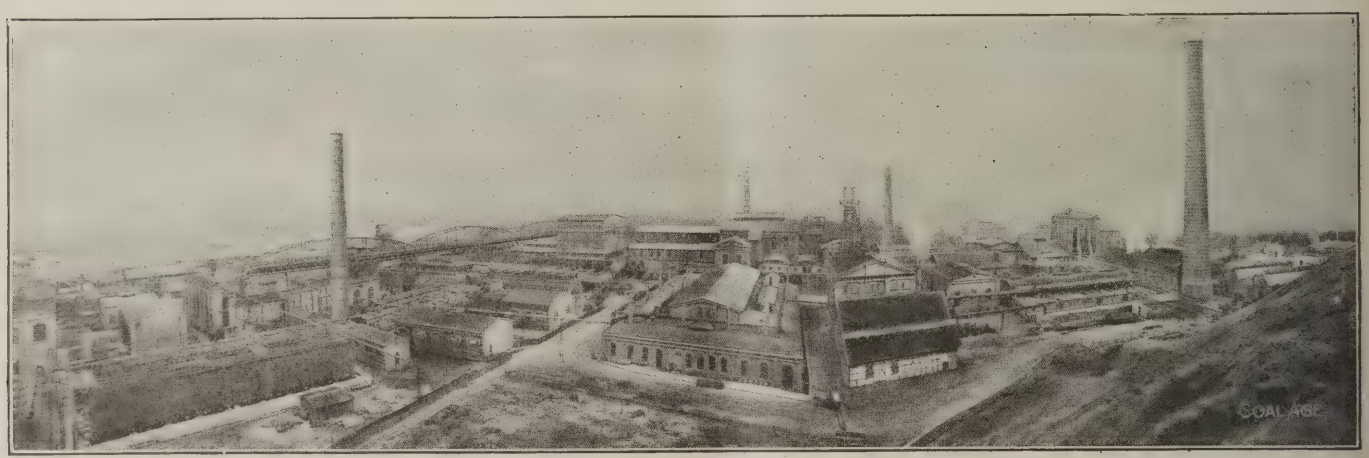
On the other hand if you can succeed better in the business of inspiring men (the hero's business) than your big boss, it won't be long before you will be a big boss yourself and in time you may hope to be even a bigger boss.

A Visit to Coal Mines in Germany

By Samuel Dean*

SYNOPSIS—American coal operators might profit by studying the plans employed in developing the German coal industry. Their system of selling coal is the greatest on earth today. The mines are models of completeness and durability. Government lends aid at every turn. Wages are less than in America or Great Britain, and production per individual is less. Surroundings, however, are more pleasant.

When we are continually told about the wonderful things to be seen in a certain country or at a certain mine we are often disappointed when we go there to see for ourselves. But in spite of all the marvelous things we have heard about Germany in recent years it is a feeling of wonder and not disappointment that creeps over the visitor as he passes into the coalfields of Westphalia on his way from Rotterdam. As soon as the giant steel headframes and magnificent colliery buildings come into view between Wesel and Oberhausen, a scene opens up which holds the interest of the mining man every minute he is in that great industrial area which has its center at Essen.



Typical German Coal-Mining Plant with Byproduct Ovens

When in the colliery districts, it is not a case of having to travel miles and miles to see a modern mining plant; all the plants are modern. Germany may be called an "old country," but Westphalia is certainly the newest looking country I have ever seen. One views with astonishment the spick-and-span appearance of everything. Apparently there is not a telegraph pole out of the perpendicular. No weeds growing, no wooden shacks in sight. In fact I do not remember seeing a wooden building, and every inch of available ground was under cultivation.

Says the French Paid for It

As I left Dusseldorf and passed through a splendid agricultural country,[1] through Cologne and on to Liége in Belgium, I had a Frenchman for a companion, and I asked him if he could tell me how it was that everything appeared to be so new. Even the farmhouses, and farm buildings with their terra cotta tile roofs glistening in the sun, appeared to have been built only a few years. He turned to me with a sigh: "It was not so 40 years ago," he said; "France paid for all this." Whether that is true or not I do not know, but France, it will be remembered, had to hand over $1,000,000,000 after the Franco-Prussian war.

That looks like a tremendous sum of money and yet the collieries in the north of France are little behind those of Westphalia. There is a lighter touch about the architecture of the buildings at the mines in France, more sheet steel and fewer thick brick walls. Both are pretty to look at, but the buildings in Germany would doubtless stand a siege longer.

A Wonderful Arrangement

And what can I say about the interior of these buildings, to enable me to convey anything like an adequate idea of their magnificence? The polished machinery, the beautiful floors and tiled walls must be seen to be appreciated. In the power houses, the switchboards resemble giant pieces of drawing-room furniture. The entrance hall for the miners at the Hermann colliery near Dortmund would be quite suitable as a banqueting chamber. One would think the designer had copied it from a castle on the Rhine. Around the interior are the offices of the different officials, and the miners enter the hall and pass to the window of the official they wish to see between shifts.

Inside the entrance gates of the colliery you can step over to a small bar, where for a trifling coin an attendant allows you to select from his assortment of bottles of soft drinks, mineral waters and milk. Up in the screens I saw and sampled the contents of a similar bar. A very handy arrangement this—a thirsty official can get a drink without having to leave the works; it is also very convenient for the workmen. By the way, it might be mentioned that it is difficult to get a drink of plain water on the continent of Europe. Traveling Americans have introduced ice water, but the waiter always gives you the impression that he is disappointed when he places a pitcher on the table.

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*Mine inspector, Victor-American Fuel Co., Delagua, Colo.

[1]The German farmer has mastered the science of plant nutrition; the yield per acre of every staple crop is greater in Germany than in any other part of the world.

I asked a German mining engineer why they erected such elaborate buildings about the mines, and he said that to a certain extent the laws demanded them, and that the owners felt that the workman took more interest in his work when everything was pleasing to the eye. I am sorry that I cannot show more pictures of the collieries in Germany. Photographs were being prepared for me, and were to have been sent on, but they have not arrived and the reader will probably know the reason why.

Extracting the Byproducts from Coal

I do not propose to go into what is being done in the way of extracting byproducts from coal; suffice it to say that soft seams which were considered valueless years ago are now being worked, and in addition to coke, they derive from them sulphuric acid, carbolic acid, chrysalic acid, benzol, sulphate of ammonia, tolule and various other products. Profits of as much as $1.25 per ton of coal from the byproducts alone are common.

German Discipline

The discipline in German works and offices is severe. There are many things which the public are forbidden to do. An observer is forced to the conclusion that many Germans do not think their great industrial success is worth the sacrifices made to obtain it. The middle course is perhaps the happiest existence. Too much discipline or too little are equally undesirable.

And yet they still have explosions in the mines in Germany, and try to palm them off as gas explosions when they travel from the face and up the shaft. On the question of dealing with the coal-dust danger, they are certainly not in front. Their explanations were amusing, and finally one of their inspectors blurted out that he did not think there was any cure for dust explosions. But hundreds will never agree with that statement. It is not difficult to make an advancing longwall mine, where tight steel cars are used, immune from dust explosions. And



Office Building of the Westphalian Coal Syndicate



Steel Headframe at a Modern German Colliery

In this branch of the industry Germany leads the world by a large margin. This is due to the superior education of the people, coupled with government assistance. For years the government of Germany has assisted the industries of the nation. Had this war not taken place, it is impossible to imagine what the country would have done. A London merchant told me that he could not understand why the Germans had rushed into the war because in his opinion they were beating the world commercially.

The bulk of their exports was shipped from Rotterdam, and a prominent official of the Westphalian Coal Syndicate repeated to me, what I had heard before, that Germany needed more seaboard; they were hemmed in too much. It is a fact, however, that the rank and file felt the oppression of militarism. The official quoted above stated to me that every summer he crossed the North Sea for his holidays, and immediately upon landing on the other side he felt like a bird let out of a cage.

in this connection it may be said that the difficulty of dealing with coal dust is far greater in America than it is in the mines on the other side of the Atlantic. In this country we have dilapidated open cars, with the coal loaded above the top, and the sides of our haulage roads are in coal.

Some German Methods Are Costly

They maintain clean haulage roads in Germany, and use tight steel cars. They employ the old-fashioned method of sprinkling, which is costly, being over 6c. a ton in certain places. This system is considered unsatisfactory by managers, but it is the law. They use troughs filled with water, along the sides of the roadways, and I am told have tried piles of wet peat in some places. Both methods are elementary.

The mines are well inspected, each mine being visited about twice a week by a government inspector. I was told that these inspectors worked in harmony with the man-

agement. Many of the managers were formerly government inspectors.

The Radbod Explosion

The explosion which recently occurred at Radbod colliery in Westphalia caused the death of 348 men including 6 officials. This was a new colliery and had only been in operation about two years. The shafts are about 3000 ft. deep. The seams gave off gas, but the workings being new the ventilation was exceptionally brisk. The gas given off was continuous, sudden blowers or outbursts being unknown. Benzine safety lamps were used in all parts of the workings except at the pit bottoms, where acetylene safety lamps were used. The benzine lamps were magnetically locked, and fitted with an internal frictional ignition device.

It is said that there was some coal dust present. An elaborate spraying and sprinkling system had been installed, and according to inspector Hollender, the rules relating to sprinkling had been enforced—the total quantity of water used for that purpose having exceeded 440,000 gal. per day. Special shotfirers were employed who fired their shots electrically and used permissible powders.

The explosion occurred at 4:20 a.m., a great cloud of black smoke issuing from the mouth of No. 1 shaft. Two more explosions occurred next day, and the mine exploded again twelve days later, after which the workings were flooded. Beads of coke were found marking the passage of the explosions, but no large masses or cakes of coke.

Gas vs. Dust

It is said that the cause of the explosion is unknown (another to that great list); that the effects of the flooding had put a detailed investigation out of the question, but that the explosion had visited all parts of the workings. Some of the inspectors seemed to think that a defective safety lamp caused the accident. I was told that this was a *gas explosion,* but when I inquired how a gas explosion could travel a main road against a strong fresh current of air there was some telephoning and eventually I was assured that gas started the explosion, and that *probably* coal dust carried it to the outside.

The Hermanite Barrier

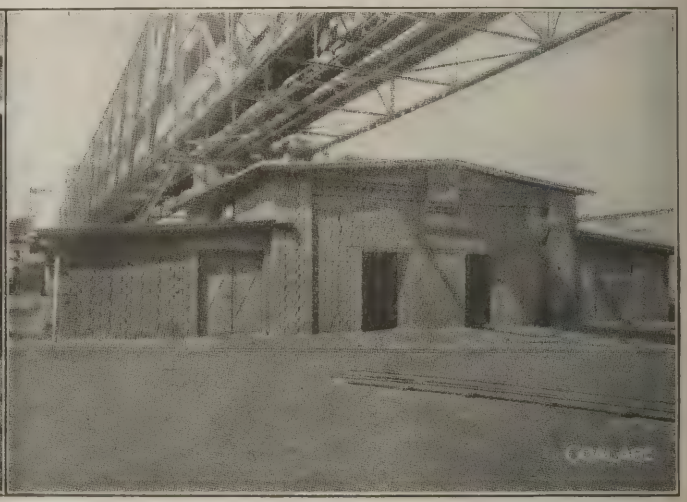
A curious barrier arrangement, inspired by Taffanel's experiments in France, has been tried at the Neunkirchen testing station in Germany. A framework is built in the roadway, fixed to roof, floor and sides. In the framework there is a swing, hung on hinges and holding light pans which are overturned on the opening of the swing. The swing is hung a little open and the shock preceding the flame of the explosion is supposed to cause the contents of the pans to be thrown into the atmosphere to extinguish the flame. Incombustible dust may be used, but the inventor, doubtless having a desire to be original, recommends a liquid which he calls hermanite; this does not evaporate, and has special extinguishing properties.

Amount of Water Necessary

Experiments at the Konig colliery showed that certain coal dusts were rendered noninflammable by the addition of a quarter their volume of water. When coal dust was only sprinkled, two-thirds of its volume of water was required. For the conditions of practice, 1½ parts of water to 1 of coal dust were considered necessary. And to combat the drying effects of the air currents 2 parts of water to 1 of coal dust might be needed. Nozzle spraying was not satisfactory, and in a report by an engineer named Hatzfeld, particulars were given of the successful experiments in France, where explosions were stopped by shale dust falling from overhead shelves, and collapsing box arrangements which were knocked down by the wave in front of the flame.



Storing Patent Fuel in a Steamer's Hold



A Shop Built of Patent-Fuel Bricks

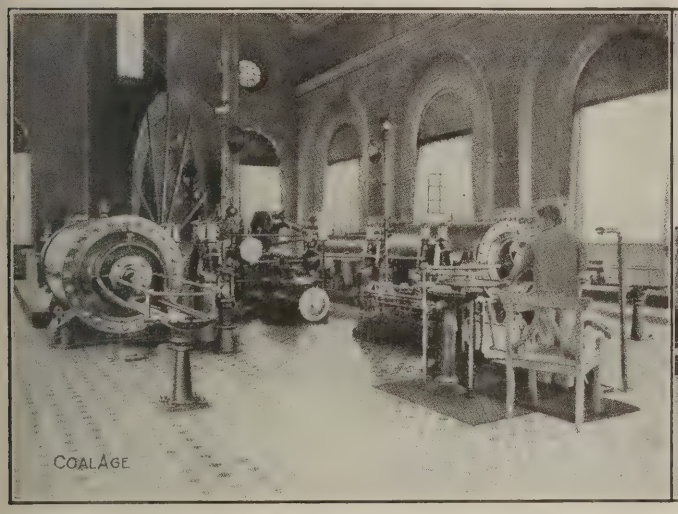
The superintendents and inspectors in Germany are well paid, but the miner is doing well when he makes $1.75 a day; the average is about six marks, or $1.50 per day. Company men receive $1 to $1.25 a shift. The output is less than one ton per man per shift for all men employed underground. The miners are well housed; in this respect they are better provided than are some of the miners in England, but their earnings are lower. They have parks in the center of the mining villages for the children—the latter being, needless to say, numerous. The rent for miners houses is 50c. per month per room. Officials are provided with free house, coal and light.

Bathing Accommodations

Large bath houses are provided at the pits, with private baths for officials and visitors. It is not necessary to carry overalls or pit clothes when traveling on the continent of Europe, as complete changes are provided, including boots, socks, underclothing, etc. Men are in charge of

the private bath rooms in Germany, but women are employed for that purpose in France, and when the visitor ascends the shaft he finds his bath ready with clean towels and soap, and his clothes brushed and laid out on a table. They are exceedingly obliging in this respect in France. When continental mining engineers go back after a visit to this country they cause much amusement by telling their friends about having to carry dirty pit clothes all over the States, and not being able to get a bath when they come out of the mine.

At a large mine in Germany employing say, 1000 men underground, the mine is split into districts with about 100 men to the district. There is an overman for each district for each shift. There are 3 eight-hour shifts from 6 a.m. to 2 p.m., 2 p.m. to 10 p.m., and 10 p.m. to 6 a.m. Half an hour is allowed to hoist and lower men. The first shift starts going down at 5:30 a.m. Coal is hoisted during the morning and afternoon shifts; the night shift is for repairs.



INTERIOR OF A GERMAN ENGINE HOUSE, SHOWING HOISTING MACHINERY



LOADING DIRECTLY FROM MINE INTO BARGES AT THE DORTMUND-EMS CANAL

Austrians, Poles and Italians in large numbers were working in German mines, and there was a shortage of men.

The price of run-of-mine coal at the pit mouth, or the average price for all sizes of screened coal, was $2.75 to $3 per ton. Large quantities of briquettes were made and sold for $3.50 to $3.75 per ton at the mine. The cost of pitch, which is used as a binder, was $10 a ton delivered at the mines.

THE WESTPHALIAN COAL SYNDICATE

The coal corporations do not employ private sales agents, the coal being sold in a manner similar to the methods employed by the orange and lemon growers of California. With regard to the Westphalian Coal Syndicate, I was told that this selling agency did not sell in an arbitrary manner or abuse its position. Its object was to avoid violent fluctuations in prices. If prices of its competitor across the North Sea jumped a dollar a ton, it raised the prices of German coal 25c. a ton, and in the event of a fall of a dollar a ton on the other side, syndicate prices went down about 25c., so that manufacturers could rely upon steady prices at all times.

The syndicate on account of its considerate methods enjoyed the confidence and full approval of the state. The state would not wish to see it abolished. The miners of all classes, including the social-democrats, wanted to see it continued. And only a few short-sighted consumers criticized it, but the majority of consumers also wished to see it continued. In consequence of its existence the mines worked regularly, averaging about 300 days every year, the miners made steady wages, strikes were seldom heard of, and all round, the situation was highly satisfactory. The plants are magnificent, the status of the officials was high, the miners lived in pretty homes and were happy, and the owners made fair and reasonable profits.

The syndicate advertised, in different languages, in the following manner:

Annual capacity production of:
Coal .....about 110 million tons
Coke .....about 26 million tons
Patent fuel .....about 6.5 million tons

Suppliers to the German, French, Spanish, Danish, Russian, Swiss, Italian, Dutch, Portuguese, Greek and many other railway companies; also the German, Austrian and Greek navies; also to the most important steamship companies at home and abroad.

The coal district of the Ruhr producing all kinds of coal of the purest quality; that is to say, from anthracite coal to high-flaming coal, the syndicate is in a position to supply every consumer of coal with the material most suitable for his purposes, no matter whether his plant has been intended for Cardiff, Swansea, Newcastle, Yorkshire or any other coals. The supply can be made in every desirable composition; there are also available washed coals of the most varied sizes from pea to nut and lump, which, owing to their purity and absolute regularity of quality, are in particular favor with purchasers.

Coke, very hard and of great purity, may be advantageously used for foundries and all smelting purposes, equivalent to the best Durham coke.

Patent fuel in sizes of 3, 5, 7 or 10 kilos, is in quality perfectly equal to the best Cardiff brands.

Exports to all parts of the world.

The salesmen in charge of the export department of the syndicate were experts at their business, and knew the characteristics and prices of fuels the world over. Their branch offices in different parts of the world secured the orders, and these were turned over to another department which was familiar with the qualities of the coal from all the collieries, and arranged the distribution. They were shipping coke to San Francisco around the Horn.

No nation in the world was making such a bid for foreign trade as Germany. In the last 25 years this trade

increased 300 per cent. The German empire is little more than half the size of Texas. The actual value of total exports during 1913 was: Germany, $2,131,000.000; United States, $2,428,000,000.

A Lesson We Might Learn

The Germans have been ready to supply what the consumer wanted. They have not shipped unscreened mine-run into a market which has been previously supplied with clean screened coal. They have not allowed the status of the sales-agent to grow away beyond that of the superintendent of the factory or mine. Coal for export was shipped over the state-owned railroads of Germany, at a less rate than fuel for home consumption, and the rate per ton for large shipments was less than the rate for small shipments.

The German firms made their quotations in the decimal system, which is understood nearly everywhere, and they went to great pains to make the path of the purchaser easy by talking to him in his own tongue. In this respect, the English-speaking individual often fails lamentably by comparison; he usually speaks only his own language, and that often indifferently. The German method is the result of the admirable system of commercial education given at the state-aided schools.

The banks appeared to treat the manufacturer and operator liberally; he could often secure a loan on the strength of orders received. In fact, some of the strong firms complained that certain banks were becoming trading concerns. The inventor seemed to be able to secure financial backing without a great deal of trouble; note how Germany led in the production of some modern mining appliances—the breathing apparatus, electric safety lamps, the freezing process of shaft sinking, nearly all the successful freezing work in England being done by German engineers. The technical German was so exceptionally well trained that financiers had confidence in his plans and proposals.

The long-credit systems of German firms were often criticized, however, by their competitors. And it is well known in the steel trade that the German Steel Syndicate paid export bounties amounting to $3.75 per ton. Some are of the opinion that militarism had placed such a burden on Germany that she was at the breaking point before war was declared.

(To Be Continued)

Alberta's Coal Output

The annual report of the Mines Branch of the Department of Public Works of Alberta for 1913 shows that the output of the coal mines of the province for that year was 4,306,346 tons, as compared with 3,446,349 tons in 1912, an increase of 859,997 tons, or about 25 per cent. Of the production in 1913, 2,374,401 tons were bituminous, 1,763,225 lignite and 168,720 anthracite.

The total number of men employed was 8068, of whom 5837 were employed underground. The number of tons of coal mined per man was 533, as compared with 517 in 1912, the increase being due to the greater use of coal-cutting machinery in the lignite field. There were 45 new mines opened and 72 closed during the year, the abandoned mines having in many cases only been temporarily opened for prospecting purposes and closed down until railway connections could be made. At the close of the year there were 289 mines in operation.

The output of coke was 65,167 tons, and of briquettes 130,861 tons. There were 28 fatal accidents, of which 24 were underground and 4 above, 60 serious and 83 slight accidents. Eight of the fatal and 15 of the serious accidents occurred in connection with haulage, and only one fatality was due to the use of electricity. Much progress was made in connection with mine-rescue work, three rescue stations being in operation at which 201 persons underwent training, 51 of whom passed final examinations and were granted certificates for efficiency.

Don'ts for Miners

Don't enter your place of work without hearing from the fireboss.

Don't pass the fireboss' station, or allow your laborer to do so, until the fireboss returns and reports that it is safe to enter.

Don't enter your place without examining carefully for gas and other conditions, even though the fireboss has reported the same safe—they may have changed since his visit.

Don't fail to be careful when taking timber up in your breast for fear it might slide down and catch you or others.

Don't sit or work under a bad top; timber it or take it down immediately, always standing in a safe place to do so.

Don't allow your drill bits to be worn too small; be sure they are large enough to allow the cartridge to enter the hole freely.

Don't fail to keep detonators at all times separate and apart from other explosives until required for use.

Don't fail to keep gunpowder and other explosives in a wooden or metallic box, and a proper distance from the track.

Don't fail to examine your safety lamp and assure yourself that it is in good condition.

Don't attempt to open your safety lamp when the rules require it to be locked.

Don't carry matches where it is necessary to use locked safety lamps. It is dangerous and against the law.

Don't fail to extinguish and leave your naked lamp at the point beyond which the use of such lamps is prohibited.

Don't fail to obey the law in reference to lights when making charges of explosives.

Don't use a nail or spike to put a cap in a stick of dynamite, nor crimp the exploder by biting it with your teeth, or have a naked light near you while handling the charge.

Don't use two kinds of powder in the same hole; that is, black powder and dynamite.

Don't do tamping with an iron or steel bar; use a wooden tamping stick and tamp the hole to the mouth.

Don't shorten your fuse or squib to hasten the blast. It is prohibited by the Mine Law.

Don't use a blasting barrel instead of a fuse, inserting a cap in the barrel and exploding with a squib. This is a dangerous practice.

Don't connect your battery wires to those used by some other person. Connect your wires direct to the battery.

Don't connect your wires to the battery until ready to fire. If shot does not explode, be sure to disconnect at battery before seeking cause.

Don't fire a shot until you have given warning and received response from everyone in the vicinity.

Don't fire two holes at the same time under any condition.

Don't light fuse or squibs with matches where safey lamps are used; use a wire and always examine your place for gas or any other dangerous conditions before firing.

Don't go in a return air course or blind heading when firing a shot—the unexpected may happen.

Don't return to the face too soon after firing; take plenty of time and avoid accident. In case of misfire, go home for the day, place a warning for others in your place and notify the person in charge of your district.

Don't drill or pick out a misfire—drill a new hole.

Don't fail to examine the face thoroughly before commencing work, and after firing each blast, look for bad top or gas, and under no circumstances allow the laborer to enter before you do so and find it to be safe.

Don't fail to immediately extinguish a feeder of gas that you may ignite by a blast or otherwise; if unable to do so,

Note—From Susquehanna Coal Co.'s Book of Instructions to Employees.

notify at once the official in charge. Also examine your working place before leaving to see that no gas blowers are left burning.

Don't remove an accumulation of gas by brushing it, where it is practicable to be removed by bratticing.

Don't fail to remove any dangerous conditions at once by dressing down the face and repairing the broken brattice or blownout props.

Don't fail to keep the roof and sides of the working place in your charge properly secured by timber, or otherwise, and do not work or permit your laborer to work under loose or dangerous material, except for the purpose of securing same.

Don't fail to use props of safe and sufficient size for your manway, and don't use split props as they give a poor hand hold. Don't fail to sprag jugglers when necessary and also nail liners at both ends.

Don't remove any props until the relief props are placed, and always see that a good hitch and a large cap piece are used, and in no case remove props or timbers except by blasting or by some other safe method.

Don't fail to pay special attention to the top, and do not undermine top coal or top rock more than to the extent of one row of shots.

Don't neglect to order necessary props, etc., one day in advance. If you fail to receive same and your place becomes unsafe, you should vacate it.

Don't fail to observe all rules for the handling of explosives.

Don't fail to immediately report to the official in charge anything you may discover wrong that may lead you to suspect danger to yourself or others.

Don't be in a hurry to go home; take your time and work safe. A great many accidents are caused by hurrying through the day's work.

Don't go into abandoned workings or live workings when the miner is not present—there may be danger.

Don't attempt to drive a heading into a finished place before learning the condition of the place from the fireboss.

Don't let your manway become unsafe or hard to travel—your life may depend upon it.

Don't leave your place at quitting time without examining it and making it safe, and on pitch work always secure the top of your manway, placing tools where others cannot be injured by coming in contact with them. Remember the fireboss, as well as yourself, must visit your place the following morning.

Don't let your car stand in the face of a place on grade without blocking it securely.

Don't allow your laborer to remain at work without you.

Don't carry a drill on your shoulder when traveling near a trolley wire.

Don't ride on loaded trips when going home.

Don't ride between cars.

A Flexible Coupling

It became necessary, says C. F. Scribner, in *American Machinist* of Nov. 5, to design a flexible coupling where the amount of room for its construction was limited; high speed was required and the demands for service were intermittent. Such cases frequently occur, as in driving a generator from a motor, driving a fan for an exhaust system and many other applications.

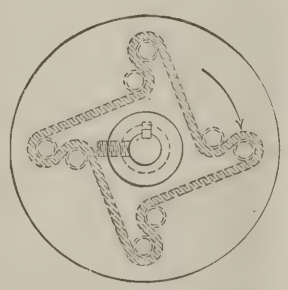


Diagram of Coupling

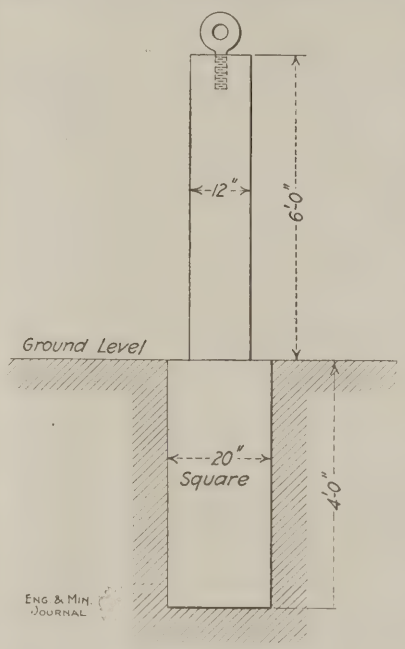
The sketch shows the design finally adopted for the foregoing requirements and which has now served successfully for a period of two years. The coupling consists of the two gray-iron flanges, having four driving studs in each, the studs being placed on the smaller radius in the driving flange and on the larger radius in the driven flange. Connection is made by the action of the driving studs of the smaller radius against the 1-in. endless leather belt, which encircles the studs spaced at the larger radius.

To break the connection, it is only necessary to loosen a setscrew, sliding one flange endwise until the studs are released from engagement with the belt, when the belt can be slipped over the flange not in motion, where it can remain until further service is required.

It was found that exceptional accuracy in the alignment of the two shafts was not required, as in the case where a slip-coupling was used and that there was a complete lack of vibration, and it was nearly noiseless, and easy in starting—factors which make its use desirable in many places.

Raising Guy Lines

Those who have had occasion to walk around the surface of mining properties at night have probably, once at least, stumbled across a guy line leading from a smokestack or similar object. L. E. Ives discusses this subject in the Nov. 7 issue of the *Engineering & Mining Journal* as follows:



Guy-Rope Support

The height at which these lines generally cross a path is just about that necessary to strike one in the neck. The sketch shows how this may be overcome, at the same time providing a perfectly strong anchor. A concrete post, reinforced with two 30-lb. rails, is made with a total length of 10 ft. The upper 6-ft. section of this post is circular in cross-section and 12 in. in diameter. The remainder is square, 20 in. on a side. The square section is placed in the ground, and the round portion extends above ground. An eye-bolt is embedded in the top, and the guy line is attached to this. In this way the line at its lowest point is 6 ft. above the ground, giving ample clearance.

Increased Coal Output of China

Prior to 1909 little attention was paid to coal exports from China, says the *Daily Consular and Trade Reports*, but during 1913, owing to the activity of the Kailan and Fushun mines, the increased valuation of coal exports was placed at $2,311,578, representing an increase of 808,670 tons.

The Kailan project is a British-Chinese enterprise, operating the Kaiping and Lanchow mines, with nearly $10,000,000 capital and an annual output of about 1,800,000 tons. The Fushun collieries are operated by the Japanese in connection with the South Manchurian Ry., the output being roughly estimated at 8000 tons per day. Some of the coal mines in China are operated by modern machinery, while others are utilizing native methods.

The Labor Situation

SYNOPSIS—The President is not intending to protect the miners continuously who are employed in the Bache-Denman mines in Arkansas, but only the U. S. marshals when executing the law. In Butte, kidnapping union men has been punished with 5 years' imprisonment, while in Colorado this crime, though frequently committed, has gone unpunished because only nonunion men have thus far suffered. The state authorities in Colorado want the U. S. troops withdrawn.

The receiver of the Bache-Denman Coal Co. in Arkansas when ordered by the U. S. Court to resume operations imported nonunion men from Clarksville and Jimtown. It was thought, of course, that as the men were employed on the order of the federal court, they would be protected by the U. S. troops brought into Arkansas to keep order.

Military Will Not Stand Guard at Mines

But to the present administration only those who obey and acknowledge the trades union are entitled to protection. So Major N. F. McClure in command of the federal troops was caused to make a proclamation that he would not act as a continual guard of the men at work but help the U. S. marshals should an emergency arise. The men working for the coal company must feel that such slackness may cause a repetition of the murder and arson which have already disgraced union labor and the state of Arkansas, and if it occurs again will dishonor the administration at Washington. There is a certainty that these marshals will be described as irresponsible gunmen of the operators and that public sympathy will be denied them. As a result the miners under their protection will take their lives in their hands.

Kidnapping Is Safe where Right Men Are Kidnapped

The reader should note how satisfactorily the rioters in Butte, Mont., have been squelched. But then, these sacrilegious men ventured to raise their hands against the Union. In Colorado far worse things have been done to nonunion men than were done in Butte by "Muckie" MacDonald to members of the American Federation of Labor. As yet no punishment has reached them while Muckie, victim of a peculiar misjudgment, has offended Mother Jones and her friends and so gets three years in the Deer Lodge Penitentiary. Joseph Bradley, vice-president of the new Union, receives five years, and Joseph Shannon, member of the executive board, is found not guilty. The crime was kidnapping miners—union miners. How shall such crimes be expiated! It will be remembered that the Ludlow affair in Colorado arose out of the forcible detention by union men of an Italian, Tutoilmando. Interference by the Colorado militia with the kidnappers of the Italian was the direct cause of that military action.

Ammons Wants U. S. Troops Removed

The governor of Colorado, E. M. Ammons, is in accord with his successor, G. A. Carlson, and believes that the time has come for the state to resume her sovereignty and call for the removal of the troops. The Burris Legislative Investigating Committee has so advised, saying to the governor:

> We recommend that you issue a proclamation that every person within the state is commanded to obey the law and to refrain from all incendiary utterances. Make it clear that each able-bodied man between the ages of 18 and 45 is, in fact, a member of the militia and that if it becomes necessary he will be called into active service.

This looks like impressment of citizens. This will not be popular if people from nonmining sections are impressed and if men are taken from the mining regions the result will be charges like those after the Ludlow affair where some men took part in the fray who were not members of the militia. With the threats of the union men such as they are, the removal of U. S. troops seems ominous. The authorities promise to deport a number of trouble makers who are citizens of other states. It would be well, however, for them to ascertain that they really have an adequate force before preparing for the execution of such a difficult program.

It is natural, however, for the citizens of Colorado to feel irritated with the presence of the U. S. troops. They have been used to set aside the laws of the Colorado legislature as also those of the United States. They have created an intolerable situation but if anarchy follows their removal, the conditions may conceivably become worse.

On Dec. 1 the Committee on Industrial Relations commences its inquiry into conditions in Colorado. The impression seems general that the militia will replace the army on that date but the change may be made sooner.

We are informed by Eli Jeffrys of the Jeffrys Coal & Mining Co. that after a short suspension of a week due to a misunderstanding, the Bloom mine at Starkville resumed operations. As soon as conditions were explained to Lindley M. Garrison, the Secretary of War, and to the colonel on the post, permission to reopen the mine was granted.

The Origin of the Possum-Hunting Movement

The following description of the uprising in western Kentucky is from the pen of Newell G. Alford, the engineer of the St. Bernard Mining Co. at Earlington, Ky.:

> Coal mining in western Kentucky for the past few months has been beset by dangers which call to mind the mysterious operations of the Ku-Klux Klan. Night riding by masked men was revived in Kentucky and Tennessee some eight years ago when the tobacco growers banded themselves together in a secret order for the purpose of exterminating the cultivation of the plant until a higher price might be secured for their crops. Farmers ignoring their warnings were visited at night by bands of masked men and whipped, the offender's buildings were often burned, while there were many instances here homes were riddled with bullets and men, women and children were shot to death. Former Governor Augustus E. Willson finally checked these outrages by putting state troops in charge of the situation.
>
> Depredations of a similar character were committed in Muhlenberg County in the early part of last April. This time the night riders operated under the name of "Possum Hunters." First a night fireman at the Gibraltar Mine near Central City was whipped by about 50 masked men under the shadow of night. Then an attempt was made to whip the store manager of the McHenry Coal Co. at Echols. This time the band was repulsed, four "Possum Hunters" being shot, while two were fatally wounded, their deaths being ascribed to quick pneumonia.

Movement Involves Five Counties

> The field of activities has since expanded into Ohio, Hopkins, McLean and Butler Counties. Rochester, Beech Creek, Drakesboro, Cleaton, Bevier, Dawson Springs, Ilsley, Carbondale, White City, Daniel Boone and Nortonville have been raided and notice served that negro miners must leave the camps. The reply of the operators to these threats has in every instance, excepting that of Carbondale, been the retention of the colored men and an increase of the vigilance guard on duty at the various operations. Carbondale has furnished the setting for two raids and a death, a miner being killed when a house was perforated with bullets.
>
> It is generally understood that the bond of secrecy among the "Possum Hunters" is extremely strong. They are initiated with a ceremony and the penalty for violation of their obligation is death.

Recent Acts of Violence

> On the morning of Nov. 13, the body of Henry Allen, 30 years old, was found dangling to a limb just back of the Advance Coal Co.'s mine near Hillside in Muhlenberg County. The body was clad in underclothes and the hands were tied behind it. Allen, an alleged leader of the Possum Hunters, was under indictment at the time for banding together with others for the purpose of intimidation. It is assumed that his threatened violation of secrecy brought upon him the extreme penalty.
>
> On the night of Nov. 14 a raid was made on the town of Island in McLean County and the tipple of the Consolidated Coal Co. was burned to the ground. This has been followed by a lull in night-riding activities.
>
> Earlington, the coal center of Hopkins County, has been strongly committed to law and order for many years and is always ready to lend its strength for its enforcement. It is not true, however, that a block house was built and provisioned in this town. This precaution was taken at Carbondale, a small camp in the same county, isolated from the neighboring settlements. The sheriff of the county, Thomas Logan, has expressed himself as being able to prevent any further lawlessness and claims to have control of the situation in Hopkins County.
>
> We have just received word that a coal tipple valued at $35,000, and owned by Shelby Gish, of Central City, Ky., was destroyed by fire by the "regulators" recently.

Operators' New Illinois Organization

The Illinois operators expect to form a new organization which will amalgamate them all into a common federation. There are now three separate bodies, the Illinois Coal Operators' Association, with headquarters in the Reisch Building at Springfield; the Central Illinois Coal Operators' Association, which comprises most of the Springfield district, and the Coal Operators' Association of the Fifth and Ninth Districts of Illinois, which is composed of the operators in the Belleville district.

The new plan provides for a parent association with four subsidiaries. One would cover the Danville and Springfield districts, another the northern coal field, a third the Belleville district and a fourth the southern coal field. Each subsidiary will act independently in its own district but conjoint action will be taken to prevent the passage of such legislation as appears injurious to the interests of the coal industry and ill-advised from the standpoint of the public.

West Virginia Coal Mining Institute

The winter meeting of the West Virginia Coal Mining Institute will be held at Huntington, W. Va., Dec. 10 and 11.

The morning of Dec. 10 will be devoted to the address of the president, Neil Robinson, on "A Plea for Posterity," after which the following papers will be read: "Cost Accounting," by Richard Smethurst, of Cincinnati, O., and "Coöperation," by the Hon. Z. T. Vinson, Huntington, W. Va.

At 2 p.m., two papers will be read, one on "Mine Gases," by Frank Haas, of Fairmont, W. Va., and the other on "The Pottsville Measures West of the Kanawha and New Rivers," by Ray V. Hennen, of Morgantown, W. Va., followed by election of officers and business session.

Introductory remarks by J. D. Van Scoten, of Washington, D. C., will open the evening session at 8 o'clock, after which Miss Mary K. Quick, of Moundsville, W. Va., will read a paper on "The Visiting Nurse," and Dr. Peter Roberts, of New York City, one on "Teaching English to Foreigners."

The entire morning of Dec. 11 will be devoted to a discussion of questions pertaining to mining. Some of the queries to be submitted at the question-box session are: What is the best roofing material for mine tenements? Assuming the force system of ventilation, is a door regulator preferable to a box regulator? Has the wisdom of the Compensation Law been proven by results so far obtained? Are oil safety lamps to be preferred to electric safety lamps in gaseous mines? Which is the best method of caring for the accumulation of dangerous gases in gob sections?

At 2 p.m., the following papers will be read: "The Benefit of Good Roads to a Mining Community," by the Hon. A. D. Williams, of Morgantown, W. Va.; "Storage-Battery Locomotives," by G. H. Shapter, Charleston, W. Va.; "Roof Supports," by Fred Keighley, Uniontown, Pennsylvania.

Extracts from a Superintendent's Diary

We have just passed through the excitement incident to the annual election of camp physician and as usual the best man didn't win.

During the past 18 months the man who was successful today has been living on the outskirts of our village and has been exerting himself worming into the good graces of all of our citizens. He had little difficulty in picking out families here and there who were dissatisfied with the efforts of the regular physician and after establishing friendly relations with them, he made use of their good will to his own advantage quite after the method so well understood by successful politicians.

The man whom he was undermining probably realized the danger but for reasons best known to himself, made no effort to block his enemy's campaign.

I foresaw the inevitable result months ago; it was history repeating itself to me as I had witnessed similar campaigns of quacking quacks at various times in the past, but my hands were tied. I was even more helpless than the chosen victim in that he might have struck back had he so desired, but I was absolutely helpless.

From the very beginning of my career as a mine superintendent this doctor question has persistently exhausted my patience and ridiculed my efforts to pass judgment.

The camp must support a physician and since he is to be everyone's physician, everyone ought to contribute toward his support. That's a self-evident, reasonable statement and everyone accepts it without argument, but any attempt to enlarge on that statement as a foundation is more than apt to inaugurate an earthquake.

If the officials of the operating company attempt to regulate the salary of the physician or the system of election or the educational requirements, they immediately run afoul not only the employees, but the company's legal department as well; these cautious lawyers know what it means to appear before a jury as defendant with medical testimony, when the plaintiff has a right to intimate that the physician is under obligations to the defendant.

If the salary of the physician is left to chance, it may become so small that no self-respecting physician will accept it, or so large that no self-respecting physician will enter the free-for-all fight necessary to win the appointment.

We have had physicians of all kinds. Some were strong on the pill treatment, while others ridiculed all pills. Some believed in prescribing for every ailment and others seldom prescribed at all. Since the doctors have to furnish the drugs as part of their contract, the ones who were free and easy with their drugs escaped the criticism of being stingy, but they were often grievously berated for unpleasant concoctions furnished. Because of the fact that the doctor's compensation is not dependent on the number of calls that he makes, it is easy to imagine that he will exhaust all reasonable means to discourage requested visits; at any rate every time one of them leaves an unpleasant dose, his motive is questioned.

And our physician's motives are subject to suspicion, not only at home but also in the world at large. The doctors' associations look with disfavor upon the control system and often accuse our physicians of violating the ethics of their profession.

Possibly some of these things have had an influence on our retiring physician; at any rate he does not seem to resent the outcome of the election as much as I do.

Final Figures on 1913 Coal Production

The U. S. Geological Survey has made its final report on coal production in 1913 in the United States.

The production of anthracite coal in Pennsylvania in 1913 was 81,718,680 long tons (91,524,922 short tons), valued at $195,181,127, an increase of 6,395,825 long tons, or 8.5%, and an increase in value of $17,558,501, or 9.9%. The gain is attributed to the light production in 1912 as a result of the fact that the mines were idle that year in April and May during the wage negotiations.

The production of bituminous coal and lignite was 478,523,203 short tons as compared with 450,104,982 tons in 1912, a gain of 28,418,221 tons, or 6.3%, and in value $47,324,213, or 9.14%. The total value of the bituminous coal produced was $565,307,658 in 1913 as compared with $517,983,445 in 1912. The average price of bituminous at the mines in 1913 was $1.18 per ton, the number of days worked was 232, and the average number of employees was 571,899.

Culm Recovery at Nanticoke

By Frank H. Kneeland

SYNOPSIS—Culm is conveyed to the washery by means of drag lines. The larger pieces are separated out and picked either mechanically or by hand after which all sizes above pea are crushed to that grade. All good coal above $\frac{1}{16}$ in. in diameter is loaded and shipped while that below this size is carefully stored on a separate dump heap.

The virtue of one age may be the sin of another; the economy of one generation, the extravagance of the next. So far as coal mining is concerned what small profits are made today are, generally speaking, secured through economies in production rather than through increases in the selling price. Many of us well remember the time when the beehive oven was considered the "last word" and most economical means of producing a satisfactory metallurgical fuel. Today, however, through the use of byproduct ovens enough material is conserved from the gases evolved to almost if not entirely pay for the whole coking operation, leaving the coke itself as practically a clear gain.

But the savings effected through modern methods and processes are by no means confined to the bituminous regions. Years ago during the earlier stages of anthracite development, there existed the firm belief that the small sizes such as chestnut and under could not be utilized to advantage. Certain it is that such sizes could not be sold, with the result that vast amounts of this material accumulated as dump or culm banks throughout the coal regions of eastern Pennsylvania. Today, all sizes of anthracite above $\frac{1}{16}$ in. possess a definite market value, and no inappreciable percentage of the revenue of many of the operating coal companies is derived from working over these culm banks and separating out and preparing for market the good coal contained therein.

Near the town of Nanticoke, in Luzerne County, Penn., the Susquehanna Coal Co. has in operation a culm-recovery and washing plant which is well worthy of notice. The washery proper, which may be seen in Fig. 1, draws its supply of culm from at least three separate and distinct banks by means of scraper lines entering the building from opposite sides.

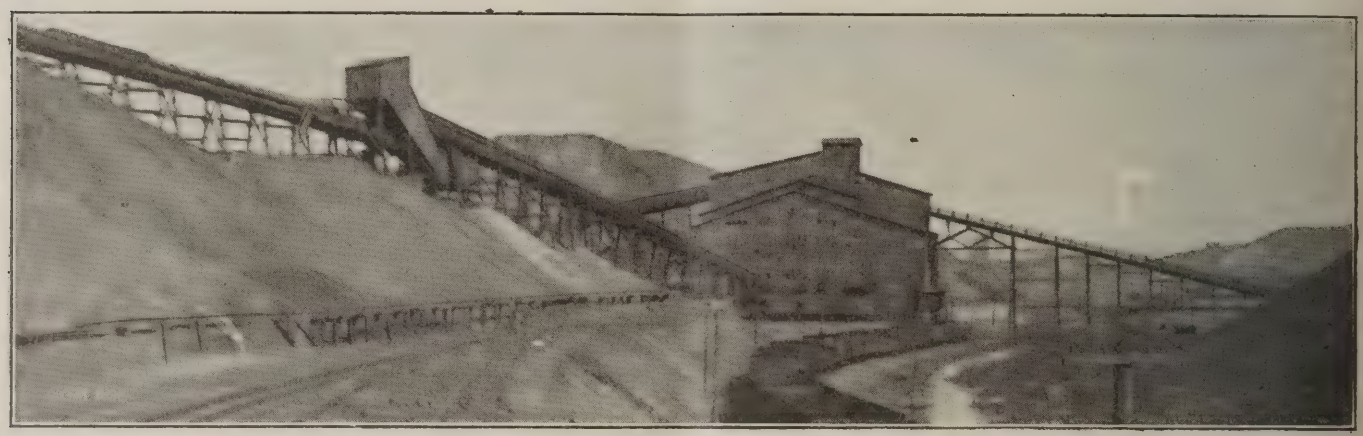


Fig. 1. General View of the Washery

To begin at the beginning, a single one of the culm banks being worked covers an area of about 440 acres to an average depth of approximately 100 ft. Assuming that this culm in place weighs only 50 lb. to the cubic foot, there is here alone 95,832,000,000 lb. of material, or 47,916,000 tons. It should be remembered, however, in considering these vast quantities that by no means all of this material is marketable fuel.

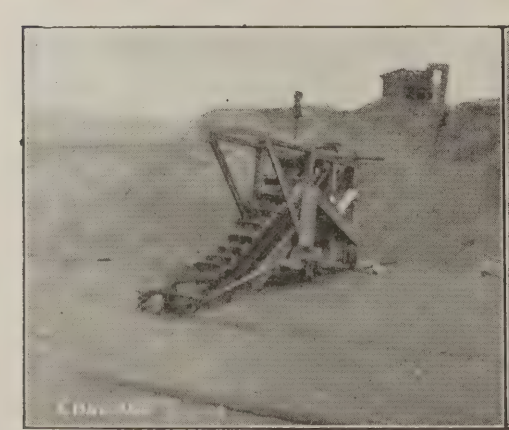


Fig. 2. Machine for Loading Culm into Conveyor



Fig. 3. Outer End of Conveyor



Fig. 4. Looking Down the Second Conveyor from the Driving End

This culm is transported to the washery by means of drag-line scraper conveyors into which it is washed by streams of water under considerable pressure, or by means of the device shown in Fig. 2, which is an electrically driven shovel or elevator to raise and spout the culm into the conveyor. In the figure this machine is shown standing upon ground which has been reclaimed from the culm bank.

Fig. 3 shows the outer or receiving end of the drag-line conveyor. This line is about 175 ft. long on a slope of approximately 25 ft. to the 100. It delivers to a second drag line 440 ft. long on a slope of approximately 21 ft. to the 100. Each conveyor is separately driven by an electric motor.

As may be clearly seen in Fig. 3, the outer end of the first drag line is in a considerable depression. In 1885, a cave occurred in the No. 1 Slope of the Susquehanna Coal Co., resulting in the loss of 29 lives. The men were caught in an old swamp under this culm bank. The recovery of the bodies was abandoned only after much effort and expense. The depression in the top of the culm bank due to the cave was about 150 ft. across and from 90 to 100 ft. deep. The low point where the end of the drag line is now located is very nearly at the exact spot where the cave occurred.

As culm banks were originally considered entirely a waste product, this one in many places has been covered with from 10 to 20 ft. of ashes from the boiler plant. These must now be removed before the culm is taken out. They are accordingly flushed off from the top of the pile by means of streams of water which convey them to a new ash heap. In Fig. 6 may be seen a workman controlling an ash-flushing stream as it travels down the hill.

From the discharge end of the second drag line, which like the first is a 9-in. pitch Simplex drop-forged chain carrying flights at suitable intervals, the culm is discharged to a flush chute. This is aproximately 400 ft. long on an inclination downwards of about 20 ft. to the 100. This chute discharges to the main drag line leading to the washery. This line is 468 ft. long and has a capacity of about 150 tons per hour. It is composed of two strands of Simplex chain, similar to that used in the first and second drag lines above mentioned, between which spaced every 36 in. are flights 8 in. deep and 26 in. wide. These, of course, operate in a properly formed trough. A general view of the flushing trough, the lower end of the main drag line, and the refuse disposal dump from the washery, may be seen in Fig. 5. Another single-strand drag-line conveyor, which is also visible in this figure, brings coal from another culm bank and discharges it to the main drag line a short distance from its lower terminus. A 100-hp. motor drives the main drag line.

On entering the washery, the coal is divided, one-half



Fig. 5. Looking Down Flush-Trough Delivering to Main Dragline; New Refuse Dump in the Middle Background

going to each side of the building. A second conveying line of the same capacity as the one above mentioned enters the washery from the opposite side, the material delivered by it going through the same processes as that from the side considered.

Nine sets of shaking screens are provided on each side of the building. There are also three other shaking screens, making 21 sets in all. Water is supplied from an overhead tank assuring an even supply at constant pressure. All shakers are fitted with Robinson bronze sprays, giving two jets to each segment of the screen, which is abundant for this purpose.

The coal as it comes from the conveyor is passed over a shaker consisting of four decks, the upper with 5-in. perforations, the second with 3¼-in.; the third with 2⅜-in. and the bottom deck being blank. This blank deck discharges to a second set of shakers. What coal comes over the largest perforations is hand-picked, while the discharge from the second and third deck is passed through anthracite spirals, the coal and slate being thus separated. All of these grades are then run through breaker rolls and crushed to pea size and smaller.

The second set of shapers separates the stove, nut and

pea coal which also is run through spirals. The nut and pea, after spiraling, are jigged to remove all impurities. after which all of these sizes above the pea are crushed to that size.

All sizes smaller than pea, from both sides of the building, are run over three banks of shakers of three screens each, separating the Nos. 1, 2 and 3 buckwheat. The material passing through the smallest perforations, or those $\frac{1}{16}$ in. in diameter, goes to a settling tank from whence it is conveyed onto the refuse dump by means of another drag line. The No. 1 buckwheat, after leaving the shaker, is jigged before going to the storage box. The silt or fine material carried in suspension by the water, as it leaves the settling tank, is deposited at the base of the refuse dump. From here the water filters through a railroad embankment to a small stream where it is impounded and again pumped up to wash the coal.

The No. 2 and No. 3 buckwheat are conveyed direct from the shaker to the storage pockets without washing or jigging. Each shaker is driven by 13-in. eccentrics giving a 5-in. throw. Parrish or flexible wooden eccentric rods are employed, while the shakers are suspended by elastic boards rigidly fastened at both top and bottom. All jigs are driven in pairs by a 10-in. belt from the main drive shaft. All other machinery is driven by



Fig. 6. Laborer Controlling Ash-Flushing Stream from Top of Culm Bank



Fig. 7. Flushing Ashes from Top of Culm Bank

1½-in. transmission ropes which are not spliced but are connected by Scott rope sockets. The main power belt for the entire building is of 8-ply rubber 24 in. wide.

The wastage or coal which is spilled when loading cars for market is brought to a tank below the track level from whence it is conveyed to the shakers for rescreening. The pump supplying the washery is a Jeansville simple duplex plunger machine with steam cylinders 30 in. in diameter, water cylinders 12 in. in diameter and having a 36-in. stroke. This machine runs at approximately 20 strokes per minute.

While means of successfully utilizing anthracite coal of $\frac{1}{16}$-in. diameter or less has not yet been devised, except through briquetting, it is believed that some such means may be developed in the future, and as has been stated above, the small coal from this washery is being carefully deposited by itself and not allowed to be contaminated with ashes or any other refuse. Future years may quite possibly see developed means of using such fuel as this to commercial advantage.

The early mining of anthracite was conducted in the best and cleanest coal measures. An appreciable quantity of what was even then marketable fuel was rejected by the slate pickers, together with considerable amounts of coal, to which slate adhered. The culm banks which today mar the landscape in many portions of eastern Pennsylvania represent in many instances as good a quality of fuel as it was possible to secure from any of the coal beds. As anthracite is made up mostly of fixed carbon, it weathers but little if any. The result is that the marketable coal secured from the culm banks when properly prepared and washed, as has been above described, represents as fine a grade of fuel of its kind, as it is possible to secure by direct mining at the present time. The cost of production on the other hand is comparatively small, since almost the entire process is carried on by the use of machinery.

West Virginia Mining Fatalities in October

The State Department of Mines has just issued the list of fatalities occurring in the coal mines of West Virginia during the month of October, showing that 34 deaths resulted from various accidents in that period. Twenty-six of these deaths were caused by falls of roof and coal, three by mine cars and locomotives, three were electrocuted, one crushed in mining machinery, and one killed by explosion.

Of the month's fatalities seven occurred in McDowell County, five in Fayette, five in Kanawha, four in Mingo, three in Raleigh, three in Logan, and one each in the counties of Marion, Ohio, Preston, Boone, Taylor, Tucker and Mercer. Of this number 17 were Americans and 17 foreigners.

The report just sent out by Chief Henry has a new feature, which shows where and under what conditions each man lost his life, in the hope that it may have its effect as a warning, and prevent workmen in the mines from taking similar risks without thoroughly acquainting themselves with the conditions. In the letter accompanying the report Mr. Henry says:

An effort has been made in making up this list to show just exactly how these persons have been killed, trusting that all who read the same may take warning and not permit themselves to take similar risks, which may also result fatally. The persons reading the list, occupied in similar positions, should profit by the mistakes of the unfortunates, and it is the duty of mine officials to eliminate, as far as possible, dangerous conditions and practices.

All are earnestly requested to carefully note how accidents occur, and then eliminate opportunities for repetition of same.

The Manierre Loader, known to coal men as an efficient box car loader for lump and small coal, has recently entered a new field. The Charles Warner Co. has installed one at their Cedar Hollow plant at De Vault, Penn., to load lime. As large lump lime breaks more easily than lump coal, and as this loader has been in successful operation for over six months, coal men are drawing an interesting lesson, which applies in their own field, from this recent departure.

Briquetting Plant of the Pacific Coast Coal Co.

By W. L. Kidston*

SYNOPSIS—A new plant using asphalt as a binder and having a capacity of approximately a million briquettes per 10-hr. shift is here described.

The Pacific Coast Coal Co., of Seattle, Wash., has been operating bituminous coal mines for a number of years at Black Diamond, Franklin, Burnett and Newcastle in Washington. These coal properties are comparatively short distances from Seattle and are at the terminus of branches of the Columbia & Puget Sound R.R., which is also operated by the coal company. The Black Diamond and Newcastle branches of the railroad converge at Renton on the southern shore of Lake Washington, where the coal bunkers of the company have been located for several years and where it owns suitable land for further development and for storage purposes. It is here that the company is now solving, by means of a modern briquette plant, some of its important fuel problems.

For some time it had been thought by the Pacific Coast Coal Co. that the most advantageous way to handle certain of its valuable coals would be to briquette them. Consequently, the late James Anderson, chief engineer, was commissioned to investigate the several plants operating in the United States and his studies led to the employment of the Malcolmson Briquette Engineering Co. to design, superintend the erection of, and turn over in working order a briquetting plant of a given capacity.

The original design of the plant called for coal-burning furnaces and the use of coal-tar pitch as a binder, but superior experimental results with asphalt led to its adoption for this purpose. The asphalt is eventually to be manufactured at the briquette plant, this change leading to the substitution of oil-burning furnaces which will ultimately use the distilling plant's byproducts.



Pacific Coast Coal Co.'s Briquetting Plant

As now constructed, the plant includes 10 buildings and 3 tanks. The buildings are: Raw coal bin 32x42 ft., drier building 36x105 ft., press building 32x64 ft., laboratory and office 18x28 ft., briquette-storage bin 20x 32 ft., demonstrating station 12x20 ft., watchman's cottage 22x28 ft. and a pump house.

The raw-coal bin is constructed entirely of fir timber bolted together. It stands 80 ft. high over all and contains two compartments of 400 tons capacity each.

The drier, press, transformer, and boiler and kettle

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buildings are constructed of structural steel covered with corrugated galvanized-iron sides and roofs, with the exception of the drier and press buildings, where the roofs are of asbestos-covered corrugated iron. The demonstration station, briquette-storage bin, laboratory and office, cottage and pump house are all of the usual frame construction.

The raw coal comes from the mines at Black Diamond, Newcastle and South Prairie in standard hopper-bottom coal cars, which are discharged into an iron-lined concrete hopper. A Link-Belt reciprocating feeder draws the coal from the bottom of the hopper and discharges it into the buckets of a gravity-discharge elevator of 100 tons per hour capacity.

From the elevator the coal is delivered by a conveyor into one or the other of the two compartments of the raw-coal bin, each compartment of which has a capacity of 400 tons.

All Quantities Are Carefully Regulated

Regulation of the quantity of the coal in the manufacture of a compact and homogeneous product begins in this



Rear View of Plant

plant at the time the coal is drawn from the raw storage. To regulate, first, the amount of coal to be used in the briquette; second, to control the proportions of the various constituents, and third, to insure a uniform mix, a positive mechanical feed of the plunger type forces the discharge from each of the compartments of the raw-coal storage bin onto its respective horizontal flight conveyor.

A motor through a chain-belt and sprocket connections operates the feeders. Eccentrics control the stroke of the plunger and the sprockets regulate the speed. Each feeder is designed for a capacity of 50 tons per hour but is operating under present requirements at the rate of 30 tons.

Flight conveyors, inclosed by steel casings, deliver the raw coal either to a pulverizer made by the Williams Patent Crusher & Pulverizer Co., or to one or both of the two driers made by the Ruggles-Coles Engineering Co., of New York.

At this point in the plant means are provided for putting the raw coal through the driers and crusher in any order either desirable or necessary to put in proper condition for mixing and fluxing.

The Ruggles-Coles driers are of special design for handling raw and fine coal. They are 9 ft. in diameter and 65 ft. long. Heat is supplied by oil fuel in Billow burners and furnaces made by the National Supply Co., of Chicago. The driers are driven at 8 r.p.m. and the work of reducing the total moisture in the coal to one-half of one per cent. is assisted by the drier fans which direct the flow of heat through the driers and at the same time draw the moisture-laden air from them and exhaust it through Cyclone dust collectors which are located just to the right of the raw-coal storage bin and immediately over the end of the drier building.

The drier fans are 4 ft. in diameter, and are each driven by 15-hp. motors. A General Electric Co. centrifugal compressor running at 3600 r.p.m. supplies low-pressure air for the Billow burners.

After the coal has been reduced to a sufficient fineness with all the dust returned to it from an elaborate system of collectors, and is in a state of almost absolute dryness, it is delivered by bucket elevators to the regulating bin. It is necessary that the moisture be reduced to a negligible quantity that the mixing may be thorough and the fluxing uniform.

On the discharge platform of the regulating bin an employee, called the "mixer," is stationed. He receives his instructions as to the quantity of coal and binder to introduce from the pressman by means of bell signals. By gate control, he regulates the amount of coal carried by an apron conveyor, and, by a steam-jacketed valve, the flow of asphalt binder which is introduced just after the coal enters the mixing conveyor.

This mixing conveyor is a horizontal steel shell with a rectangular cross-section and extends 30 ft. from the discharge of the apron conveyor from the regulating bin to the feed box of the fluxer. Within the shell are mounted longitudinally two shafts upon which are set series of paddles of the propellor type, which churn the coal and binder and simultaneously push it toward the fluxer.

From the paddle mixer the coal and the binder are discharged into a feeder which supplies the fluxer. The final and most important stage in the process of preparation takes place in this latter machine. It is here that not only the binding qualities of the mix are perfected, but the future physical properties of the briquette are created.

This fluxer, with 30 tons capacity per hour, is the largest of its type now employed in briquetting coal. It consists of three superimposed horizontal cylinders in a single casting. Within each cylinder there is mounted a shaft upon which are set arms, or paddles, which agitate the mix while superheated steam is introduced through double horizontal rows of tuyeres on each side of the cylinder. The function of this dry steam is to maintain the asphalt in a sufficiently fluid condition to permit its being driven into and impregnating the interstices of the coal under the beating action of the fluxer paddles.

From the fluxer the material passes through two screw conveyors to the feed box of the press. These conveyors were built under the Schorr patent, which is controlled by the builders of the press. It is necessary, where asphalt is used for binder, to cool the fluxed material before it enters the press, and this is done by an air-exhaust system attached to the conveyor and also to the press-feed box.

The Press

The Rutledge briquetting press used in this plant takes its name from J. E. Rutledge, vice-president of the Malcolmson Briquette Engineering Co., although invented by G. Komarck, of St. Louis. It is the third press of its kind to be constructed and the first to take the name of Rutledge. It embodies several improvements over the others.

Essentially, the Rutledge press consists of three parts—two major shafts with punch-ram attachments and an endless bed with die-plate sections. The three are synchronized by proper gear connections. The machine is driven by a 75-hp. motor connected by friction clutch and silent-chain drive.

Each shaft is fitted with 12 punch rams, each ram having 14 punches. The rams are so arranged that they assume an exact vertical position before they engage the die plates. A vertical pressure is exerted upon the material within these die plates from both above and below. Each pulsation of the press produces 200 tons pressure, which is equivalent to about 30,000 lb. upon each briquette.

Attached to the upper group of rams are 12 arms, or pilot punches, one corresponding to each ram, which engage the corresponding die plates and time them for the punches. It is the pilot punches which furnish the motive power for the die-plate bed. So nicely is the work of the press timed that only $^1/_{64}$ in. is allowed for clearance. Turning over at the rate of 10 r.p.m., the press produces 30 tons per hr., or 1,000,000 briquettes per day.

The press punches are constructed with removable tips, which not only provides for quick adjustment and economical maintenance of the parts receiving the greatest wear, but also for the change of the brand or trade mark, which is impressed on every briquette. This brand designates the particular coal used and serves as a guarantee to the consumer that he is getting the quality for which he is paying. These tips are made from forged and hardened nickel-steel.

The press weighs 80,000 lb. and all the wearing parts are made from nickel-, manganese- or vanadium-steel. The rollers are of nickel-steel, the tracks of manganese-steel, the cams and springs of vanadium-steel. All bushings are of bronze alloy made especially to withstand high pressures.

The lubricating system is both unique and practical. The oil is driven through the main shafts to the interior of the press and from there works its way to the surface, properly lubricating all parts and preventing the entrance of any dust or grit. The press and its installation alone cost about $50,000.

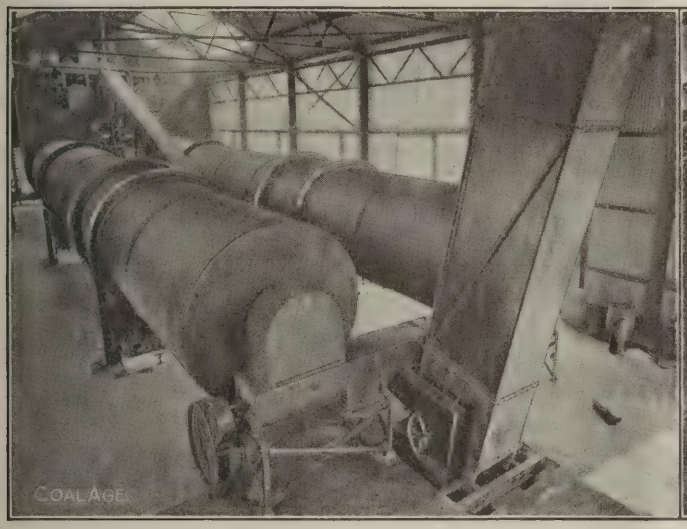
As the briquettes leave the press they slide down over a perforated apron to the cooling belt, or conveyor. The belt is over 600 ft. long and is composed of 47,000 parts. It is made up of flat links giving a large area for the free circulation of air. As the briquettes are carried forward and up to the briquetting storage pocket, they are subjected to a fine spray of cool water which assists in reducing their temperature as well as hardening them before they are discharged into the bin.

Hardness of Product Is Sought and Attained

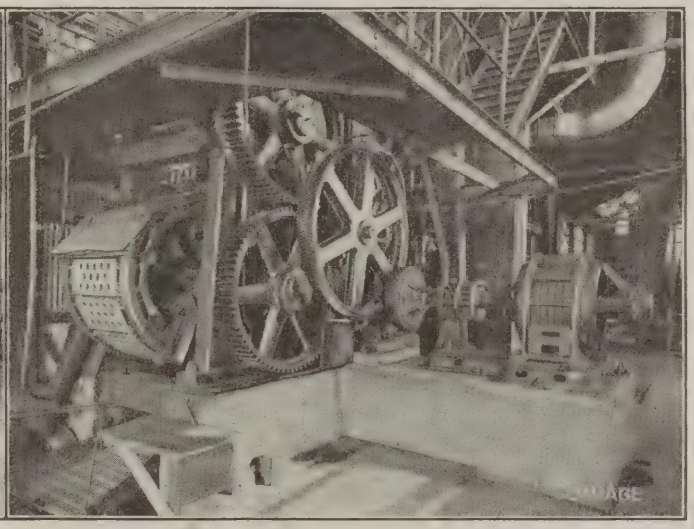
By the proper pulverizing of the coal, the use of all the dust, the employment of asphalt as a binder, and the efficient fluxing of the mix, a briquette of remarkable hardness is produced. They are dumped from the cooling belt onto a cross-conveyor over the bin and in turn discharged on a vibrating baffle, thence to another baffle, from which they enter the bin. From here they are discharged direct to standard coal cars for shipment. The breakage is practically nil.

The briquettes now made weigh 10 oz. each. They are cylindrical in shape with a diameter of 2¼ in. and a maximum height of 2¾ in. and have ⅜-in. dished heads. Their hardness can best be stated in percentage of breakage under the standard tumbling test employed by the United States Government in its investigations at St. Louis. There the tumbling tests showed from 10 to 12 per cent. of breakage for the usual commercial briquettes, while similar tests on the Pacific Coast Coal Co.'s product show but 3 per cent. breakage, indicating a superior hardness.

Asphalts of the specified grades are received in barrels at the oil spur at the rear of the plant from whence they are carried by gravity in a barrel chute to the asphalt yard on a level with the charging floor of the boiler and kettle room.



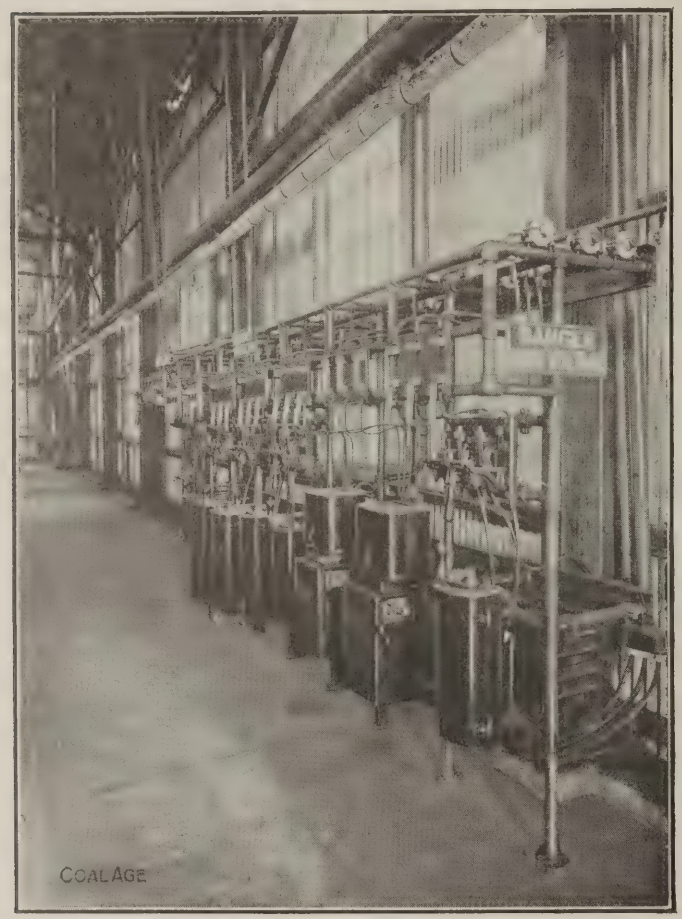
Big Driers for the Coal



Close View of the Briquetting Press

There are two melting kettles of 40 barrels capacity each, placed in a specially designed setting. The single Wickes boiler employed in the operation of this plant is fired by oil through Jordan burners.

At present, oil is received in tank cars over the same route as the asphalt and is stored in steel tanks on the side hill. From these tanks it is drawn off by gravity through an insulated steam-heated pipe line to the boiler house. Future plans of the company, however, contemplate the purchasing of crude oil and its refining at the plant for the purpose of obtaining the exact grade of asphalt required in the briquetting process. Fuel oil will then be a byproduct to be used as required about the plant.



The Electric Control System

Fuel-oil circulation is maintained by a Billow pumping system installed by the National Supply Co., of Chicago. Asphalt circulation is secured through a rotary pump made by the Kinney Manufacturing Co., of Boston, and by steam-jacketed lines and valves.

Special attention is given to the asphalt-feeding equipment. It is the mixer attendant's duty to see that asphalt is maintained at a uniform temperature and head, and that there is a uniform flow through the steam-jacketed valve into the machine. Provisions are made for a flow through a steam-heated valve from the regulator to the kettles. Thus circulation of the asphalt is kept up continuously and a uniform static head maintained.

Temperature regulation of the binder is not only essential but that of the coal and steam as well. To this end automatic Bristol recorders giving 24-hr. graphic records are placed directly in front of the operator in charge of each movement dependent upon critical temperatures.

Water for the system is heated and filtered by a Warren-Webster feed-water heater under automatic thermostatic control. Superheated steam for fluxing is generated in a special oil-fired Foster superheater, which has a capacity for raising 2000 lb. of steam per hour at 150 lb. pressure to 556 deg. F.

Electricity is purchased from the Puget Sound Traction, Light & Power Co., and delivered at 2300 volts alternating current to the transformer station, where it is stepped down to 440 volts for the motors and 110 volts for the lighting circuit. It enters the plant through two main control boards and is distributed throughout the works entirely in conduit.

Plant operation is divided into two groups—the drier group and the press group. Each has a main control board which permits direct or automatic regulation, not only of each motor, but of each group as a unit. The drier group is automatically controlled by an electric tripping device which is thrown by an overflow from the regulating bin.

As the press is the final and perhaps the most important machine in the process of briquetting, the control of the whole plant or any group or unit thereof is directly under the pressman by means of complete bell-and-light-signal apparatus, as well as a speaking-tube system. Every machine has an individual motor drive, and, where not direct connected, is equipped with a silent-chain drive, of which there are 15 in the plant.

For a daily check on all materials used in the manufacture of briquettes the necessary laboratory equipment has been installed and a competent chemist employed. As this is the first plant to use asphalt on a large scale it has required some careful experimental work, and special attention has been given to the study of the physical properties of the binder, much importance being attached to the penetration test. Besides the investigations conducted with reference to the asphalt, complete analyses are made every day of the coal and the briquettes.

The plant above described was constructed under the direction of J. C. Ford, president of the Pacific Coast Coal Co., and by his departments of engineering, building and mechanics, represented respectively by N. D. Moore, D. C. Brown and D. O'Leary. Field construction was in direct charge of Ralph Galt, briquette engineer, who is now superintendent of operation.

Coming Meetings

The American Society of Mechanical Engineers will hold its annual meeting in New York City, Dec. 1, 2 3 and 4, 1914. Calvin W. Rice, secretary, New York City.

The American Mining Congress' seventeenth annual session will be held at Phœnix, Ariz., Dec. 7, 8, 9, 10 and 11, 1914. J. F. Callbreath, secretary, Denver, Colo.

The Coal Mining Institute of America will hold its winter meeting Dec. 8 and 9, 1914, at the Fort Pitt Hotel, Pittsburgh, Penn. Charles L. Fay, secretary-treasurer, Wilkes-Barre, Penn.

The West Virginia Coal Mining Institute's winter meeting will be held at Huntington, W. Va., Dec. 9, 10 and 11, 1914 Prof. E. N. Zern, secretary-treasurer, Morgantown, W. Va.

The American Institute of Mining Engineers will hold its annual meeting in New York City, beginning Feb. 16, 1915. Bradley Stoughton, secretary, New York City.

The Kentucky Mining Institute's winter meeting will be held Dec. 4 and 5, 1914, at the Seelbach Hotel, Louisville, Ky. Ivan P. Tashof, secretary-treasurer, Lexington, Ky.

Editorials

The Colorado Mine War

Under this title the Rev. A. A. Berle, of Cambridge, Mass., writes in the *Bibliotheca Sacra* with great sanity and conviction on the recent events in the mine regions of Colorado. A 24-page reprint lies on our desk which anyone may have on application. So much of what he has said we have endeavored to say, howbeit probably with less force, in our editorial columns and in other parts of the paper and consequently we do not wish to be unduly critical where our opinions differ. However, we do take issue with these remarks:

> The State of Colorado must settle, before it settles all else, the question whether it is to have a state administration which will uphold law and will maintain order, and will do this without the intervention of the President of the United States and the military forces of the Union. At the present time, men are being denied their fundamental constitutional rights by the presence of the armed forces of the United States. The right of private contract, the right to seek employment and continue therein unmolested, has been destroyed, and there can be no peace till these are restored. There is no genuine pending issue which is not provided for in the civil code and there is no wrong for which the laws and courts of Colorado do not provide adequate relief. It is to the law and the courts to which these issues must be brought for their settlement.

With his declaration that the laws and courts should dominate we have no contention, but we do not see any reason justifying the military forces of the United States in being just now a law-disregarding body. There is no reason why they should abridge the right of public contract in Colorado any more than that they should do so in the Philippines.

That they have violated the rights of the citizens is due to their perverted use by the bureaucracy at Washington, and not to any inherent defects in the U. S. military forces. The militia of Colorado would possibly be no better and even might be worse if the governor of that state was as subject as the Wilsons to the hypnotic suggestions of the exploiters of labor.

Before the U. S. Army was ordered to the mining camps of Colorado, we advocated its use in settling the difficulties there existing. But we do not know whether we should now continue such advocacy in view of the fact that Colorado, at last, seems almost as a unit in standing behind the militia in defense of order. A new governor, G. A. Carlson, who appears to be less pliable than his predecessor, E. M. Ammons, will soon come into office and the voters seem to have elected him because they thought he would act promptly and with decision. The present governor is now prepared to act at least a little less flinchingly than before.

Perhaps a sufficing militia properly backed by funds can be secured. Consequently despite the promises of trouble from labor leaders, the state troops of Colorado *may* be able to handle the situation. At this distance we cannot presume to make judgment, which must be hard even for those who are on the spot. Certainly we have no brief against the use of militia for promoting order if they are adequate in themselves and in their support for the work proposed.

But we have always been prepared to hope that the autocracy at Washington might learn that this is the United States and that there are laws, at least in time of peace, which even the most arrogantly righteous of persons must obey. The oath of office might yet rise to plague the President. He might yet realize that he was not called like Deborah to make rulings on the spur of the moment in order that happiness and peace might come to the poor bewildered American people. We do not want to be dogmatic. Perhaps the Massachusetts divine, however, is right. He may know that the President is beyond reason.

Railway Rates and Their Relation to National Prosperity

An interesting address on the regulation of railway rates was delivered recently by E. B. Leigh, a prominent industrial manager in Chicago. In commenting on the Interstate Commerce Commission's disavowal of all right or power to consider the case of the railroads in the light of its influence as a stimulator of business, Mr. Leigh says: "It is manifestly of the utmost importance that somewhere in our government, responsibility shall be for that specific promotion of the general welfare which consists of protecting the railways against influences, governmental and otherwise, which tend to impoverish the roads, and with them the whole people." Mr. Leigh rightly contends that the general railway problem has been committed by congress to the Interstate Commerce Commission, and that the latter body is clearly shouldered with the responsibility. The powers now delegated to the commission make it more of a legislative than a judicial body.

Much of the wonderful progress of our country has been due primarily to the railroads. In developing their territories, they become immense consumers of material and thereby doubly contribute to general business prosperity.

The Commission as now created is possessed of greater power for either good or evil than has ever before been conferred upon any governmental body. It can confiscate private property or it may be the greatest of all conservators of the public good. It can upset industries or it may establish normal business and carefully regulate commercial conditions.

It is about time the United States Government came to believe more in the principle or plan of industrial progress through encouraging business. Federal solicitude for the welfare of the individual might be exercised with no little profit to the nation as a whole.

The railways have nothing to sell but transportation, and yet they constitute our greatest industry next to agriculture. Nearly 50 per cent. of the total iron and steel production of the country is consumed by the railroads, so it is quite evident that any restriction of railway consumption must seriously affect the country's prosperity.

In conclusion, Mr. Leigh asserts that unless the rail-

roads are placed in a position to make purchases on a normal scale, a return of business prosperity will be seriously retarded. Coal Age is quite of the same opinion, and although the coal industry is by far the greatest freight producer in the United States, we suggest that the Interstate Commerce Commission meet the situation more squarely, and endeavor to apply such first-aid to the railroad business as will help lessen the present industrial paralysis.

The Closing of the Lake Trade

The Lake shipping season is over, and it is estimated that the bituminous movement will aggregate between 20 and 22 million tons. This is rather disappointing, as the growth of the Lake business has been rapid the last few years, and the high mark of 1913, 28 million tons, has been looked upon as a normal season.

However, when we consider the business conditions of the entire country during the past year, the Lake coal traffic of 1914 has been good. The decrease as compared with previous years is not so large as in the iron-ore trade where the loss is fully 40 per cent. as compared with 1913, and 30 per cent. over a period of three years. The coal traffic of 1914 will probably average 100 per cent. as compared with the average over the last five years, and this indicates a healthy situation.

The largest change in the bituminous business was in the tonnage coming from the West Virginia fields. The Ohio No. 8 field, which usually ships about five million tons in the Lake trade, has not moved a single pound of coal this season, the mines having been closed since Apr. 1. Cambridge operators began shipping in the middle of the season and have sent their last cargo up the Lakes. The Hocking district did not begin to move coal until late in the season and will fall substantially below its standard of 1,500,000 tons of lake coal. West Virginia fuels have made up the loss.

How much of the Northwestern trade will return to Ohio mines another year is the important question just now. The West Virginia operators have introduced their coals into many places that have never before been willing to consider them; it was an opportunity that they fully appreciated, and when the salesmen go out for 1915 business, a battle will be fought to hold a major portion of the new trade.

Considering the large stocks carried over on the Upper Lake docks, the 1914 business has been extremely good. The winter of 1913-1914 was open and the consumption of coal in the Northwest was comparatively light. Shipments the first two months of the Lake season were not so heavy as usual; in some instances, docks did not want any new coal until July 1, but when shipping was finally resumed, the traffic was steady.

There was no car shortage and vessels were always more plentiful than cargoes. However, so much coal was put on the Upper Lake docks during the summer months that when Nov. 1 came, there was practically a full supply. An open fall made it unnecessary to ship heavily in the last month of the season and extra freight for the last trip and storage in vessels were not required.

Anthracite shipments have been quite in proportion to the bituminous. The decrease in lake traffic was a little larger up to Nov. 1 than in bituminous, but the hard-coal companies continued to ship heavily in November and will have as much coal at the head of the Lakes by the close of navigation as usual.

Absurd Reports of Increased Coke Production

About once in so often the daily newspaper reporters become seized with an apparently irresistible impulse to make the wheels go round. Since the biennial election of Nov. 3, which perhaps furnished the psychological moment, the daily papers have been full of alleged news of plant resumptions. In many cases the reader might readily be deceived, although without being acquainted in detail with the industries involved, he should perceive that with general business in its present prostrated condition, no rapid resumption in activity, such as suggested by these reports, could possibly occur.

Among recent reports have been many purporting to give news of resumptions in the Connellsville coke region. The coke trade is so aligned that such statements appear particularly ludicrous. One report is to the effect that 21,000 ovens are going in blast in the coke regions. This is 55 per cent. of the total number in the region, and represents approximately the entire number idle. As a matter of fact, several thousand ovens are at plants where the coal has been so nearly worked out that the ovens could not operate unless they were to use coal that had been shipped to them.

Coke is not stocked to any extent. It suffers from rehandling and from the weather, and there is never any material excess of production over consumption. Substantially the entire output of the Connellsville region is consumed in the iron industry, and the production cannot and will not be increased until the iron industry revives. Up to the present moment the production of pig iron has been declining. There may be prospects of a slight increase in pig-iron production in the near future, but there has been none to date, consequently no increase in the demand for coke, and certainly no increase in the production. The reports of coke ovens resuming are pure fabrications.

The Ohio Situation

It has been said that the Ohio miners on strike are anxious for a settlement, and only desire that the officials of the Union will let them vote on the subject so that they can exhibit that sentiment to their leaders. But the news from Coshocton is, to say the least, disturbing.

The price offered by the operators was 54.6c. per ton for machine-mined run-of-mine coal, 4c. of which compensation was for the pushing of loaded cars from the working face. That is a much better price than 47c., the magic figure for which they have been loudly calling in eastern Ohio. The trimmings of the banquet were as good as the main *piéce de resistance,* for turn either to right or left the operator in the proposed contract was required to pay for extras.

Though the scale committee approved of the arrangement, the men in a referendum refused it. The patience of the public with the Ohio resistance is stretched almost to the breaking point. Those whom the gods would destroy, they first make mad.

Sociological Department

The Y. M. C. A. Building at Ramage, W. Va.

Ramage is a mining village in Boone Co., W. Va., 53 miles southwest of Charleston, on the Coal River R.R. and on the banks of Little Coal Creek. Recently, it dedicated a Young Men's Christian Association Building and this is fully expected to be a success because the sentiment back of the movement has already ripened.

The endeavors of the Y. M. C. A. in Ramage were *not,* however, a success at the very first. The Association had to meet at the start the conservatism and suspicion which everybody, miners and mountaineers especially, have for something new. This questioning or doubt is not really a fault. Far from it; if there were no disposition to turn over every new departure and weigh it carefully, the miner and mountaineer and the general public would doubtless often be misled and beguiled. However, the average generous-hearted benefactor wonders why it is that his purposes are questioned when he knows himself that his intentions are above scrutiny. He cannot understand that others have no speedier way of determining the integrity of his aims.



The Village of Ramage, Boone County, W. Va.

The Early Conditions at Ramage

There has been a large amount of dissatisfaction among the miners of West Virginia; a sentiment of resistance has been carefully fostered by agitators and the strikes along Cabin Creek and Paint Creek have continually borne fruit in other districts though without creating violence such as the villages on those streams experienced.

The money earned was quite generally spent in drunkenness, and conditions in Ramage were disgraceful every pay day. The violence during these debauches caused arrests and suits and then quarrels between families, and thus involved men who had personally no grievance and were guilty of no offense.

Whenever the mines were idle, time hung heavily on the hands of the men and they seemed to scent trouble when there was none. As a result when they went to work they were listless and discontented and disposed to exert themselves as little as possible. When any man was discharged because he was not industrious and neglected his manifest duty, the rest became affronted and in violation of their scale agreement went on strike.

The Need for Amusement

As F. F. Taggart, the secretary and treasurer of the Spruce River Coal Co., the company operating at Ramage, has stated he found the men were desirous of some mild form of excitement. One day the mine was rendered idle, all the men leaving for a town ten miles away. Investigation showed there was some kind of traveling circus billed for that day. At another time a quack doctor with an interesting tongue and some sort of an instrument drew the miners about three miles to enjoy his vaudeville acts and listen to his story. It was then that the Spruce River people realized that amusement was needed.

The company at first proposed to do what they have since done, erect a building. The important thing is not to build anything but to create a sentiment and they gradually realized this. After all it is often a harder task to mold sentiment than to erect a hall, and not a few may prepare the equipment and yet have no degree of success. Here, say the miners, is a new company development, earning perhaps a slight income, doubtless intended eventually to earn a big income, and every employee is ready to shun it, feeling that he is successfully thwarting an unholy purpose.

It was Ira D. Shaw, international secretary of the Y. M. C. A., who was asked to come to Ramage to see what could be done. Mr. Shaw was not successful in his project; he did not succeed in getting the men interested.

They had their suspicions and so the matter was temporarily abandoned. A second effort made by Mr. Shaw was more successful and the work was started.

The Sentiment of the Miners

But after the foundations were built and erection began, there was more curiosity than real interest evinced in the construction of the building. In fact, it seemed to concern the people very little whether the hall was ever completed or not. Looking over the problem, it was seen that the building was an unimportant matter after all in comparison with the man who would conduct the work. Weeks were spent trying to obtain the right man for the job, one who had a good character, experience in Y. M. C. A. work, and an ability to deal with such men as the company employed. At last, C. W. Ridenour was secured and he took charge on Apr. 1 of this year.

The first 60 days were wholly spent in the completing and arranging of the building and in getting acquainted with the employees. No attempt was made to organize a Y. M. C. A. The association secretary endeavored to study conditions and to find out the difficulties with which he would have to contend.



A Closer View of the Building



Ramage Colliery of Spruce River Coal Co.

Description of the Association Building

The building has two stories and a basement and measures 32x70 ft. A porch extends along one side and in front of the building and halfway down the opposite side. The width of this porch with its ample length makes it large enough to accommodate all the people of the village when the warmth of the summer enables them to congregate on it. In the basement are shower baths and locker rooms, a motor and a pump for a deep well which pumps water to a tank on the hill. This tank supplies the town with water.

On the first floor are the general reading room, poolrooms, and in one corner a barber's chair, writing and checker tables and a large fireplace. Soft drinks and ice cream are also served here at a standard soda-water fountain.

The second floor has a general assembly hall, equipped with a moving-picture machine, platform, comfortable chairs and a piano. The floor is used for Sunday school work, lectures, miners' meetings and any good public cause. The building with its equipment cost close to $6000.

The Building Is Opened with Free Entertainment

The first two weeks the building was open, the community at large was entertained every other night with free moving-picture shows and the auditorium was always crowded. On Sunday night illustrated lectures with Biblical subjects were delivered.

From that time on, the Y. M. C. A. work grew so rapidly as to astonish those who had instituted it. A Sunday school was organized with Bible classes. Literary organizations followed and in less than ninety days the employees were coming to the building and spending their evenings there every night in the week but Monday.

Desirable Citizens Move in and the Drunkards Leave

It was gratifying to the mine management to find that there was always a waiting list at the mines as the result of their efforts to make things pleasant for their employees. Previously the men were always leaving and going to other mines. Perhaps too many mine officials look for a verbal appreciation of their efforts, and desire their employees to say how much they are pleased with the efforts of the company. The best of men are not built in that way. They may say it to their families and friends but they will hesitate a long time before they will express it to those who have materially benefited them. The best evidence of success is in the retention of the employees, in their participation in the benefits and in the anxiety of those not employed to obtain jobs and to profit by the change in location.

Strange to say not only did Ramage retain its desirable men and obtain more but it concurrently got rid of the drunkards, who moved out for other towns as if the new habits of the citizens made the village uncongenial to them.

The Employees Have Full Charge

The association was not organized till work was well under way. The board of directors was composed of the men employed at the mine and none of the company and none of its officers have anything to do with the association or serve in any capacity.

The Y. M. C. A. organized a strong baseball team and six acres of the company's property were turned over to it for an amusement park. This park was inclosed by the men who worked in the mines. A fee of 10c. is now charged for admission to the moving-picture show, children being allowed to enter for half price. Five cents is charged for shower baths. This entitles each person to an individual cake of soap and a large towel. Admission to baseball games costs 10 and 15c.; pool tables 5c., while ice cream and soft drinks are sold for 5c. each. The whole

revenue goes to the treasury of the association and further development work.

Some Account of the Village

A hospital is now planned, open to any of the families of the employees and a nurse will be engaged to give her whole service to this work. The houses are all comfortable four-roomed cottages with porches in front and a large space for gardens and front yard. The company has planted hundreds of trees all through the town, laid out flower beds and given away flower and vegetable seeds. Next year contests with prizes for the best gardens and lawns will be given.

The town of Ramage has two good schools with excellent teachers. The best of water is secured from driven wells and as sanitation is diligently taught and the yards are kept clean, the town is a model from a hygienic standpoint. In fact the people seem pleased to have their homes inspected.



The Ramage Y. M. C. A. Headquarters

The social feeling in the town is one of the leading virtues of the new work. The men and their wives are interested in the newcomers and desire just as ardently as the company officials that good citizens shall enter the community. They have no use for lazy, good-for-nothing men or drunkards. It is hard to estimate how much this means in promoting efficiency.

The Y. M. C. A. is more than earning running expenses. It is gathering in money for improvements which will be made as time passes.

Dedication of Building

The dedication took place Oct. 10, 1914. I. M. Taggart, the president of the Spruce River Coal Co., made the address of welcome. The governor of West Virginia, H. D. Hatfield, and the former president of the United Mine Workers of America, Thomas L. Lewis, delivered the principal addresses.

The following words from the speech of the latter are well worthy of consideration outside of Ramage as well as in that village:

> There has always been more difficulty in getting employees and employer together for the purpose of discussing a difference that there ever was in finally settling it. Neither of the parties in a controversy can approach a problem in an intelligent manner if they have been denouncing or endeavoring to take an unfair advantage of one another.

The Spruce River Coal Co., of Massillon, Ohio, has realized this element in management and the officers are generously ready to express their indebtedness to the Y. M. C. A. for satisfactorily solving the problem for them. Mr. Taggart, the president, recently stated in a letter which we have seen:

> The result of the small amount of money which has been expended is almost beyond our belief. I am advised that the National Young Men's Christian Association is putting forth a special campaign throughout the mining districts for this particular welfare work and it should receive the endorsement of the public and the press, as it certainly brings results.

It is to be hoped that not only at Ramage and Decota but all through the State of West Virginia, the good work may spread.

Recent Legal Decisions

Duty to Warn Employee Against Danger—It was the duty of a company which operated an overhead coal conveyor to warn an inexperienced employee, who was directed to oil the shaft of the conveyor, against the danger of his clothing catching on a revolving setscrew projecting from a safety collar, which was covered by dust and could not be seen when the machinery was in motion, and, having failed to perform this duty, the company is liable to the employee for injury resulting. (Halpin vs. National Safe Deposit Co., 184 Illinois Appellate Court Reports 13.)

Discrimination in Freight Rates on Intrastate Shipments—A shipment of coal from one point to another within a single state is intrastate in its character, as affecting the shipper's right to recover on account of discrimination against him in the matter of freight rates, although he intends to later reship the freight from the state. The fact that a shipper pays a discriminatory rate, knowing that other shippers are being given unlawful rebates, does not preclude him from subsequently recovering damages on account of the discrimination. (Pennsylvania Supreme Court, Mitchell Coal & Coke Co. vs. Pennsylvania Railroad Co., 88 "Atlantic Reporter," 743.)

Seller's Liability for Increased Freight Charges—Duration of Coal Sales Contracts—Under a contract to sell coal f.o.b. the selling coal company's mines, the company is liable for increased freight charges arising from a shipment from a more distant mine owned by a third party. Where a contract bound a coal company to supply fuel required by a brick company during "the remainder of the brick-making season, say from this date to Apr. 1, 1910," at a given price, the brick company was not entitled to require delivery after Apr. 1. "In interpreting the contract, the real intention of the parties must be allowed to control; but, if the contract is unambiguous, such intention must be gathered from its language. . . . The giving of Apr. 1 as the date of the termination of the contract was not a mere approximation of the time it should end, but an absolute limit, beyond which it could not extend; so, in our opinion, the contract did not require appellant to furnish appellee any coal after that date, although the brick-making season may not, in fact, then have ended." (Kentucky Court of Appeals, Nelson Creek Coal Co. vs. West Point Brick & Lumber Co., 152 Southwestern Reporter, 929.)

Legal Aspects of Labor Organizations—The decisions of the United States Circuit Court of Appeals for the Fourth Circuit, which were handed down in the cases of Mitchell vs. Hitchman Coal & Coke Co., and Bittner vs. West Virginia-Pittsburgh Coal Co., 214 Federal Reporter, 685, 716, establish the following principles of law relative to mine unions: A union organized for the betterment of the interests of its members may order a strike, and induce other employees, by peaceable means, to join the strike; being subject to restraint by injunction only when unlawful means are resorted to. When a combination of employees amounts to a violation of the Sherman Anti-Trust law, a mining company injured thereby is not entitled to maintain suit to enjoin continuance of the combination; the company's only remedy is a suit for treble damages resulting from the unlawful combination. The federal government is the only party that can maintain an injunction suit of this kind. When a mining company employs nonunion men under an agreement that if they join a union, the contract of employment may be terminated by the company, efforts made by members of a miners' union to persuade such men to join the union, without coercion or intimidation, does not constitute an actionable interference with the contract of employment. Injunction lies, however, to restrain the members from coercing or intimidating employees who decline to join the union.

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 6—There are two provisions that might well be included in the mine laws of coal-mining states and that would, I believe, result in a direct benefit to the industry as a whole. They are as follows:

First, a definite *educational training* should be required as a prerequisite to a candidate's taking the examination for mine foreman or fireboss. This requirement might be met in different ways. In many states, the law provides that no boy under 16 years of age can be employed in a mine. In that case, applicants for examination for certificates of competency should be required to produce evidence that they had attended school up to the age of sixteen.

Should, however, this early training have been neglected, in the case of any candidate who had been compelled to leave school before reaching that age, such a one might be permitted to offer, instead, a period of attendance at night school, or of study under a competent teacher, or the completion of a certain amount of correspondence-school work.

It seems self-evident that a requirement of this nature would result not only in the applicants being better prepared for the examination, but would provide or pave the way for the more efficient and intelligent operation of mines.

Second, there should be some recognition, in the mining laws, of *technical training* as a partial substitute for practical experience. This suggestion is made in behalf of the graduate mining engineer who has spent from four to six years in the study of mining engineering and, having secured his degree of Engineer of Mines, determines to work his way up and familiarize himself thoroughly with the practical operation of a mine. As evidence of his practical knowledge of mining, he desires to obtain a certificate of competency to act either as fireboss or mine foreman.

Under the bituminous mine law of Pennsylvania (1911), a candidate must serve five years before he is eligible to take the examination. During this time he must work for smaller wages than are commensurable with the time and money devoted to obtaining his education. It should be recognized, in the mine law, that such a candidate, by reason of his technical training, is undoubtedly better fitted after, say two or three years of service in the mines, than the man with less education but more practical experience.

Briefly, my suggestion is that a candidate for an examination, holding the degree of Engineer of Mines, should be credited with one year of service in the mines for each two years of college work. If he has had four years in college, he would then be required to serve three years in the mines; and if he has had six years in college, he would only be required to work two years in the mines, before being eligible for examination for a certificate of competency.

Compare, for instance, two young men at the age of 18, starting to prepare themselves for mining work. The one enters the mine at once and, after five years' work, becomes eligible for examination for a certificate of competency. During that time the other man has spent four years in college, obtained his degree of Engineer of Mines, and has had one year of practical work in the mines. Who will say that this man should work four years longer before he is eligible for examination? Should not his technical knowledge and training reduce this period of practical service in the mine and fit him earlier for the examination?

The five years of practical work required, by law in Pennsylvania, is a particular hardship to the college man. In many cases, he has been compelled to work his way through college and often graduates in debt for money that he has had to borrow in order to finish his education. For this reason, again, few of these men can afford to enter the mines as laborers or miners for five years of service, but must seek more remunerative employment that will enable them to pay off their indebtedness. While a three-year term of practical service in the mine would attract many, it goes without saying that a five-year term of such service practically debars from the examination all but those who have means and are independent.

As an illustration, permit me to cite a case that came under my observation. Ten years ago a young lad, after driving a mule for a year in one of the Pennsylvania collieries, decided that he could best improve himself by getting an education. He returned to school and worked his way through college, but found, after graduation, that it would be impossible for him to support himself and meet his indebtedness, while gaining the five years' practical experience in the mine, required to make him eligible for examination under the mining law. Thus debarred from the mines, he went West in the employ of a metal-mining company where his ultimate opportunities were no better, if as good, than those presented in coal mining. The period of service required, before he could secure a paying position, however, was much shorter and made it possible for him to meet his engagements.

In closing, permit me to say that coal mining is bound to be safer and more efficient if it attracts young men with technical training into the operating department. I believe the suggestion made of allowing *two years of college work to count for one year of practical service in the mine* would unquestionably result in gaining many desirable men who now feel that they cannot tide over the five years of practical work at relatively low pay.

M. D. Cooper, Mining Engineer,
Ellsworth Collieries Co.
Ellsworth, Penn.

Letter No. 7—I notice, in the inquiry of James T. Reynolds, fireboss, Coal Age, Oct. 3, p. 563, which appears under the title, "A Gaseous Mine," he raises the question of perspicuity in the statement of the Pennsylvania bituminous mine law, where the attempt is made to

define what constitutes a gaseous mine in Pennsylvania.

I have referred to the sections of the bituminous law to which Mr. Reynolds draws attention, and agree with him that the meaning of the law relating to a gaseous mine is vague and indefinite. The law does not give a clear and satisfactory definition of such a mine; but, to a certain extent, leaves the matter somewhat in doubt. In regard to Art. 28, Sec. 3, which reads: "The provisions of this act shall not apply to any mine employing less than 10 persons inside the mine, in any one period of 24 hr.," I fail to understand what the number of men working in a mine has to do with its being *gaseous* or *nongaseous*.

A mine generating explosive gas in such quantities that it can be detected by a modern safety lamp is, without question, a gaseous mine. This is true regardless of whether the number of men working on the inside is less or more than ten. The fact that the mine is liberating gas in such quantities that it is readily detected on the lamp *makes* the mine a gaseous mine, whether it be large or small and employing many or few men.

Like the bituminous statute of Pennsylvania, the mine laws of Tennessee do not clearly and satisfactorily define a gaseous mine; but leave this question in doubt. It is not stated anywhere in the Tennessee law what sort of a mine constitutes a gaseous mine. As a consequence, the duty of classifying such mines, in Tennessee, has devolved on the chief mine inspector, who has used his best judgment in so doing.

The Tennessee law, Sec. 9, Chap. 237, 1903, provides for four classes of coal mines, designated as A, B, C and D. The duty thus devolves on the chief mine inspector to list the mines of the state as belonging to one or another of these classes. In this classification, the greatest difficulty is experienced in respect to "Class A" mines, which by law "shall include every coal mine or other mine known to liberate firedamp (CH_4) at present or in the future, and all mines of this class shall be inspected . . . . at least once every 60 days." Besides this requirement of frequent inspection, Class A mines must be supplied with at least 150 cu.ft. of air per min., for each person, and 600 cu.ft. of air per min., for each animal employed in the mine at one time. In Class B mines there is required but 100 cu.ft. per min., and in Class C mines, 85 cu.ft. per min. for each person underground, while these mines require only 500 cu.ft. per min. for each animal employed.

It is easy to see, from the indefinite wording of the law, that it is an exceedingly difficult matter to draw the line of distinction, in respect to Class A mines, which are subject, by reason of such classification, to rigid restrictions. The law simply states that mines known to liberate firedamp (CH_4), at present or in the future, shall belong to this class. The question naturally arises, How much gas must a mine liberate before it can be claimed that it rightly belongs to Class A. This feature of the law throws an unnecessary burden on the mine inspector. In this regard, there is need for a clearer definition of the legal requirements. I will say, in closing, that all mining statutes should be so amended as to make their meaning clear and conclusive and leave no doubt as to the proper classification of the mines in the state.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

Problems in Rescue Apparatus

Letter No. 4—In reply to the criticism of W. H. Moore, COAL AGE, Sept. 19, p. 477, I beg you will permit me to present the following statement from the eminent physiologist in England, to whom I referred in my previous letter, COAL AGE, Aug. 22, p. 314.

In response to my request, this eminent authority sends me the following, in respect to the relative volumes of carbon dioxide exhaled and of oxygen inhaled, under different conditions of activity.

"On an ordinary mixed diet, for every four volumes of carbon dioxide breathed out, five volumes of oxygen are breathed in. In other words, one-fifth of the oxygen breathed is utilized in the oxidation of hydrogen to water; and four-fifths, in the oxidation of carbon to carbon dioxide.

"The water so formed may leave the body as sweat, urine or exhaled vapor. The water that is given off, to the breathing apparatus, from the exhaled air, is therefore almost entirely derived from water that has been drunk. Most of the oxygen inhaled at each breath is, of course, exhaled again into the breathing bag.

"Resting, a man requires about 250 c.c. of oxygen per minute, but when exercising hard, from eight to ten times this amount. He will thus use up the whole of his supply of 120 liters per hour when working hard, and be obliged to waste, through the escape valve, the larger part of it when resting."

H. N. ELMER, Sales Agent,
Siebe, Gorman & Co., Ltd.

Chicago, Ill.

The Ohio Situation

Letter No. 3—In my letter on the Ohio Situation, COAL AGE, Oct. 3, p. 561, I claimed that the eastern Ohio miners should receive the 47c. rate they were asking, because of the fact that the Hocking Valley miners sacrificed 2½c. per ton for the benefit of their brothers in the eastern part of the state. I made the assertion that "Equal labor demands equal compensation."

In the issue of COAL AGE, Oct. 17, p. 637, an editorial entitled "Small Potatoes," takes exception to what it styles my "moral maxim." Against this so called maxim, the writer of the editorial arrays "a stern economic truth," which he pronounces as follows:

> Wherever products are competitive and enter the market on equal terms, equal labor can demand equal compensation only when the products of equal labor are themselves equal.

This dictum is then illustrated by a supposed colloquy between a miner's wife and a farmer, whom I shall call "Brown." Brown is trying to sell potatoes to the miner's wife, who refuses to buy on the ground that Brown's potatoes are not as large as Thompson's, while the price asked is the same. To this Brown replies that he has worked as hard as Thompson, in growing the potatoes. "But," said the miner's wife, "it's taters I'm buying and not your labor."

In my opinion, this is not a parallel case with that existing between the two Ohio districts. The Ohio miners are selling labor and not potatoes, or coal, or any other commodity. Suppose, for a moment, that Brown and Thompson find that they cannot do their farm work without help; and each hires a man to work on the farm.

Brown cannot say to his hired man, later, "These potatoes are smaller than Thompson's and I cannot afford to pay you as much as Thompson pays *his* man." To such reasoning, the man would reply, "It's my labor you are buying and not potatoes. I work as hard as Thompson's man. He is not overpaid and I am entitled to the same wage. Last year, when you had the best of Thompson, you paid no more for labor than he did; and, this year, it's up to you to pay as much. If you cannot raise potatoes equal to Thompson's, the only thing to do is to leave the potato market to him and raise corn."

The reasoning is economically sound. It is only another way of saying that *the economic law tends to prevent the production of an inferior article.* In other words, *the article produced must be of sufficient value to pay for the labor of production, at a living wage.* This is the same conclusion reached in the editorial, where it says, "There is every need that the economic law shall arrest the hand of the man who chooses to produce an inferior article at an excessive cost."

I must not be understood as saying that eastern Ohio mines must shut down. Instead, let them improve their methods. In this connection, permit me to quote from Letter No. 6 of Supt. J. D. Jones, writing on the Foreigner in Mining, COAL AGE, Oct. 17, p. 643. Mr. Jones asserts, "Competition in the coal industry will soon cause efficient engineering to replace obsolete methods. . . . . While trained men and improved methods are generally forging ahead, I know mining properties in eastern Ohio and elsewhere that have made no progress during the last 15 years. On these properties one cannot find a labor-saving device or a machine designed later than 1900. . . . . Many coal-mine operators have been so engrossed in their sales department and other matters, that they have given no attention to the introduction of mining machines and other improvements."

Again, the editorial states:

> The wage scale of Ohio has made the state backward in conservation, negligent of first-aid, indifferent as to housing, and largely unprogressive.

While this argument has merit, it is not as convincing in behalf of conservation, first-aid measures, good housing, etc., as the argument generally used, "It pays." Ohio's labor rate has always, I believe, compared favorably with that of other states in the same competitive district. Illinois, also, is admittedly progressive.

I believe that the writer of the editorial to which I have referred is sincere, and I have not written in the spirit of opposition, but with equal sincerity, being convinced of the justice of my claim that *equal labor demands equal compensation.*

GEO. N. LANTZ.

New Straitsville, Ohio.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

A Centrifugal or Turbine Pump is a water turbine operated, by power, in a reverse direction. In a water turbine, the water imparts motion to the turbine wheel and power is developed; but, in a turbine pump, power is applied to turn the wheel or propeller, which imparts its motion to the water. The difference is the same as that between a windmill and a ventilating fan. The moving air turns the mill, while the fan operated by power moves the air.

A **piston pump** is one in which the cylinder is fitted with a piston, the area of the piston being equal to that of the cylinder.

A **plunger pump** is one in which the piston is replaced by a plunger that is moved in and out of the cylinder or pump barrel displacing the water therefrom each alternate stroke. A plunger, unlike a piston, is of necessity single-acting; except where the plunger is inside-packed, or the same plunger operates between two water cylinders. A piston pump may be either single- or double-acting, according to the arrangement of the valves that control the inflow and discharge of the water.

The terms **outside-packed** and **inside-packed** in reference to pumps refer to the manner of packing the plunger. A piston pump is necessarily always inside-packed. A plunger, however, may be either outside- or inside-packed. (See figure on the following page.)

An **air pump** is a pump used to exhaust air from a receiver or other chamber or vessel. A machine used to compress air is called an air compressor.

A **boiler-feed pump** or simply **feed-pump** is a small pump used to force the feed-water into a boiler.

A **sinking pump** is a pump used in sinking shafts. A special design of this class of pumps is adapted to hang in a shaft, so that it can be readily raised or lowered as occasion may require.

RECIPROCATING PUMPS

The essential parts of all reciprocating pumps are the pump **cylinder** or **barrel, piston** or **follower, plunger, piston rod, valves, packing rings** and **packing,** to which may properly be added the **air chamber,** which is an important adjunct of all high-duty pumps.

The **cylinder** of a piston pump is similar to that of the steam engine; but the **pump barrel** of a plunger pump may be of any reasonable size and shape.

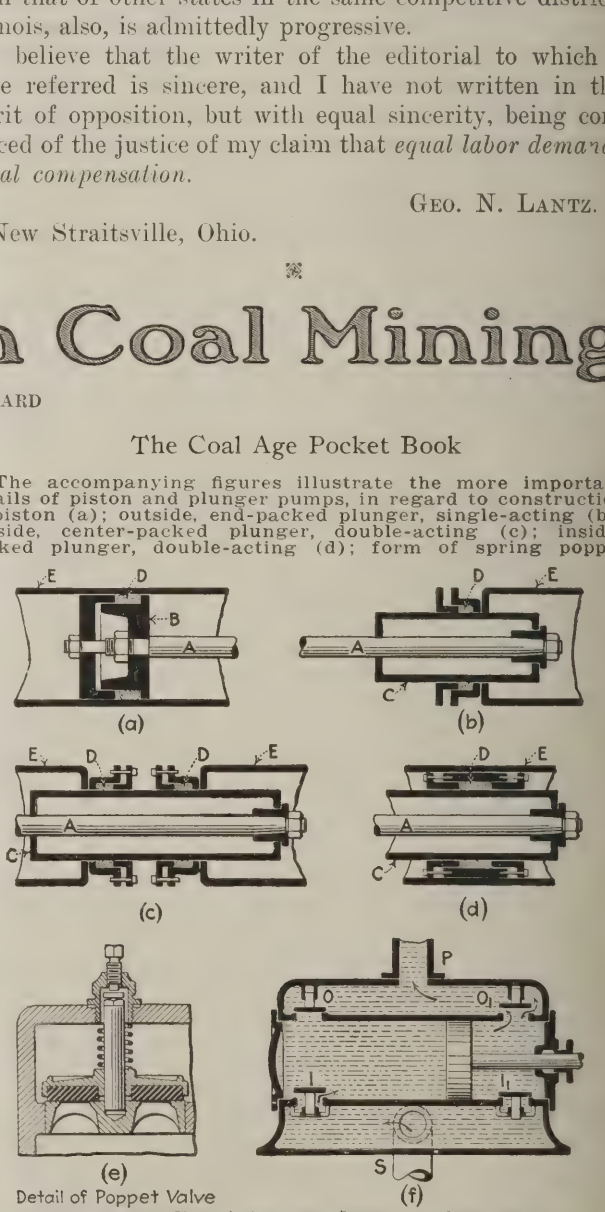
The **piston** or **"follower"** is a more or less solid disk attached firmly to the piston rod. Its circumference is grooved deeply to receive the packing or packing rings, as shown at (a) on the following page.

The **plunger** may be outside-packed, single-acting, as shown at (b); outside, center-packed double-acting (c); or inside-packed, which is also double-acting (d).

The **piston rod** of a direct-acting pump connects the steam piston of the pump with the water piston or plunger, so as to form a single, compact system. In some cases, the steam and water-ends have separate piston rods, which are connected, by siderods, into a rigid system.

The Coal Age Pocket Book

The accompanying figures illustrate the more important details of piston and plunger pumps, in regard to construction of piston (a); outside, end-packed plunger, single-acting (b); outside, center-packed plunger, double-acting (c); inside-packed plunger, double-acting (d); form of spring poppet



Detail of Poppet Valve

A = Piston Rod, B = Piston in two parts; C = Plunger; D = Packing, E = Cylinder or Pump Barrel, I, I_1 = Intake or Suction Valves; O, O_1 = Outlet or Discharge Valves; P = Discharge Pipe; S = Suction Pipe

COAL AGE

valve (e); diagrammatic arrangement of the suction (I, I_1) and discharge (O, O_1) valves in a piston pump (f). The outside, center-packed plunger is here shown as operated by the piston rod A, which will require to be end-packed in one cylinder.

Inquiries of General Interest

Resistance Required to Reduce Speed of Electric Motor

I want to ask if you will kindly answer the following question in COAL AGE:

How can I calculate the size and length of wire required to build a wall resistance sufficient to reduce the speed one-half, in operating a 15-hp., 250-volt, General Electric motor, using a current of 54.7 amp. when running at a speed of 600 r.p.m.?

An answer to this question will greatly oblige one of your subscribers and an interested reader.

Every day electric motors are becoming of increased importance in coal mining. The use of such motors underground possesses many advantages that appeal to mine superintendents and foremen, owing to the ease with which they can be installed and moved from place to place as occasion may demand. The installation of an electric motor will, of course, depend on the absence of gas in the mine.

MECHANIC.

Red Jacket, W. Va.

In order to obtain the best possible answer to this question, it was submitted to an engineer of one of the large electric companies, who is familiar with the installation and operation of this class of motors. His reply is as follows:

"With the same field strength as at 600 r.p.m. and with full-load torque on the shaft; that is to say, with the same current input of 54.7 amp. delivered to the armature, it will require about 52 per cent. normal volts impressed on the armature to give a speed of 300 r.p.m. This will leave 100 — 52 = 48 per cent. of the voltage to be absorbed by the external resistance, which gives 0.48 × 250 = 120 volts. Then for a current of 54.7 amp., the required resistance, according to Ohm's law, will be

$$R = \frac{volts}{amp.} = \frac{120}{54.7} = 2.2\ ohms$$

"Reference must now be made to the wire tables given in any standard handbook for electrical engineers. From these tables it will be found cumbersome to use most any form of resistor wire alone for this external resistance of 2.2 ohms. With either german silver or iron wire, which are the most readily obtainable, there would be required for this resistance at least 500 ft. of wire of the proper current-carrying capacity, with the maximum allowable temperature rise.

"There is, however, an alternative if rapidly flowing water is available. By submerging the resistance coil in a stream of water, the heat developed by the resistance in the wire is carried off and the overheating of the coil prevented. Adopting this method, it is found that 30 ft. of No. 18 B. & S. iron wire wound in the form of a coil and submerged in running water, as described, will carry a full-load current without overheating. I would suggest that iron grids, built especially for this purpose, be purchased from the company that supplied the motor. This would, without doubt, be the most satisfactory solution of the problem."

ELECTRICAL ENGINEER.

New York City.

Drying Washed Coal

I would like to ask of COAL AGE and its many practical readers any information they can give in regard to the drying of washed coal. What I desire particularly to know is whether a soft bituminous coal can be successfully washed and then dried so that it will contain only 3 per cent. of moisture. Information in regard to the successful installation and operation of such a drying process, together with data relating to the additional cost in the production of the coal, will be greatly appreciated.

JOHN HAMMOND, Mine Foreman,
Wharton Coal & Coke Co.

Coral, Penn.

The question of drying coal as it comes from the washery is not a new one. It was suggested, some time ago, in connection with the work of washing the coal. Such a drying process has been tried in a number of instances; but with what results, we cannot state.

The drying of the coal, in respect to the advantages to be derived thereby, can be viewed in two aspects. First, the extraction of the surplus water from the washed coal reduces, to that extent, the cost of transportation of the coal to market. Though the percentage of reduction is comparatively slight, the saving in freight charges on, say 1000 tons of coal per day, may prove an item not to be disregarded.

Second, the shipment of comparatively dry coal may and often does result in a shrinkage in the weight paid for mining, and cause a difference between the mine sheets and the railroad weights that would be serious. Again, the drying process would probably start an early disintegration of the coal, which would greatly increase the loss by breakage, in handling. It has been suggested that the drying of the wet coal may greatly assist the oxidation of the sulphur contained in the coal and, in this respect, prove a decided advantage by improving the quality of the fuel. These comparative advantages and disadvantages must be considered when estimating the additional cost.

A reference was made, some time since, COAL AGE, Vol. 3, p. 880, to a centrifugal drier, which was designed and placed on the market by the American Concentrator Co. (Ohio). It was claimed, at that time, that this machine could handle 50 tons of washed coal per hour, containing 13 per cent. of water and, by its operation, reduce this content to 5 per cent. The principle of the machine depended on the surplus water of the coal being thrown out by the centrifugal force developed by the rapid revolution of the coal in the machine.

We hope that further information in regard to this interesting subject will be forthcoming.

Examination Questions

Miscellaneous Questions

(Answered by Request)

Ques.—If 30,000 cu.ft. of air is passing in a square airway with a velocity of 500 ft. per min., what is the length of each side of the airway?

Ans.—Assuming this is an average velocity of the air current, the sectional area of the airway is

$$a = \frac{q}{v} = \frac{30{,}000}{500} = 60 \text{ sq.ft.}$$

The length of any side of a square airway of this section is $\sqrt{60} = 7.75$ ft., or 7 ft. 9 in.

Ques.—If the weight of a cubic foot of air is 0.0766 lb., and the water gage is 1.5 in., what is the height of the motive column?

Ans.—The pressure corresponding to a 1.5-in. water gage is $1.5 \times 5.2 = 7.8$ lb. per sq.ft. The corresponding motive column basing the calculation on the given weight of air is then $7.8 \div 0.0766 = 101.8$ ft.

Ques.—Explain the symbols, CH_4, CO_2, SH_2. What are their comparative weights?

Ans.—The symbol CH_4 is the chemical symbol representing a molecule of methane or marsh gas, whose molecular weight is $12 + 4 \times 1 = 16$. The symbol CO_2 is the chemical symbol for carbon dioxide, and its molecular weight is $12 + 2 \times 16 = 44$. The symbol SH_2, which is more commonly written H_2S, is the chemical symbol for hydrogen sulphide, and its molecular weight is $2 \times 1 + 32 = 34$. The densities of these gases referred to hydrogen as unity are 8, 22 and 17, respectively; the density of a gas referred to hydrogen being one-half its molecular weight.

Ques.—The portal to one of our mines is a concrete arch, at which the air is measured. The arch is 10 ft. high, 8 ft. to the springing line and 8 ft. wide; what are the perimeter and area of this intake?

Ans.—The perimeter of the intake is made up of the width of the floor, 8 ft.; the two vertical sides, to the springing line of the arch, each 8 ft.; and the circumference of the arch. The distance from the floor to the springing line of the arch being 8 ft., and the height of the arch 10 ft., the arch is an ellipse whose major axis is the width of the arch, 8 ft., and the minor axis, $2\ (10 - 8) = 4$ ft. The perimeter of a semiellipse is 3.1416 times one-fourth the sum of the two axes; or, in this case, $3.1416\ (4 + 8) \div 4 = 9.42$ ft. The total perimeter of the arched airway is, therefore, $9.42 + 3 \times 8 = 33.42$ ft.

The sectional area of the intake is made up of the area of the semiellipse, plus the area of the square below the arch. The area of the semiellipse is 0.7854 times one-half the product of the two diameters; or, in this case, $0.7854\ (4 \times 8) \div 2 = 12.57$ sq.ft. The total area of the cross-section of this intake is therefore $12.57 + 8 \times 8 = 76.57$ sq.ft.

Ques.—If there are 10,000 cu.ft. of air passing through a mine, in one current, and the resistance of the two shafts at that time is equal to the resistance of the mine; what quantity of air will pass through the mine if another airway be added of the same size and length as the first airway, the power on the air remaining the same? Assume that each shaft is 6x6 ft. in section, and 500 ft. deep, and that they are connected at the bottom by an entry 6x6 ft. in section, and 1000 ft. in length?

Ans.—First, find the reciprocal of the cube of the relative power potentials of the shafts and entries, which are calculated as follows:

Two shafts, $\frac{1}{X^3_u} = \frac{lo}{a^3} = \frac{1000 \times 24}{36^3} = 0.5144$

One entry, $\frac{1}{X^3_u} = \frac{1000 \times 24}{36^3} = 0.5144$

Two entries, $\frac{1}{X^3_u} = \frac{1000 \times 48}{72^3} = 0.1286$

In tandem circulations where the air passes through consecutive sections, the sum of these values for each section in the circuit, will give the corresponding value for the entire circuit, from which the relative potential value for the circulation can then be found. In the present case, the calculation is as follows:

Present circulation, $\frac{1}{X^3_{u_1}} = 2 \times 0.5144 = 1.0288$

(General potential), $X_{u_1} = \frac{1}{\sqrt[3]{1.0288}} = 0.9906$

Proposed circulation, $\frac{1}{X^3_{u_2}} = 0.5144 + 0.1286 = 0.643$

(General potential), $X_{u_2} = \frac{1}{\sqrt[3]{0.643}} = 1.159$

Having found the general potentials of the original and the proposed arrangements, the quantity of air circulated by the same power in each case is proportional to the potential ratio, which gives

$$\frac{Q_2}{Q_1} = \frac{Q_2}{10{,}000} = \frac{1.159}{0.9906}$$

$$Q_2 = \frac{10{,}000 \times 1.159}{0.9906} = 11{,}700 \text{ cu.ft. per min.}$$

This is a difficult question for examination; but the work could be greatly shortened by canceling the common factors in the first potential values, which would give the following relative values:

Two shafts, $1/X^3 = 1$

One entry, $1/X^3 = 1$

Two entries, $1/X^3 = \frac{1}{4}$

Present circulation, $1/X^3 = 1 + 1 = 2$; and $X_1 = \sqrt[3]{\frac{1}{2}}$

Proposed circulation, $1/X^3 = 1 + \frac{1}{4} = \frac{5}{4}$; and $X_2 = \sqrt[3]{\frac{4}{5}}$

Potential ratio, $\frac{X_2}{X_1} = \sqrt[3]{\frac{4 \times 2}{5}} = \frac{2}{\sqrt[3]{5}}$

Finally, $Q_2 = \frac{10{,}000 \times 2}{\sqrt[3]{5}} = 11{,}700 \text{ cu.ft. per min.}$

Book Review Department

COAL FIELD DIRECTORY AND MINING CATALOG OF COAL MINING EQUIPMENT FOR THE YEAR, 1914. 564 pp. 9½x12½ in. Keystone Consolidated Publishing Co., Inc., House Building, Pittsburgh, Penn. Cloth Boards.

"As uptodate as a telephone book and as concise as an encyclopedia" is the proud boast of the publishers and we must admit the claim has much merit. The early part of the book is full of advertisements of an extremely readable character with occasional technical matter which seems well chosen. The field has certainly been well canvassed and to a cursory examination the book seems remarkably complete.

The corporation has for several years been publishing a directory and therefore is well equipped for effective work. The ordinary directory of coal mines in fine type at the end of the book occupies 140 pages. To it is added an exceptionally valuable addition of 17 pages, cataloging mines by counties so that traveling-men and managers who wish to district their work will receive no little assistance in so doing.

The book reflects much credit on E. B. Day, whose ideas, we believe we are right in saying, it represents. There are many exceptionally good tables bound within its covers and we believe that many engineers and managers will find it serves as a text-book.

EXAMINATION OF LUBRICATING OILS. By Thomas B. Stillman, late professor of engineering chemistry, Stevens Institute of Technology. 120 pp., with 5-page index. 6x9 in. The Chemical Publishing Co., Easton, Penn. Cloth boards. Price, $1.25.

The study of oils is hedged about by much secrecy. The greater part of the literature published tells us how particular we should be to get the right kind of oil, what will happen to our machinery if we are indifferent as to the quality, how important it is that we should employ an expert to select our oils, but on the subject itself there is a silence more profound if not as ominous as that regarding the military status of nations. It is a study in which everyone who uses oils is interested, but when he would post himself he finds a conspiracy of silence, or rather, much noise, with but little valuable fact.

The text book above mentioned supplies much needed information and gives several specifications for lubricating oils, also the results of many tests made by the author. It seems possible that eventually the public will realize that there are oils of various qualities—specific gravity, composition, viscosity and the like—which will serve certain purposes equally or almost equally well.

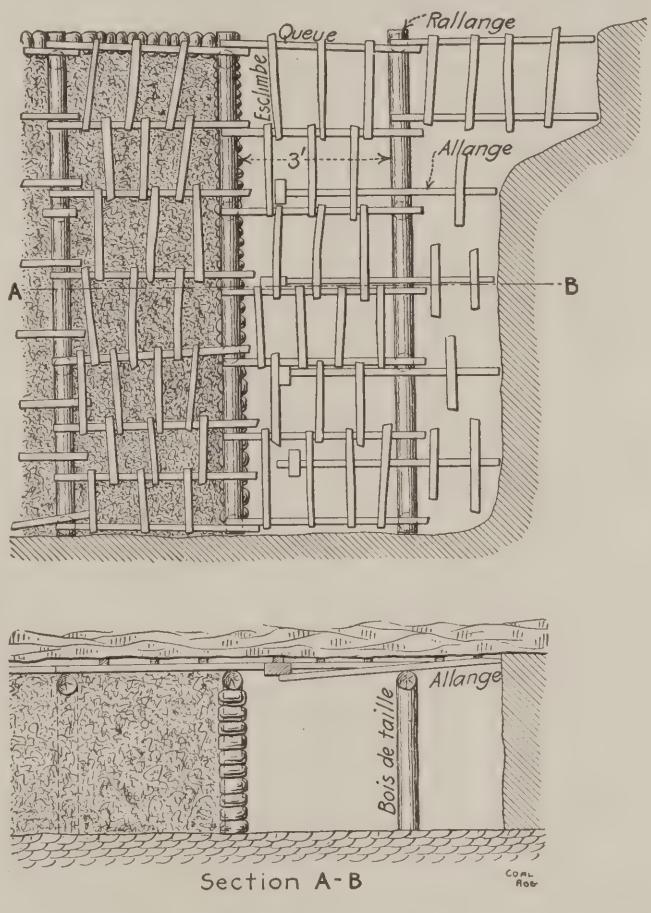
Consequently, the test that will be imposed will not be exclusively an examination of the oils as oils, but a trial of their lubricating qualities. The resistance of a journal revolving at a certain speed for a definite time will determine largely the excellence or the undesirability of oil. Chemists may demur at this test, but oil should be tested, like cement, by its performance. The Thurston, Henderson-Westhoven and Riehlé machines make such determinations. Of course, where the service of the oil is discontinuous, and the fluid is exposed to alternate high and low temperatures, a steady test with such a machine would be an unfair criterion taken alone. Furthermore, no machine appears to have been manufactured to measure the lubricating qualities of oil when fed to steam and applied thereby to surfaces.

However, the author is not sponsor for these remarks. His description of all of the various tests seems rather favorable to the use of everyone of them, and probably all of them have their value; some because oil has not only to lubricate, but has also to be fed to the surface; others because oil has to be stored for long periods, and still others because it has to be used at different temperatures and is liable to explode and may, moreover, have a chemical action on surfaces which are exposed to its influence.

MODERN PRACTICE IN MINING, VOL. III, METHODS OF WORKING COAL. By R. A. S. Redmayne, chief inspector of mines of Great Britain. XII + 204 pp. with 6-page index. 5¾ x 8¾ in. 167 illus. and one folding plan. Longmans, Green & Co., 4th Ave. and 30th St., New York City. Cloth Boards. Price, $2.

This book written by the chief inspector of mines of Great Britain fully sustains the reputation of the series. The numerous illustrations are not photographs of nothing in particular such as we find in so many books of mining but almost all are drawings made for the text. Most of them are small but all of them are of value.

We have taken one of these to illustrate a French method of timbering in a mine now no longer in the possession of the French people—Courrières. What the French call "bois de taille" we would term a "prop." "Rallange" should be translated "collar." We have nothing corresponding to "allange" in America, but "steel forepole" would best serve as a description. The "queues" are crossbars timbering from collar to collar and the "esclimbes" are shorter crossbars set on the "queues." On these the roof rests immediately. The "allanges" or steel bars rest on the "rallanges" or collars and are pushed forward to the face of the coal, their forward ends being pressed against the roof at the face by a chock of



THE STEEL FOREPOLING METHODS OF FRENCH MINES

wood bearing down lever-wise at the other end. The collars are kept within 3 ft. of the face and as the steel bars or allanges are only 20 in. apart there is little risk of death from falling roof.

The book deals with the opening out of a mine, the size of shaft pillars, the support of underground engine houses and stables, the protection of roadways and the actual workings in the coal. The room-and-pillar system has two chapters and longwall two more. The last chapter discusses the relative value of various methods of support at the face.

The treatise contains much regarding English, French, Belgian and German methods. It overlooks American systems almost entirely. The one illustration given of room-and-pillar working in the United States is almost unknown here and would be most uneconomical if adopted. It would not be fair to judge the book on its value as a reflection of our methods. Hardly a single volume written abroad and treating of America would successfully meet the searching light of such criticism.

Coal and Coke News

Harrisburg, Penn.

Much information was obtained from the Pennsylvania welfare and efficiency conference held in the capitol building during the past week. In a short time the legislature will be in session and a flood of bills will be offered looking to every sort of regulation of employment and the welfare of the employed. Many of these measures will be helplessly utopian, some will be so radical as to fall of their own weight, and some will be much more reasonable. This is the situation which confronts every legislature. Much has been accomplished in the last 20 years, most of it beneficial and some of it open to criticism in that it has failed to accomplish the good expected.

State Commissioner Jackson made an address which contains much food for reflection. An investigation made by him involving thousands of employees in various capacities in all parts of the state resulted in the surprising fact that one-fourth of these had changed their employment within a year. Some of this is due to the depression of late and much must be set down to adverse circumstances, but in any event it is not a good showing. Workmen who are constantly changing employment cannot be expected to have the high efficiency of those who work steadily at the same task for years. Operators cannot expect to get the best results with a shifting body of employees.

It was the opinion of many of the delegates that the legislature should establish a bureau of employment with offices in the chief cities, so as to bring employer and employee together. The system has worked fairly successfully abroad and might do some good here, but Commissioner Jackson stated that too much cannot be expected from such a system, because the man out of work in this city, for instance, might find it impossible to take a job in the Pittsburgh district or the anthracite region. But at least the plan is worth trying. If we have a revival of industry, as some believe confidently we shall, the problem of the unemployed will settle itself. If not, much scientific work will be necessary to adjust conditions.

Governor Tener, in addressing the conference, expressed regret that during his administration no workman's compensation and employers' liability act had been passed. The governor, in his first message, declared in favor of such an act, and the fact that the Senate of 1913 defeated such a bill, his friends always contended, has been the one sore spot of his administration with the governor.

PENNSYLVANIA

Anthracite

Hazelton—The discovery of a 6-ft. extension of the Lykens Valley vein at the Truseckow No. 16 coal mine of the Lehigh & Wilkes-Barre Coal Co. forebodes the continuation of operations at this plant for 25 years or more. The coal bed in question was discovered at a point where geological experts declared that there could be no coal. It will be developed at once.

Wilkes-Barre—Four men were seriously burned recently in a premature explosion in the Stanton Colliery of the Lehigh & Wilkes-Barre Coal Co. A first-aid crew went to their assistance, and it was necessary to dig some of the men from under a fall of coal and rock.

Nanticoke—The biggest production record for one month in the history of anthracite mining is said to have been attained in the month of October by the Truesdale colliery of the Delaware, Lackawanna & Western R.R. Co., when over 118,726 tons of coal were shipped from the big electrically operated breaker. This record considerably outdistances the figures of the Woodward and Pettebone collieries combined, the latter two producing a total of 115,395 tons for the same period of time.

Bituminous

Indiana—L. F. Sutter and A. P. Sutter recently bought the coal tract of the Plotzer heirs on Yellow Creek, containing 204 acres, the price being $125 per acre. This tract contains two workable coal beds, while 70 acres are in good timber. The purchasers will open mines and market coal.

Roscoe—Claiming that a stage of water too low to permit shipments of coal down the Ohio, and that the European war have had a damaging effect upon the coal industry, members of the local miners union No. 854, District No. 5, have sent out a general appeal for financial aid. In preference to accepting charity, however, the miners say that they will gladly work at any occupation that offers, and have applied to the Government for jobs on roads and public institutions.

Somerset—Mine Inspector F. W. Cunningham has instituted a suit in the criminal courts that is decidedly unique. He charges an assistant mine foreman of the Consolidation Coal Co. at Jenner No. 2 with neglect of duty for failing to have props set at the working face of the coal to protect the roof. It is alleged that failure to have the props in place resulted in the death of a foreign miner some weeks ago. The subforeman claims that he directed this man to set the props, as the roof appeared to be unsafe. He then proceeded to perform other duties, and when he returned in about an hour the foreigner was buried under a pile of coal, having failed to carry out his instructions.

Connellsville—The coke production of the Connellsville region remains about 200,000 tons weekly. There have been, however, in the recent past, a slight increase in the number of shipments and a decided interest is manifested in 1915 contracts.

Pittsburgh—The coal business of Pittsburgh and vicinity has undergone a slight beterment in the recent past, more inquiries being received, with slightly greater sales. It is believed, however, that the most hopeful feature of the business is the fact that there is practically no reserve stock. It is believed that with the slightest encouragement the coal companies will increase their production, thereby giving many of the idle miners employment.

Evans Station—The mines of the Evans Coal & Coke Co. at this place recently resumed operation after being closed or on half time for a considerable time past.

Trotter—Supt. B. B. Boyd, of the Trotter plant of the H. C. Frick Coke Co., has established a court of his own. Under orders that have just been issued, any employee who brings a prosecution before a justice of the peace or alderman without first consulting the superintendent is to be discharged. The superintendent hears the quarrels that arise and decides whether they are of sufficient importance to warrant going to law. Mr. Boyd says that hundreds of dollars a year are collected from Trotter foreigners because they are so easily led into bringing actions against their fellow countrymen.

WEST VIRGINIA

Fayetteville—The Minden mines of the New River & Pocahontas Co. are now using power for operation purchased from the Virginian Power Co. These are the first mines in this section to employ the Virginian company's power.

Elkhorn—The U. S. Bureau of Mines rescue car No. 8 is now engaged in the work of training the miners here in the use of the oxygen breathing apparatus and first aid to the injured. Great enthusiasm is being shown among both miners and operators and 25 men have already completed the full course of training.

Clarksburg—A coal deal of considerable magnitude was recently made public by the filing in the County Clerk's office of a deed from J. V. Thompson, of Uniontown, Penn., to Harry Ainsworth, of Moline, Ill., conveying to the latter a $\frac{1}{8}$ interest in the P. M. Jackson coal land of this county. The consideration involved was not announced. The tract consisted of 4008 acres lying on Jones' Run and Isaac's Creek.

Fairmont—In order that work may be given to its employees during the present temporary shortage of orders, the Consolidated Coal Co. has begun the concentration of men at the mines which are easiest to operate. Until orders are more prevalent and the car supply better, some of the plants of the company will remain idle.

Morgantown—The United Mine Workers of America are trying to organize the Fairmont field, Morgantown, Grafton, Clarksburg, Buckhannon and all intermediate towns being considered in the district. Meetings have already been held in Taylor and Preston Counties. A recent meeting held at Flemington resulted in a light attendance and but little interest was exhibited by those present.

ALABAMA

Birmingham—The U. S. Bureau of Mines has appointed a committee to arrange for first-aid instruction in all of the mining camps of the Birmingham district, and to plan for a big field demonstration to be held in Birmingham soon. Chief Mine Inspector Nesbitt is in charge of preparations.

KENTUCKY

Cannel City—The Bureau of Mines has requested the Kentucky Black Cannel Coal Co. to send samples of cannel coal to the federal laboratories in Pittsburgh for experimental purposes. The results of the experiments will be compiled in book form and will contain analyses not only of the cannel coals, but of many others.

Winchester—The mines of the Consolidation Coal Co. and the Elkhorn Mining Corporation are reported here to be resuming operations and to be giving work to several thousand miners who have been idle for some time. Business has shown decided improvement in the last week or so.

Henderson—Two long trains of tank cars leave here each day to supply Madisonville and the coal-mining operations in that part of the state with water for operating purposes. A year ago Madisonville constructed a municipal reservoir which it was expected would hold enough water for all purposes, but it has never been filled, the drouth of the past summer having kept it dry. This is the third successive year that trains of tank cars have hauled water from the Ohio River to the Madisonville consumers.

OHIO

Bridgeport—Additional reports of destitution among the families of striking coal miners in this district indicate that there will be great distress among them during the winter, as they do not possess any fuel, as a rule, and are without funds to provide themselves with food and clothing.

Columbus—No change has taken place recently in the labor situation in Ohio. Miners and operators in the eastern Ohio district have not yet arranged for the resumption of scale conferences and the entire district is idle. In the Coshocton district the situation is also unchanged. Since the rejection of the conference committee's report by the referendum vote of the miners, no steps have been taken to bring about another conference.

INDIANA

Indianapolis—About 75 retailers attended the meeting of the Indianapolis Retail Coal Men's Credit Association. It was decided that the limit of credit should not be more than 30 days. Figuring on profits, it was agreed that $1.40 should be added to the mine price and the freight charges before any profit could be shown to the retailer. This amount included loss in transit, breakage into slack by handling, cost of driver, upkeep of horses and equipment, cost of unloading at yards and overhead expense. It was shown that some coal sold at $4.50 a ton had actually cost the dealer $4.60.

Brazil—A fire recently destroyed the engine house of the Hamlin & Heck mine near here and was making toward the tipple. The miners were warned to make their escape by way of the narrow airshaft which opened near the burning building. All escaped promptly except six, one of whom was unusually large. This man stuck in the shaft, blocking the escape for the other five. It took desperate efforts to dislodge him, which, however, was finally accomplished. Fred Heck, one of the owners, was severely burned while holding the shaft door open for the escaping miners.

ILLINOIS

Chicago—An idea to reduce the production of surplus coals by returning to the 1¼-in. lump screen, as suggested by H. C. Adams, of the Jones & Adams Coal Co., is meeting with the general approval of operators in Indiana and Illinois, and it is likely that a meeting will be held shortly in Chicago to take definite action with respect to this suggestion.

Belleville—One of the most interesting mining propositions in Illinois today is the new National mine, southwest of here, producing between 200 and 300 tons per day. This mine was sunk and is owned entirely by miners. In July, 1911, 17 miners and three outsiders put in $1000 each and leased 135 acres on a 3½c. royalty. They did their own work, and when the mine was ready to produce hired a mine manager, who has no interest in the mine at all. It is one of the few mines in Illinois that has worked continuously six days a week, week in and week out. The coal is sold through a St. Louis jobber on a percentage basis, bringing the market price.

Pocahontas—The miners at the Pocahontas mine are out on a strike that threatens to last through the winter. For repeatedly breaking the rules of the mine, a miner was discharged. He happened to be the president of the miners' local, and failure on the part of the operator to reinstate him brought the men out. Arrangements have been made to keep the mine closed indefinitely, rather than make the reinstatement.

Grayson—A fire at the mine near here of the Big Creek Colliery Co. severely damaged the operation. It is expected that it will be a month or more before the mine will resume work.

Herrin—Of the three mines taken over last spring by the Taylor Coal Co. from the Southern Illinois Coal & Coke Co., namely, Possum Ridge, Oak Ridge and Walnut Ridge, only one is now worked. The Oak Ridge mine has been abandoned; the Walnut Ridge mine has not worked since last summer, with no prospects of working for several months to come, and the Possum Ridge mine is getting out a tonnage of about 800 or 900 tons per day. Lack of a sufficient market, and the low price of coal, are the only reasons given.

Marion—An unusually large tonnage of Illinois coal has recently moved to Ohio River points, coming from the mines adjacent to this place, and going to Brookport and Golconda, where it is loaded onto barges for points on the Ohio River. Low water has prevented coal coming down from the Pittsburgh field.

Taylorville—Two large suits for damages were recently filed in the Circuit Court, one against the Stonington Coal Co. for $5000 by Bert Duisy, injured in the mine on March 28 last, and the other for $10,000 damages filed by Chester Davison against the same company for injuries received in May.

Springfield—Francis Peabody, of Chicago, the closing of whose coal mines at Witt, Montgomery County, has resulted in acute suffering to 600 miners and their families, has taken steps toward relieving the situation and it is probable that some of the mines will work upon short time for a limited period.

Lovington—About 150 miners employed at the Lovington Coal Co. shaft recently walked out. The trouble, it is alleged, occurred over the employment of a nonunion driver.

MISSOURI

Chilhowie—The coal mines at Chilhowie were recently purchased for $200,000 by the Chilhowie Coal & Coke Co. These mines have been closed for a couple of years, but will resume operations immediately.

ARKANSAS

Heber Springs—The first real coal mine ever opened in Cleburne County is now being developed one mile west of Heber Springs. This operation is owned by Mortimer Frauenthal and the product is said to be a fine grade of soft coal equal to that shipped in from Alabama or western Arkansas. The coal measure now being worked is about 3 ft. thick, and it is believed that another and thicker measure lies below this.

Prairie Creek—Under the protection of Government troops operations at the Bache-Denman mining interests were resumed Nov. 20 in the Hartford Valley by nonunion labor. It is the intention to gradually extend operations until several of the mines will be running.

Fort Smith—Twenty-six persons, including former officials of the United Mine Workers of America, were indicted by the special United States grand jury investigating the troubles in the Hartford mining district. Among those indicted are Peter R. Stewart, former president of the mine workers for district No. 21, comprising Arkansas, Oklahoma and Texas; Fred W. Holt, former secretary; James S. Slankard, a constable at Hartford, and James McNamara, an ex-councilman of Hartford. They are charged with conspiring against the government to interrupt justice in connection with the troubles of the Bache-Denman Coal Co. at Prairie Creek, and also of sending threatening letters to U. S. Judge Frank A. Youmans and taking prisoners away from a deputy U. S. marshal and participating in riots.

COLORADO

Denver—It is announced that Governor Ammons will shortly request President Wilson to withdraw the federal troops from the Colorado strike zone, and it is expected that the regulars will begin their exodus about Dec. 1. Adjutant-General Chase has issued orders to the Colorado National Guard to hold itself in readiness for field service probably about that date. Although strike leaders have declared that reëntry of the state troops into the field would mean a resumption of warfare, the military authorities declare they are capable of handling the situation.

PERSONALS

R. C. Cofer has been appointed general inspector of mines for the Pocahontas Consolidated Coal Co., in place of Robert Wallace, promoted to general superintendent. Both promotions were well earned.

Howard I. Smith has been transferred from Pittsburgh to Urbana, Ill., as district mining engineer for the U. S. Bureau of Mines. This is the position made vacant by the resignation of J. T. Ryan, who has entered private business.

Judge Allie Young, formerly on the state Circuit bench, retained as counsel by the Consolidated Coal & Coke Co. at a salary said to be $15,000 a year, has opened offices at Whitesburg, Ky. He will give all his time to the company.

Thomas Hammond, of Vandegrift, Penn., for the past four and a half years chief mine foreman for the Pine Run Coal & Coke Co., has resigned his position, effective Dec. 1, and will accept a similar position with the West Penn Mining Co., near Apollo, Penn.

Jacob Yoch, for several years in charge of the North Breese Coal Mining Co.'s property at Breese, Ill., has been transferred to St. Louis as general manager for the International Coal Co. Edward Yoch comes from that position to take charge of the properties at Breese.

J. M. Roan, mine inspector of Ohio, has been called to the Poston mines, near Nelsonville, to settle the question of the percentage of fine coal allowable. The operators have complained that the miners are loading an excessive amount of small sizes which they desire stopped.

S. L. Sherer, secretary of the Big Muddy Coal & Iron Co., is on an extended trip through the Eastern coal fields. Mr. Sherer is also vice-president of the St. Louis Art Museum, and is expected to look up some masterpieces in the Boston and New York galleries for the St. Louis institution.

William McKinley, general superintendent of the Central Coal & Coke Co., has resigned. Mr. McKinley will probably do nothing this winter, but will reënter the business next spring for himself. William Harkes, formerly with the Northern Central Coal Co. at Moberly, Mo., will take his place as general superintendent.

John S. Jones, of Chicago, who recently purchased the holdings of the Sunday Creek Coal Co. from the receiver, expects to assume control of the property about Dec. 1. This property comprises 25 or 30 mines and large acreages in the Hocking and Sunday Creek Valleys in Ohio and along the Kanawha River in West Virginia.

Philip Carson, president of the Cresson Coal & Ice Co., of Philadelphia, Penn., was recently held under $500 bail for court by Magistrate Macleary on a charge of personally obstructing City Inspectors Sinclair and Mayer from weighing his loaded coal wagons. The prosecution is the first brought by the bureau since its inception in July of last year.

Eugene C. Roberts, Jr., who has for some time been the superintendent of the Fairmount mines in the Allegheny Valley at New Bethlehem, Penn., has been made temporary manager of the Copper Reef copper mines at San Carlos, Ariz., and has gone to assume his new duties. If the work does not suit him, he has the option of returning to his old position.

OBITUARY

Jeremiah B. Jones, 80 years of age, and for many years a coal operator and contractor, died recently at his home, 5240 Schuyler St., Germantown, Penn. Mr. Jones was a member of the Society of Friends and is survived by a wife and one daughter.

Samuel Dunkerly, aged 69 years, for 40 years general superintendent of the G. B. Markle Coal Co., died on Nov. 19, in the State Hospital, following an operation for stomach trouble. He was a veteran of the Civil War and for many years was assistant to the late G. B. Markle.

CONSTRUCTION NEWS

Ebensburg, Penn.—Surveys are being made by the Monroe Coal Co., it is said, for a railroad from the Pennsylvania line at Beulah, some distance west of Ebensburg, to the line of the Cambria & Indiana R.R., 14 miles distant.

Columbus, Ohio—The contract for the railroad bridge across the Ohio River at Sciotoville for the Chesapeake & Ohio Northern R.R. has been awarded to the Dravo Construction Co. of Pittsburgh. Work is to start at once.

Baskett, Ky.—Work was suspended at the Pittsburgh Coal Co.'s mine here last week while repairs were made to the hoisting apparatus. Cables broke and let two cages fall to the bottom of the shaft, a distance of 135 ft. Fortunately, no one was injured.

Claysville, Penn.—Word has been received that Owen Murphy, who was sinking a shaft at Coon Island, expects to resume operations in the near future. He was compelled to close down the work some weeks ago on account of the Baltimore & Ohio R.R. refusing to put in a switch. This matter has, however, been adjusted. Forty miners' houses will also be built during the coming winter.

Chattanooga, Tenn.—Contracts for the concrete and iron work of the new $1,000,000 coke plant for the Chattanooga Gas & Coal Products Co. have been let by the engineers, and actual construction work upon the plant at Alton Park will begin shortly. Approximately $200,000 will be expended on the concrete and iron work alone. Installation of the ovens and coal-handling devices will begin about Dec. 15.

Pottsville, Penn.—Work was recently started at the lower end of the St. Clair yards of the Reading Co. to install two large pumps for the purpose of bringing water from the Tumbling Run Dam to Wadesville. A large gang of men was also put at work at the Tumbling Run Dam preparing that end of the pipe line. The purpose of the company is to augment the water now coming from the Silver Creek Dam.

NEW INCORPORATIONS

Novinger, Mo.—The Novinger Coal Co. has been incorporated, with a capital of $6000, by John Appleby, Frank Beck and Charles W. Kelly.

Franklin, Ky.—The Franklin Coal Co. has been organized with a capital of $5000. The incorporators are Bailey Franklin, Lena Franklin and W. J. Franklin.

Seattle, Wash.—The Issaquah Coal Sales Co. has been organized with a capital of $50,000. The incorporators are W. J. Taylor and J. Oakwood. R. D. Ogden is attorney.

Yukon, W. Va.—The Hyper-Pocahontas Coal Co., of Yukon, W. Va., has been organized by D. D. Hatfield, J. W. Strickler and others, of Yukon, with a capital stock of $25,000.

Oklahoma City, Okla.—The Superior Smokeless Coal Mining Co. has been organized with a capital stock of $30,000. The incorporators are H. F. Wheeler, Charles T. Gibson and H. M. Sinclair, of Oklahoma City.

Jenkins, Ky.—The Elkhorn & Shelby Creek Coal Co. has been organized and will develop 400 acres of coal land near Penny, Ky. All machinery has been purchased and installed except the mining machines.

Massillon, Ohio—The Spruce River Coal Co. has been incorporated with a capital of $100,000, to mine coal. The incorporators are I. M. Taggart, F. F. Taggart, L. P. Schunke, E. R. Allricht and C. P. McLain.

St. Louis, Mo.—The Williamson County Coal Co., of Illinois, with a capital of $50,000, has been licensed to do business in Missouri, with an office in St. Louis. This is a subsidiary company of the Lumaghi Coal Co.

Parkersburg, W. Va.—The Mingo Block Coal Corporation, of Parkersburg, W. Va., incorporated at $2,000,000, has been organized by George S. Sarver, E. A. Ferrin, C. C. Brown and Edwin S. Nely, of Greensburg, Penn., and C. J. Pitgen, of Pittsburgh, to operate coal mines.

Glenville, W. Va.—The Frick Coal & Coke Co., of Glenville, W. Va., has been incorporated with a capital stock of $1,500,000, by Charles N. Lindley, Charles Edsall and H. J. Von Hemert, of New York, and David J. Carter and Harry W. Sheet, of Clarksburg, W. Va. It will engage in mining.

INDUSTRIAL NEWS

Philadelphia, Penn.—The Lennox Coal Co., with mines at Hastings, Penn., has established a Philadelphia office in the Stephen Girard Building, in charge of A. K. Cosgrove as Eastern manager.

Birmingham, Ala.—According to statistics compiled by Chief Mine Inspector Nesbitt, there have been within the last two years only eight fatalities in the coal mines of Alabama among mine workers under 21 years of age.

Kansas City, Mo.—In the past month three of the leading railroads out of here have changed from coal to oil as a fuel. The low price of oil and the uncertainty of the labor problem in the coal fields of the Southwest were chiefly responsible for the change.

Birmingham, Ala.—The Pierce Coal Co. has just opened a new mine in Jackson County, Ala., which is said to be one of the best equipped in the state. A railroad 20 miles in length has just been completed to connect it with the main line of the Southern Ry.

Columbus, Ohio—The officials of the Hocking Valley Ry. Co. have notified the Ohio Utilities Commission that the $4,000,000 6 per cent., one-year notes recently authorized by the commission have been sold for 98¼. The proceeds will be used to better the equipment of the road.

Toledo, Ohio—The general offices of the Royal Collieries Co. have been removed from Jackson to Toledo, Ohio, and are located in the Ohio Building. Eben Jones, of Jackson, is president, and E. W. Ervin is general and sales manager. The company operates in the Jackson district, and also in Kentucky.

Cincinnati, Ohio—At the regular meeting of the Ohio Valley Improvement Association, held in Cincinnati recently, resolutions were adopted calling on Congress to make adequate provisions for carrying on the work of improving the Ohio River. The object of the association is to secure a 9-ft. stage in the Ohio at all times.

San Francisco, Calif.—The first cargo of coal that has ever been brought to San Francisco from the United Kingdom arrived here from Glasgow recently aboard the British steamship "Crown," of Toledo. The coal was consigned to Balfour, Guthrie & Co., but it is rumored that the cargo of 6499 tons was really meant for a British warship.

Ringling, Okla.—The gradual return of the railroads of the Southwest to the use of fuel oil, together with the contracts made with numerous other industries to use oil for fuel, is increasing the number of independent refineries in the oil districts of Kansas, Oklahoma and Texas. The Southern Pacific, the International & Great Northern, and the Santa Fé have each placed large orders for this fuel.

Scranton, Penn.—A jury recently awarded Samuel M. Reese, of Scranton, damages to the extent of $1500 against the Peoples Coal Co. It was the first case of its kind ever recorded in this vicinity, that is, damages awarded against a mining company as a result of damage to property. The deed gave the Peoples company the right to mine the underlying coal, but did not waive surface support. Mr. Reese sued for $3000.

Washington, Penn.—Charged with having refused to pay his employees semi-monthly and being unable to get bail for $1200, John Greek, of Pittsburgh, president of the Greek Coal Co. and owner of mines near Washington, was placed in the county jail to await a preliminary hearing on Nov. 18. The action against Greek was brought by four of the 65 employees who were thrown out of work when he closed down his workings on Sept. 12, last.

Lynchburg, Va.—The Lynchburg board of trade is preparing to send a representative to the Interstate Commerce Commission to make application for a rate of $1 per ton on coal from West Virginia mines, the present rate being $1.50. The rate from West Virginia mines to Bluefield is only 65c. a ton, while to Norfolk it is $1.40 for export coal, and the Lynchburg board feels that something between these two rates would be a fair charge to that city.

Winchester, Ky.—When the projected tunnel is constructed by the Louisville & Nashville R.R. at Willow Shoals, Lee County, the line to the coal fields along the Winchester-Irvine extension will be shortened five miles. All indications point to an enormous traffic over this line. Construction work is still in progress on the terminals. Preparations are being made at this point to handle daily 1000 cars of outgoing and 500 cars of incoming freight.

St. Louis, Mo.—Under normal conditions, the Missouri Pacific-Iron Mountain system uses 11,000 tons of coal per day on the locomotives of the system. At the present time the daily consumption is 8000 tons per day. The curtailment of 3000 tons per day hits the Illinois field harder, perhaps, than any other field on the system. It is believed that 2000 tons per day of this coal formerly came from Illinois and the other 1000 tons from Kansas and Arkansas fields.

Philadelphia, Penn.—Coal dealers attempting to prevent the weighing of their wagons by inspectors of the Department of Weights and Measures, will in future be prosecuted. According to Chief Virdin, the inspectors have thus far found 80 per cent. of the coal scales defective, most of them to the disadvantage of the purchaser. One dealer refused to permit the inspector to weigh a load of coal leaving his yard, and after a preliminary hearing was held in $500 bail.

Philadelphia, Penn.—The American Federation of Labor in Annual Convention on Nov. 18, unanimously adopted a resolution calling on President Wilson to insist that the coal operators of Colorado immediately comply with the Federal plan of settlement of the strike existing in that state. In the event that they refuse, the President was urged to operate the mines in the interest of the people under Federal supervision until such time as the civil and political rights of the people are established.

Little Rock, Ark.—The greatest fight that the business houses of Arkansas ever put up is the protest against the proposed increase in the rates on coal. The increase to Little Rock consumers alone would amount to $50,000 per year and the state would be affected to the extent of over $100,000. The proposed increase is only on Arkansas coal and would throw the state open to an invasion of Kentucky and Illinois coals. The new rates are an increase on slack of 15c. per ton and 25c. on domestic sizes.

Prince Rupert, B. C.—The first carload of coal has been received at Prince Rupert from west-central Alberta and distributed among consumers for testing purposes. Its use for domestic consumption as well as for steam production is stated to have proved entirely satisfactory. As the charge for haulage is less than the freight between Nanaimo and Prince Rupert, a considerable trade is expected to be opened up between the Alberta mines on the eastern slope of the Rockies and points on the North Pacific coast.

Cincinnati, Ohio—Receivers Harmon and Smith, of the Cincinnati, Hamilton & Dayton Ry. Co., have filed in the United States District Court their report of the receipts and disbursements of the road for the month of September, showing a balance on hand on Sept. 30 of $546,606.43. The income account for the month shows a total operating revenue of $939,902, and operating expenses of $697,334, leaving a net operating revenue of $242,568. Various deductions leave the net income at $107,458.38 for the month.

Washington, D. C.—Solicitor-General Davis on Nov. 19 filed in the Supreme Court the government's brief in the suit against the Delaware, Lackawanna & Western R.R. and the Delaware, Lackawanna & Western Coal Co., seeking to destroy an alleged connection between the two concerns. The defendants were charged in the bill with violation of the commodities clause of the Hepburn bill. The suit was designed also to have a contract between the two companies, held to be in contravention of the Sherman anti-trust act.

St. Louis, Mo.—Of vital importance to several of the coal firms with offices in St. Louis is the suit filed on Nov. 14, in the Supreme Court of New York County, New York, by Robert Holmes, a director of the St. Joseph Lead Co., against said company and eight directors thereof, to compel said directors to enter suit against several coal-shipping companies, with offices in St. Louis and mines in Illinois, to recover damages to the extent of approximately $50,000 for losses sustained by the Lead company, caused by its directors and purchasing agents permitting the coal contracting companies to substitute inferior coal from the Standard field in place of high-grade coal from the Carterville field.

Toledo, Ohio—At a dinner given at the County Club in Toledo recently, attended by the officers and directors of the Hocking Valley Ry. Co. and the Chesapeake & Ohio R.R. Co., the full extent of the improvements to be made by both companies was discussed. Among the things contemplated is the double-tracking of the Hocking Valley from Columbus to Toledo, the enlargement of the terminal and dock facilities of the road at Toledo, the building of the line of the Chesapeake & Ohio from Portsmouth to Columbus and other steps to increase the efficiency of the roads. These improvements have been under consideration for two years, but have been held up. Now it is proposed to carry them out.

Columbus, Ohio—A bulletin compiled by J. M. Roan, chief deputy and safety commissioner of mines, has been issued by the Ohio Industrial Commission, showing that there were 22 fatal accidents in the mines of the state during the six months ending June 30, 1914. Significance attaches to the fact that the victims were young men, the oldest being only 45. This leads to the comment that the younger miners have faith in their agility and take risks in violation of rules. The need of greater discipline is urged. A second document issued by the same authority is addressed to operators, general managers, superintendents, mine bosses and mine foremen, which calls attention to the increasing dangers incident to cold weather. It points out that cold air entering the mine absorbs the moisture from the workings, leaving a dry dust which is a menace. Mine men are asked to heat the air wherever possible to at least 40 deg. F. and to see that the dust is wet down and kept moist.

Coal Trade Reviews

General Review

Cold snap fails to precipitate the expected activity in anthracite. Some favorable developments in bituminous but still much pressure to move tonnage. High ocean freights restrict foreign shipping.

The recent cold snap has failed to give the expected impetus to the hard-coal business. Considerable activity is noted among dealers, due to a rush of orders from domestic consumers, but the increase was not reflected back to the mines where occasional instances of curtailed production are still noted. Conservative observers are of the opinion that the winter's consumption will fall substantially below normal because of the destitution in most manufacturing districts, which will compel a rigid economy among the poorer classes. But in spite of these discouraging features, the current wholesale business continues on a satisfactory basis, with production and consumption generally well balanced, though the demand is at times intermittent, and salesmen are compelled to push hard for orders.

Bituminous reports continue uniformly optimistic as to the future, even from those districts suffering most acutely from the depression; but so many premature reports of an upturn have occurred in the past, that careful observers will be wary about accepting such in the future. There are undoubtedly favorable developments in the current market, but there is pressure in every direction to move coal, and prices continue weak.

Sacrifice sales are almost a daily occurrence, while the large accumulations at many of the distributing centers seem to indicate a lack of coöperation among the producers. Cheap fuel is the rule, and there is little encouraging in the situation. A number of foreign points are reported as hard pressed for coal, but the heavy demand for steamers in other lines has advanced rates entirely beyond any possibility of taking up this business.

Manufacturing demand in the Pittsburgh district has fallen off a trifle further,and though the movement in the retail trade is somewhat improved, negotiations on new contracts are so rare that there is scarcely any definite circular. Mine operations are at 40% capacity. Domestic trade in Ohio is notably more active, the cold snap having released many orders that were being held back; stocks have begun moving out of the dealer's bins and more orders are coming into the mines. The cold weather has been of such proportions that it was all the coal dealers could have desired, but the effects on the trade have not been so impressive as anticipated. The closing of the Lake trade has thrown considerable coal back on the market, which has not been easy to absorb in every case.

Middle Western operators see definite indications of an improvement as a result of the lower temperatures, and some increased industrial activity. The improvement has not attained to large proportions as yet, but prices are somewhat stiffer, and mine outputs are more closely regulated to market requirements. Indications point to a profitable season.

ATLANTIC SEABOARD

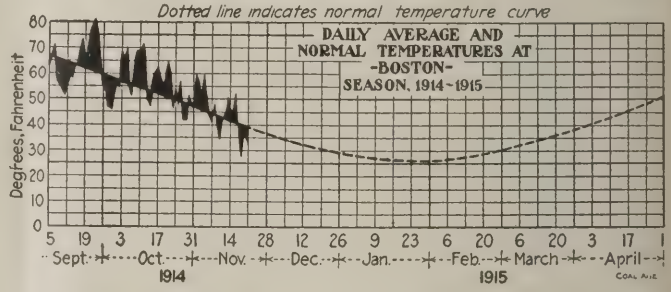
BOSTON

Improved mill business lends some encouragement, although stocks are too large to forecast any spot demand. Uneven production in West Virginia and Tidewater accumulations still large. Export trade off again. Anthracite dull.

Bituminous—There are a few favorable sides to the present market, but only a few. The demand on contracts is a shade better, due partly to the colder weather and partly to an improved mill situation. The latter, however, is hardly general enough to affect the spot market in any way, for stocks throughout New England are too large to permit any buying. Pocahontas and New River continue to show heavy accumulations at Hampton Roads and there is apparently a lack of coöperation among many of the mining interests. Some operators are holding down to a small output consistent with market needs, but others are not. The result is that sacrifices are made almost daily and the net return to the mines must be disappointing.

Inquiry for export has sagged off again, due probably to the lack of suitable carriers and the consequent inability of American shippers to name delivered prices. Several foreign ports are said to be in a bad way for fuel and it is unfortunate that some way cannot be found to ship the coal.

Prices are unchanged, ranging at the Virginia terminals from $2.50@2.75, depending on the degree of distress in which the shipper finds himself. Sales are not at all frequent, for most of the trade in New England is tied up on yearly contracts; many of these have had to be modified in view of the general softness of the market, but rumors of such adjustments are naturally hard to confirm.



Georges Creek is beginning now to show a larger volume of shipments than was the prospect a week or two ago. A few steamer cargoes have made up the arrears in this market and now conditions on this grade are restored to about the status that prevailed in October. No concession is heard from the season price of $2.85@2.95 f.o.b. Baltimore.

Many mines in the Pennsylvania districts are on a two-day per week basis and the outlook is anything but encouraging. There is pressure on all sides to make sales, and prices are still weak. All-rail there is only a scattering demand.

Water Freights are perhaps in better position than a fortnight ago. At least three coastwise colliers that have been in regular service between Hampton Roads and New England have been chartered to load grain for Copenhagen. Rates, however, are still not far from the minimum, 60@65c. being the utmost that would have to be paid for ordinary tonnage.

Anthracite—The trade is almost as dull as in bituminous. There is only a hand-to-mouth demand and the producers are slowing up operations in most parts of the field. All kinds and sizes are in more than adequate supply and salesmen are making strenuous efforts to place coal. The winter has not taken hold in this territory, although a moderate fall of snow last week will probably give some impetus to the retail demand.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.45	$1.15@1.50	$1.67@1.77	
Philadelphia*	2.10@2.70	2.35@2.70	2.92@3.02	
New York*	2.40@3.10	2.65@3.05	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.50@2.75
Boston†	.....	.....	.....	3.40@3.73
Providence†	.....	.....	.....	3.25@3.58

* F.o.b. †On cars.

NEW YORK

Recent embargoes have reduced the excess of bituminous and a slightly better tone is noted. Anthracite steady but rather quiet. All sizes in easy supply.

Bituminous—There are conservative members of the trade who believe they see definite indications of a change for the better, though conceding that the improvement must inevitably be slow. The foreign trade is undoubtedly helping out to quite an appreciable extent among the operators specializing on this business, even though the effect on the market as a whole must be negligible. The recent embargoes at the New York piers have also had a beneficial effect in that they have served to clean up the surplus stocks. In addition to this the new contracts are now beginning to come up for

consideration and a discussion of these is stimulating some interest. A moderate activity still prevails in the bunkering trade which is absorbing considerable coal, and in fact has been the principal mainstay of some companies.

On the other hand, the improvement is progressing so slowly that it obviously cannot assume important proportions before the close of the year, which means that two months' activity is the most that can be expected under the best conditions. It is further noted that there has been a further sharp contraction in operations at the gas coal mines, though this may in a measure be due to an attempt of the labor unions to organize that district. The bituminous market cannot be quotedly changed from the recent level, which we continue to quote as follows: West Virginia steam, $2.35 @2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@ 3.15; Georges Creek, $3.15@3.25.

Anthracite—With shoal water points facing the possibility of an early closing of navigation, there has been a mild rush for anthracite, although it has not at any time attained to abnormal proportions. Curtailment of operations is still necessary in a few isolated instances, and with considerably more than the average tonnage in storage it is not generally thought that the anthracite trade will experience any unusually profitable season, even though the weather be more than ordinarily severe.

A stronger demand is noted for nut coal, but egg is still off, and difficult to move except at low prices. Plenty of stove coal is now available to meet all demands and can be had in full and unrestricted cargoes. Pea coal is moving along in excellent form and is closely held at the full circular as a rule.

In the steam sizes, low-grade rice coal is exceedingly difficult to move. A few odd lots of buckwheat, No. 1, are being offered at $2.15 at Port Reading, but most of the business is being done at $2.35 or better. The high-grade steam coals are in active demand, especially barley and rice, though concessions are to be obtained on No. 1 buckwheat where it is necessary to move the coal promptly. The New York market is now quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.10@5.35	5.30	4.85@5.30
Stove	5.35	5.35	5.30	5.20@5.30
Chestnut	5.60	5.50@5.60	5.55	5.35@5.55
Pea	3.55	3.45@3.55	3.50	3.40@3.50
Buckwheat	2.80	2.70@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.45@2.25
Barley	1.80	1.70@1.80	1.75	1.25@1.75

PHILADELPHIA

Seasonable weather creates better attitude in anthracite. Domestic in good demand, but steam sizes inclined to be apathetic. Bituminous on about parity with week previous. Demand and prices the same.

Anthracite—There was a much better tone to the market during the past week. The cold weather has created a demand from those who have been putting off purchases from time to time, in the hope that the high temperatures would continue. As a matter of fact, there are indications that considerably less coal will be consumed during the winter than has been the case in the past. No such widespread industrial depression in the mill districts has existed for many years, and it is understood that families are doubling up with the intention of reducing expenses to the lowest possible basis. This means many tons of coal that otherwise would have been consumed, will not find a market, and it is fair to assume that before the winter is over, this will be felt by the anthracite operators and dealers.

Egg size is in a little better demand, due to the change in the weather, and stove and nut are keeping well up in front, with pea a close second. Buckwheat and rice have also felt the impetus, due to increased consumption by hotels and apartment houses, and for the present the outlook is good, although the market still lacks the activity that should prevail at this season of the year.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.80 @ 4.90
Stove	5.00	5.10
Chestnut	5.25	5.10 @ 5.15

Bituminous—The bituminous market has not shown any improvement. Quotations are unchanged, and the demand in no way increased. Some operators, however, are inclined to think that two weeks of good weather will create a better call, but this is not the general feeling in the trade, and the wish is probably father to the thought.

BALTIMORE

Anthracite is the strongest feature of the trade. Bituminous conditions adverse but a gradual building up is now looked for. Exports continue to hold up well.

Cold weather, considerably ahead of the schedule as set by last year, has proven a boon to the trade. Anthracite dealers are quite busy delivering coal to belated customers; there are apparently a much larger number than usual this year who have failed to lay in full supplies and a very good early winter business is expected. Most of the coal men are now pushing deliveries as fast as possible.

In bituminous many large mining sections of West Virginia, Pennsylvania and western Maryland are working not more than one-third time; some mines are on a one day per week basis. Cheap coal is offering everywhere. Pennsylvania low grades are quoted at 90c., and then being taken only in small lots. West Virginia gas three-quarter is to be had around 85c., with run-of-mine at 75c. Some western Maryland low-grade fuels were offered at 80c. There is a strong feeling that the trade has now reached its lowest level.

Exports continue to hold up fairly well. From one to two loadings, comprising shipments of from 2000 to 3000 tons, are being made daily. Were it not for the cutting off of the usual big shipments to Tampico and Vera Cruz by reason of unsettled political conditions in Mexico, the export trade would probably be considerably above normal.

HAMPTON ROADS

Colder weather causes some increase in demand for local consumption. Export and coastwise shipments are holding up fair considering existing conditions.

Dumpings over the piers at Tidewater, while not as heavy as anticipated, are at the same time showing up as well as could be expected. The coastwise movement has been principally to New England ports, with some small shipments going South.

Circular prices are still being asked for New River and Pocahontas run-of-mine, and even with somewhat of an accumulation at Tide no cut, so far as can be ascertained, is being made. The retail price on Pocahontas and New River run-of-mine is $4 per short ton, with lump at $5.50. Some of the suppliers are introducing a New River and Pocahontas nut coal into this market, which, although a quicker burning fuel, is much cheaper in price than anthracite, it is meeting with much favor and retails for $5 per ton against $7.50 for anthracite nut.

Authoritative announcement of destination of vessels is no longer made, but the following have cleared, presumably for the ports noted:

Vessel	Destination	Vessel	Destination
Vulcano	Genoa or Naples	Sava	Trapani, Sicily
Joseph Di Giorgio	Jamaica	Wegadesk	Cristobal, C. Z.
Talisman	Havana	Eibergen	Para, Brazil
Gladstone	Chilian Ports		

OCEAN FREIGHTS

South American rates entirely prohibitive. Some offerings to Italy. General cargo requirements heavy.

There are a few steamers available for coals to the West Coast of Italy, that can be obtained from about $5.76 to $6; these boats carry from 3500 to 6000 tons each. Also a few small boats that will entertain Cuban coal, say at $2 to $2.10 for Cardenas; $2.10 to $2.25 for Santiago; also Bermuda at about $2.10.

There are a number of orders in the market for steamers to take coal to Brazil and River Plate ports, but owners' ideas are so much in excess of those of the shippers' that it is useless to quote the figures they are asking. The demand for steamers for grain, horses, general cargo, etc., still continues and owing to the great absorption of tonnage for these trades a scarcity of steamers is now very apparent.—W. W. Battie & Co.

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
William P. Palmer		Baltimore	Mayport	1609	
Spiral	Norwegian	Philadelphia	Sagua	860	
Iona Tunnell		Philadelphia	Mayport	1118	
Theoline		Philadelphia	Jacksonville	850	$1.00
Wawenock		Philadelphia	Boston	258	
Yallaroi (ship)	Italian	Norfolk	West coast Italy	1363	
Tibagy	Brazilian	Virginia	Rio Janeiro	1552	
Zilia (bark)	Italian	Virginia	West coast Italy	1095	
Henry T. Scott		Baltimore	San Francisco	915	
St. Gothard	British	Baltimore	Mediterranean	1790	
Isle of Iona	British	Philadelphia	Havana	2467	
Courtney C. Houck		Norfolk	Tampa and back	1357	
		Boca Grande	Baltimore		
Henry J. Smith		Philadelphia	Boston	998	0.70
Governor Powers		Philadelphia	Bangor	1578	

Note—Steamers are indicated by **bold face** type, all others being schooners

LAKE MARKETS

PITTSBURGH

No regular asking prices on contract. Prompt market much cut up. Lake shipments ended. Operations reduced to about 40%.

There have been no negotiations for contract coal and it can hardly be said that there are any circular prices. While the majority of operators still regard the circular of a year ago, based on $1.30 for mine-run, as nominally in force, others, as recently reported, have announced circular prices on a basis of $1.20. With no transactions in contracts, and not even a similarity in asking prices, circular quotations may be disregarded entirely. For prompt coal the market is much cut up and no very close prices can be given, but the following quotations represent about as much as any seller could hope to secure: Slack, 60@70c.; nut and slack, $1; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district.

Shipments have practically ceased in the Lake trade, manufacturing demand has fallen off a trifle more and the retail demand, while somewhat better with the cold weather is still unsatisfactory, as dealers are carrying very limited stocks. The cessation of Lake shipments has not stiffened the slack market as much as is usually the case, because the demand for slack is particularly light and there remains considerable production on account of coal demand running so largely, in proportion, 1¼-in. for the domestic trade. Mine operations in the district are averaging about 40% of capacity.

BUFFALO

Heavy steel orders may help the bituminous situation. Some coal losing money on demurrage. General feeling more hopeful. Anthracite doing well.

Bituminous—There is some improvement in bituminous here and there, due mostly to the foreign orders for steel manufactures and textiles. People in other trades are agreed that business is improving and some say that it will soon return with a rush and before we are ready for it. There are undoubtedly many European buyers here and elsewhere, looking for manufactured articles that they can no longer find at home, and this is helping to restore confidence. The general feeling is much better than it was a month ago, though some shippers say the coal business will lag along a matter of six months after most other things are booming.

There is some coal still on track, paying demurrage, but it usually belongs to some inexperienced shipper. Prices are not much changed, being on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley sizes about 25c. lower, slack as a rule selling on a par with Pittsburgh.

Anthracite—There is a good movement of all anthracite sizes except egg, and shippers are disposing of it without much difficulty. The urgent demand for stove and chestnut is not in evidence and it may not be at all what it has been in former seasons, as there was more than the usual tonnage of these sizes sold early in the season and the weather has been unusually mild until the present time.

It was supposed that there was an excess of anthracite on the upper Lake docks, but some shippers who have lately visited that district deny this and it appears that the Lake season is going to end as briskly as the fleet and the weather will permit. Shipments are heavy, the amount cleared for the week being 148,000 tons, which is the largest since the middle of August. Practically everything is going to shippers' docks at the heads of the Lakes, which shows that the smaller points have all the coal they require.

TORONTO, CAN.

Situation much improved by the cooler weather but this was partially discounted by the heavy stocking in August and September.

Trade has been considerably improved since the cooler weather began, but much of this has been already discounted by the laying in of large supplies in August and September in anticipation of a possible shortage. The navigation season has practically closed and only a few more consignments by water will be received. The yards are well stocked for the winter's trade. Prices are as follows: Retail, anthracite, egg, stove and nut, $8; grate, $7.75; pea, $6.75; bituminous steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale f.o.b. cars, three-quarter lump $3.78; screenings, $2.64.

TOLEDO

Domestic trade greatly stimulated by colder weather. Steam business also shows some improvement owing to better factory operations.

Winter has arrived at last and has caused a remarkable revival in the coal trade here. The biting winds sweeping off the Lake are just what is needed to tone up the coal situation here and the effect has been fully as great as was expected. Orders have been coming in about as fast as they can be taken care of and the comparatively light stocks of the retail dealers are being reduced quite rapidly.

There has also been a noticeable improvement in the steam market; a number of idle factories are starting up. The Lake movement is light but still continues despite the rough weather. There is no congestion in the railroad yards and dealers are not anticipating any shortage. Prices remain unchanged.

COLUMBUS

The lower temperatures have stimulated the trade. Buying more active and prices better maintained. Lake trade now over.

Quite a little boost was given the trade in Ohio by the mild cold wave. The effects are noted in the increased orders received from dealers, who have been able to move stocks. Orders which had been held up because of mild weather were permitted to come forward and there was a general strengthening of the market. Stocks are being reduced to a point where a general buying movement will soon be started. In the rural sections there is also a better movement as farmers are now taking time to haul their winter's supply of fuel.

The steam business is still slow and there is no immediate indication of a change for the better. Manufacturing does not improve very rapidly but larger war orders may have an effect soon. Fuel requirements are not large as yet and much of the buying is being done on the open market rather than on contracts. Contract prices are about the same as the previous year. One of the best features is the strength shown in the small sizes, because of the curtailed production of lump. Nut, pea and slack and coarse slack are selling at higher levels.

The Lake trade is now over and on the whole it was as satisfactory as could be expected under the conditions. Because of the suspension early in the season the tonnage was not, of course, as large as in previous years. Some coal will be loaded yet for storage but it will be only a small amount. Congestion on the docks of the upper Lake ports is reported.

In the Hocking Valley the production was about 45% normal. In the Jackson and Crooksville fields it is estimated at 40% and in Massillon about the same. Pomeroy Bend field reports a large production, about 80% of the average.

The retail market is stronger and prices have been advanced slightly. There is still a marked preference for the fancy grades such as Pocahontas and West Virginia splints.

Anthracite is in good demand and prices remain strong on all grades.

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.55	$1.65	.....
Inch and a quarter	1.50	1.55	$1.40
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.35	0.45	0.35
Coarse slack	0.25	0.35	0.25

CLEVELAND

Fine coal prices continue to advance as the demand increases and the supply becomes smaller. The domestic trade is good. Some new business is being booked.

One large jobbing company has purchased a considerable amount of fine coal for shipment over the next two weeks, at $1.70, Cleveland. Fairmount operators are quoting slack at 65c. and 70c. at the mines. Ten operators named the lower price to local brokers at the opening of the week and three the higher price. Spot quotations are from 5 to 10c. lower than shipment prices, but when the stocks on track are cleaned up spot prices will probably go higher than shipment prices as there is no more of the cheap coal of a week ago to be had.

With the exception of Bergholz, Hocking, Youghiogheny and Panhandle there is no coal being quoted that can be brought into this market at a profit. Fairmount would cost the jobbers at least $1.80, while West Virginia No. 8, Cambridge, Goshen and other Ohio coals not quoted are either not to be had except on old contracts or at prices ranging from $1.75 to $1.80 on track here.

Considerable new business is being booked by operators and jobbers. The improvement continues in the market for fine coal. The three-quarter market is dead because of the

close of the Lake season on Monday next and there is so little going forward that only a neglible amount of this size is being made.

Many of the mines in Ohio are working only part time, some as low as two days a week, but a few operators with mines in the Bergholz field are working up to 90% of capacity. A number of operations in West Virginia and Pennsylvania are being closed down with the shipment of the last Lake order.

There is a fair demand for domestic coals, such as Bergholz, Hocking and Youghiogheny 1¼-in., but it is not large enough to keep the mines supplied with all the fine coal they can sell. It is generally the opinion now that slack will go no lower this winter.

Quotations for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.60	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.60	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1¼ in.	.....	$2.40	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$1.95@2.00	$1.95@2.00
Mine run	2.60	2.25	1.95	1.85@1.90	1.90
Slack	2.40	1.70@1.75	1.65@1.70	1.70@1.75	1.70@1.75

CINCINNATI

Colder weather has stimulated both the domestic and steam markets. Indications point to continued improvement.

The long expected cold spell materialized last week in fine style, freezing temperatures being a nightly occurrence. The resulting business was exceedingly good, as compared with that prevailing for a long time past. The steam trade also seemed to benefit by the change, contract deliveries being nearer a normal mark than at any time so far this season. A satisfactory amount of domestic business has been handled during the week by dealers and operators alike, with every indication that this will continue at the usual winter volume for the rest of the season.

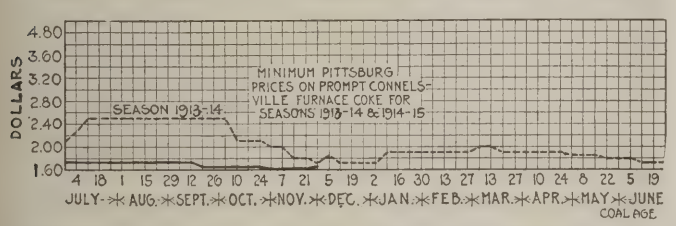
All that can now be asked is a better tone in the iron and steel trades, which would mean a good consumption of steam coal for the winter.

COKE

CONNELLSVILLE

No demand for prompt coke and negotiations on contracts proceeding very slowly. Prices soft. Production and shipments approximately stationary.

Negotiations continue on a few furnace-coke contracts for next year, either the first-half or the whole year, but the possible buyers are not pushing matters at all. It is understood that $1.75 has been quoted for the first-half of the year without arousing any interest. There is scarcely any demand for prompt coke, the few furnaces operating being well supplied on contract. There have been occasional sales of small lots at $1.60, but this price could possibly be shaded.



Prompt foundry coke is weaker, there being offerings at $2.15 to consumers, equivalent to $2 to dealers. The four large operators that made contracts at $2.35 to dealers and $2.50 to consumers for the twelvemonth ending June 30 are adhering to the figure for prompt shipment, in order to protect their contracts, in which there is usually an expressed or implied price guarantee. There is no demand for contract foundry coke at this time. Reports that many ovens are being freshly fired in the Connellsville region are purely fabrications, for with pig-iron production still tending to decline, the requirements are lessening and coke ovens are more likely to go out than to go in. The market is quotable as follows: Prompt furnace, $1.60; contract furnace, $1.65@1.75; prompt foundry, $2@2.25; contract foundry (nominal), $2.35@2.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 14 at 206,314 tons, a decrease of 5240 tons, and shipments at 210,387 tons, an increase of 6644 tons.

BUFFALO

There is no stir in coke yet. As a rule the members of the trade are hopeful, as the pig iron stored at the furnaces is selling better than it was. Coke prices remain on the basis of $4.25 for best 72-hr. Connellsville foundry, with stock coke $3.30.

CHICAGO

The coke market lags along about the same, although it may be said that during the last few days inquiries for prices have been received in larger volume. Quotations are: By-product, $4.95; Connellsville, $4.75@4.90; Wise County 72-hr. (select), $4.75; gas coke, $4.25; furnace coke, $4.40@4.65.

THE STEEL INDUSTRY

Pig-iron buying increases. Turn for the better anticipated after the first of the year.

Pig-iron buying has increased; as to that there is no doubt. In finished-steel markets the expectation of better buying just ahead is stronger, for inquiry has grown and in some lines the decline in orders has stopped. Many manufacturing consumers seem to be waiting for the reductions in labor cost which it is widely believed will become effective Jan. 1. Whether prices meantime will discount them is the question close buyers are trying to answer.

Reported Russian and Norwegian inquiries for rails and the figuring of Russian and French commissioners now in New York on various lots of freight cars are still without tangible results.

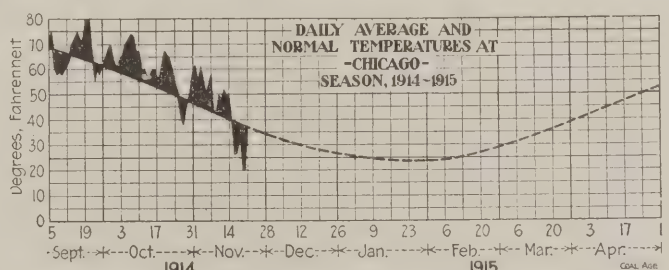
The inquiry of the New York Central for 25,000 tons of rails is likely to result in winter rollings for one mill, at least. Otherwise the rail makers have little to relieve the prospect of a very lean winter. The Pennsylvania Steel Co. has booked a 3500-ton order and the Ensley mill has a week's double-turn operation ahead.—"The Iron Age."

MIDDLE WESTERN

CHICAGO

Arrival of winter weather has a good effect. All Indiana and Illinois coals stronger. Further improvement noted in the screenings situation. Anthracite trade quiet.

Market conditions in Chicago and the Middle West have shown a distinct improvement during the past week owing to the freezing winter weather. A continuance of the low temperatures will be necessary to reduce the large stocks but at this season of the year it is not probable that anything like warm weather will continue for long. Operators are much encouraged over the results of the recent cold snap; while the volume of business has not increased sufficiently to insure full operation of the mines, improvement of any kind is exceedingly welcome to all connected with the trade. It is felt that the period of depression is over and that better conditions will prevail during the balance of this season at least.



There seems to be a more careful regulation of output at the mines than in a number of years past.

Indiana coals have a stronger tendency, especially in screenings. There is a good demand for Sullivan and Clinton County domestic sizes, and Fourth Vein screenings are strong, being held at around 80c. per ton.

The demand for Franklin County domestic sizes has improved particularly screenings which are higher in price.

The anthracite trade continues generally dull, although there has been a perceptible improvement in spots.

Smokeless lump and egg such as Pocahontas and New River, have been in good demand, but mine-run is still weak.

But little improvement is noticed in the demand for splint coals, although colder weather has cleaned up all that accumulating demurrage.

The demand for Hocking and Kentucky coals is still far below the supply, and with little or no improvement due to colder weather.

Youghiogheny gas and smithing coals are quiet. Prevailing quotations are as follows:

	Franklin Co.	Springfield	Harrisburg	Sullivan	Clinton
Lump	$1.55@1.75	$1.50@1.60	$1.50@1.75	.....	$1.65@1.75
4-in. lump.	.....	.....	.....	$1.60@1.75	.....
Steam lump	.....	.....	.....	.....	1.15@1.20
2½-in. lump.	.....	.....	.....	1.50	.....
1¼-in. lump.	.....	.....	.....	1.20@1.35	.....
Mine-run	.....	.....	1.10	.....	1.10
Egg	1.40@1.75	.....	1.50@1.75	.....	.....
6x3-in. egg.	.....	1.50	.....	.....	.....
Nut	.....	1.35	1.30@1.75	.....	.....
No. 1 nut.	1.35@1.75	.....	.....	.....	.....
Screenings	0.60@0.75	0.50@0.60	0.55@0.75	0.60@0.80	0.60@0.80

Hocking Valley 1¼-in. lump, $1.40@1.60; mine-run, $1.25.

New River and Pocahontas lump and egg, $2.25; mine-run, $1.25@1.40.

Somerset Smokeless lump and egg $2@2.25; mine-run, $1.25@1.40.

Carterville lump, $1.60@1.75; 6x3 in. egg, $1.60@1.75; No. 1 washed egg, $1.60@1.75; No. 2 washed egg, $1.50@1.60.

Green County 5-in. lump $1.60@1.75; 2½-in. lump, $1.30@1.60; 1¼-in. lump, $1.35@1.50; screenings, 75@90c.

INDIANAPOLIS

Spurt of buying all around due to cold weather. Steam grades advanced in price but retail quotations are unchanged. Slack selling at better prices.

A fall in the temperature has naturally stimulated the movement of domestic coal and increased the running time at the mines at least one day a week. Some operators have even sold their output for a week or two ahead. The suddenness of the severe weather stirred up the buyers, and prices at the mines were advanced 10 to 15c. a ton for steam coal. Slack demand was good and as high as 75c. was obtained in the open market, as against 50c. the previous week. For domestic the price is $1.50 to $1.75, according to size and quality; No. 4 mine-run, $1.10 to $1.20; other sizes $1 to $1.05. The increased activity caused a slight shortage in gondola cars, chiefly because of their larger use for loading domestic coal. Up to the time of the change of weather the working schedules had not been much increased by the reported general industrial improvement, though something from that is expected later on. The steel mills of the state and some other industries have increased operations and their demand for coal. Retail prices show no change.

There is a "trade-at-home" movement throughout the state at which the coal interests have taken the opportunity to point out that the public institutions of the state should buy Indiana coal.

ST. LOUIS

Situation somewhat improved by the cold weather. Indications point to a steady market for the balance of the season.

A slight improvement in local conditions has been noticeable during the past week. This is due entirely to the cold weather and it has not been long enough nor severe enough to materially affect the market yet. The demand for domestic coal from the South has helped conditions wonderfully, but this call has been confined mostly to egg size. There seems to be a plentiful supply of lump in the Williamson and Franklin County fields but there is apparently no demand this year which is something out of the ordinary. Everything indicates a steady coal market from now until the first of the year.

There has been a slight increase in the price of screenings and steam sizes from higher grade fields, but with the increased output of domestic sizes, this will fall back again. In the Standard field, 2-in. lump is sold as low as $1 in some instances, while the top of the screenings market is 25c.; 6-in. Standard lump has gone as low as $1.15, but with a few more days of cold weather, it will be on the upward trend.

There is very little anthracite moving in, and the retailers report no demand. The same applies, in a general way, to smokeless.

The prevailing wholesale prices are:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.25	$1.05@1.15	$1.20
3-in. lump	.....	....	1.40	.....	.....
6-in. lump	$1.35@1.60	....	1.50	1.25@1.30	1.40
Lump and egg	1.85@2.15	$2.25	.....	.....	1.35
No. 1 nut	1.25@1.35	....	.....	0.75@0.80	.....
Screenings	0.50@0.55	....	0.80@0.85	0.20@0.25	0.20
Mine-run	1.05@1.10	....	.....	0.75@0.80	.....
No. 1 washed nut	1.50@1.60	2.25	1.60	....	.....
No. 2 washed nut	1.25@1.35	....	1.35	.....	.....
No. 3 washed nut	1.10@1.15	....	.....	....	.....
No. 4 washed nut	1.05@1.10	....	.....	....	.....
No. 5 washed nut	0.20@0.25	....	.....	....	.....

PORTLAND

Cooler weather causes increase in demand, but prices show no advance.

Cool weather has set in here and coal dealers are beginning to realize that consumers have been buying largely from hand to mouth. Coal briquettes have made considerable of an inroad on the market for coal, but as these are handled by the dealers, this does not make any particular difference in the amount of business they do. The briquettes are sold at $9 per ton delivered, while hard coal is quoted at $9.50 and $10. Soft coals are selling all the way from $6 to $8 per ton but the demand for these is rather limited at present.

There are no reports of any coal coming here from Australia this winter and it is not believed there will be any.

A small cargo of Wellington, B. C., coal was received here this week and is selling at $10 delivered within the first zone limits of the city. This was the first importation from that section for a long time.

Utah coal has not been coming in as freely as last season, but this is due largely to the fact that consumers have been buying sparingly, because of the mild weather.

KANSAS CITY

Three days of cold weather last week moved the excessive stocks. No increase of prices.

Kansas City has had a touch of real winter and the first strong domestic movement of the season resulted. The stocks accumulated during the previous warm weeks were generally reduced to normal. The cold snap did not last long enough to effect any increase in prices. Another period of warm weather succeeded the temporary winter. There has not been enough cold weather to cause much consumption by the larger users, and contracts seem slow making their appearance.

SAN FRANCISCO

The past week has shown practically no change in the local situation. Weather continues warm and coal for domestic purposes is in light demand. Bituminous coals are going to the dealers at $7.50 to $8 per ton, which is a normal figure for this season of the year.

PRODUCTION AND TRANSPORTATION STATISTICS

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for September and the three months of the fiscal years 1913 and 1914, in short tons:

	September				Three Months			
Destination	1914	%	1913	%	1914	%	1913	%
Tidewater	384,246	19	261,012	16	985,701	17	819,266	18
East	227,959	11	188,570	12	608,893	10	552,610	12
West	1,241,932	62	1,010,987	64	3,898,894	66	2,946,659	63
Total	1,854,137		1,460,569		5,493,488		4,318,535	
From Connections								
Bituminous	149,628	8	120,468	8	414,845	7	318,730	7
Anthracite	2,526		1,606		5,270		4,819	
Total	2,006,291	100	1,582,643	100	5,913,603	100	4,642,084	100
Coke	13,439		29,680		59,653		86,348	

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for May and the three months of the years 1913 and 1914:

	March		April		May	
State	1913	1914	1913	1914	1913	1914
Missouri	259,270	263,593	204,255	179,723	186,366	165,395
Kansas	492,304	501,841	444,142	378,192	407,124	370,097
Arkansas	113,354	165,037	136,153	87,002	130,020	95,749
Oklahoma	257,162	296,484	246,155	239,443	252,901	241,180
Totals	1,122,090	1,226,955	1,030,705	884,360	976,411	872,421

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for October and ten months of 1913 and 1914, in short tons:

	October		Ten Months	
	1914	1913	1914	1913
Anthracite	1,055,344	1,046,703	9,205,279	8,711,723
Bituminous	4,233,393	4,887,840	40,346,167	42,662,163
Coke	720,070	1,152,950	8,324,007	12,012,363
Total	6,008,807	7,087,493	57,875,453	63.386.249

SAULT STE. MARIE CANALS

Coal shipments through the Sault Ste. Marie Canals for September and October were as follows:

	September			October		
	Canal			Canal		
	U. S.	Cana.	Total	U. S.	Cana.	Total
Anthracite	142,063	20,847	162,910	211,810	25,900	237,710
Bituminous	1,427,127	296,475	1,723,602	1,313,170	295,941	1,609,111

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports of the United States for September, 1913-14, and for the nine months ending September, 1912-13-14, in long tons:

	9 Months			September	
Imports from:	1912	1913	1914	1913	1914
United Kingdom	4,062	4,597	8,410	904	102
Canada	1,050,394	828,013	771,158	81,984	101,646
Japan	20,228	79,075	44,539	8,846	90
Australia and Tasmania	108,925	121,386	164,124	24,735	26,933
Other countries	2,025	2,816	2,053	.....	.....
Total	1,185,634	1,035,887	990,284	116,469	128,771
Exports:					
Anthracite					
Canada	2,551,589	3,119,522	3,017,158	319,410	389,213
Brazil	.....	.....	6	.....	6
Other countries	50,042	53,480	44,893	6,149	5,869
Total	2,601,631	3,173,002	3,062,057	325,559	395,088
Bituminous,					
Canada	7,766,198	10,283,998	7,241,856	1,631,526	1,202,930
Panama	362,277	387,582	214,131	35,732	23,166
Mexico	239,402	397,753	257,380	20,655	42,312
Cuba	851,389	983,392	793,898	115,278	97,787
West Indies	506,624	464,645	479,895	45,149	64,099
Argentina	.....	55,877	193,786	7,251	55,567
Brazil	.....	211,045	201,071	10,957	45,846
Uruguay	.....	5,163	61,443	.....	4,929
Other countries	1,257,403	1,004,508	1,459,320	92,904	320,884
Total	10,983,293	13,793,963	10,902,780	1,959,452	1,857,520
Bunker coal	5,495,719	5,763,584	5,711,948	684,395	673,372

NORFOLK & WESTERN R.R.

Destination of shipments over this road for October and the first ten months of this year and last year were as follows in short tons:

	October		Ten Months	
Coal	1913	1914	1913	1914
Tidewater, foreign	105,523	98,839	1,341,910	1,686,391
Tidewater, coastwise	311,881	302,297	3,204,849	3,220,081
Domestic	1,677,545	1,596,703	15,483,089	17,071,474
Coke				
Tidewater, foreign	3,292	.....	30,491	339
Domestic	111,020	63,625	1,264,781	870,729
Total	2,209,261	2,061,464	21,325,120	22,849,014

FOREIGN MARKETS

GREAT BRITAIN

Market heavy and prices maintained with difficulty. Ocean freights high. Exports show a large falling off.

The London coal trade continues depressed. Both household qualities and manufacturing coals are moving slowly, and the demand is lifeless. Supplies are coming forward in abundance, and the principal metropolitan centers are congested. Prices are maintained with increasing difficulty.

High rates of freightage are the dominating feature. On the Tyne business is very restricted, and only most pressing orders are undertaken. The Lancashire coal market is still very moderate, and those in Yorkshire have also suffered a falling off in business. Matters at Cardiff have taken a change for the worse, and prospects appear exceedingly dull. The position of the Scottish trade remains unchanged.

Further regulations have now been issued relating to trade with the enemy, which require certificates of origin or declarations of destination to be presented of goods imported into or exported from the United Kingdom.

The quantity of coal, coke, and manufactured fuel sent out of the United Kingdom during October is considerably below that of the corresponding month of last year. The total was 4,151,381 tons. During October 1913 and 1912 the totals were respectively 7,059,928 tons, and 7,058,442 tons. During the first 10 months of the present year the exports amounted to 54,523,993 tons, as compared with 63,958,136 tons, and 54,605,209 tons, in the corresponding periods respectively of 1913 and 1912.—"The Colliery Guardian."

Nov. 13—Tonnage arrivals are unsatisfactory, and so far as Second Admiralty List and Monmouthshire coals are concerned, substantial concessions from quoted prices can be secured by those in a position to take immediate deliveries. For forward shipment sellers generally are inclined to adopt a waiting policy rather than sell at under the quoted figures, being of the opinion that the high rates of freight current will attract tonnage. Quotations are approximately as follows:

Best Welsh steam	$5.04@5.28	Best Monmouthshires	$4.02@4.08
Best seconds	4.56@4.68	Seconds	3.84@3.96
Seconds	4.32@4.44	Best Cardiff smalls	1.92@2.04
Best dry coals	4.68@4.92	Cargo smalls	1.20@1.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash payment.

Freights—Chartering orders are numerous but there is a great scarcity of tonnage and rates practically all round are much improved. Rates are approximately as follows:

Gibraltar	$2.52	Venice, Ancona	$4.80	Singapore	$4.32
Malta	2.76	Alexandria	3.84	Las Palmas	2.40
Marseille	2.60	Port Said	3.84	St. Vincent	2.64
Algiers	2.52	Aden	4.08	Rio Janeiro	3.84
Genoa, Savona	3.48	Colombo	4.20	Monte Video	3.24
Naples	3.48	Sabang	4.08	Buenos Ayres	3.48

FINANCIAL DEPARTMENT

HOCKING VALLEY PRODUCTS CO.

President Daniel E. Reagan reports for the year ended Dec. 31, 1914, as follows:

Results—Notwithstanding general conditions, the damaging effects of the spring flood and suits of certain bond and stockholders to set aside oil lease, there is a decided improvement in the condition and prospects of the company.

Coal—During 1913 the production of coal from the mines and sales thereof show a decrease, and will continue to gradually diminish from year to year, since with very few exceptions the operations consist of working or drawing the pillars left during past operations for the support of roof of mines, and, as the pillars are withdrawn, the mines are abandoned.

Oil and Gas Properties—The maximum production of oil was for March, 1912, when 30 wells produced 52,470 bbl., while 69 wells for December, 1913, produced only 14,408 bbl. Total production for year 1912 was 419,312 bbl.; for 1913 was 192,300 bbl. If the development of the oil properties had not been aggressively pushed, the production and earnings would have shown a much greater decline.

Sinking Funds—Attention is called to the improved condition of surplus account, through increased business of the brick plant and the purchase and retiring of bonds by the sinking fund of 5c. a ton on coal, 25c. a thousand on brick and 15c. a barrel on oil.

INCOME ACCOUNT FOR YEAR ENDING DEC. 31

	1913	1912		1913	1912
Clay products sales (billed)	$201,213	$115,395	Selling expense	$34,569	$26,332
Coal sales (billed)	287,522	337,152	General expense	43,540	48,591
Coal royalties	42,817	40,506	Taxes	15,865	11,324
Oil royalties	60,221	85,673	Depreciation	5,000	5,000
Rentals	27,322	36,152	Reserve for doubtful accts	5,011	4,165
Misc. earnings	9,879	15,014	Reserve for Bessie-Ferro rental	.....	7,500
Total	$628,965	$629,892	Interest on 1st M. bonds	82,763	89,948
Cost of clay products sold	$161,566	$118,699	Net surplus	$11,845	$5,964
Cost of coal sold	261,525	308,327	Sk. fd. depreciation—		
Expense of other properties	7,281	4,042	Sk. fund, coal	$19,541	$18,169
Net income	$198,593	$198,824	Sk. fund, clay prod	4,297	2,890
			Sk. fund, oil	28,845	62,897
			Litigation expenses	6,109	.....
			Total net deficit	$46,947	$77,992

BALANCE SHEET DEC. 31

Assets:	1913	1912	Liabilities:	1913	1912
Property	$6,083,890	$6,084,271	Capital stock	$4,596,350	$4,596,350
Notes & accts. rec	106,133	101,707	First M. bonds	1,578,400	1,717,600
Cash	193,460	259,531	Accts. payable	15,516	19,000
Clay prod'ts, coal and oil	102,249	96,038	Accrued bond int.	44,703	48,042
Due from lessees mining equip't.	42,855	35,507	Sinking fund	138,292	92,078
Materials & supp.	6,445	4,394	Miscellaneous	31,105	22,834
Miscellaneous	16,138	32,545	Profit and loss	146,804	118,089
Total	$6,551,170	$6,613,993	Total	$6,551,170	$6,613,993

Coal Contracts Pending

Contract No. 9—Fort Wayne, Ind.—The Municipal Light, Heat & Power Co., of Fort Wayne, is in the market for 20,000 tons of screenings. Deliveries are to be made in hopper bottom cars during the next year. Address the Municipal Light, Heat & Power Co., Fort Wayne, Indiana.

Contract No. 10—Chicago, Ill.—The Chicago Coated Board Co. is in the market for 300 tons of screenings per day. Deliveries are to extend over a period of one year, and to be made at Chicago, Ill. Address the Chicago Coated Board Co., 420 E. North St., Chicago, Illinois.

Contract No. 11—Portland, Maine—The Portland Gas Light Co. is in the market for 30,000 tons of Penn Gas, Westmoreland, or any good grade, three-quarter screened, gas producing coal for delivery between Mar. 1, 1915 and Mar. 1, 1916. Shipments are to be as required, about in equal monthly proportions, to wharf through one bridge, Portland, Maine, ample water alongside. All communications should be addressed to C. H. Tenney & Co., Managers, 201 Devonshire St., Boston, Massachusetts.

Contract No. 13—New York—The more important bids received on this contract were as follows, delivered:

14,000 TONS NO. 1 BUCKWHEAT—Charles D. Norton & Co., $3.48; Smith, Lineaweaver & Co., $3.19; John W. Peale & Co., $3.53; Meeker & Co., $3.42.

3700 TONS NO. 1 BUCKWHEAT—Charles D. Norton & Co., $3.67; A. J. & J. J. McCollum, $4.24; Smith, Lineaweaver & Co., $3.69; Bacon Coal Co., $3.69; John W. Peale & Co., $3.67; Meeker & Co, $3.74

4000 TONS NO. 1 BUCKWHEAT—Charles D. Norton & Co., $3.43; Smith, Lineaweaver & Co., $3.48; John W. Peale & Co., $3.70; Meeker & Co., $3.67; Gavin Rowe, $3.54; Joseph Johnson's Sons, $3.30; John E. Donovan, $3.55.

15,000 TONS SEMIBITUMINOUS RUN-OF-MINE—Charles D. Norton & Co., $3.36; Smith, Lineaweaver & Co., $3.34; John W. Peale & Co., $3.35.

4000 TONS SEMIBITUMINOUS RUN-OF-MINE—Smith, Lineaweaver & Co., $3.78; John W. Peale & Co., $3.78.

3800 TONS NO. 3 BUCKWHEAT—Charles D. Norton & Co., $1.97; Smith, Lineaweaver & Co., $2.07; Meeker & Co., $3.01; Pattison & Bowns, $1.97.

2400 TONS SEMIBITUMINOUS RUN-OF-MINE—Charles D. Norton & Co., $3.93; Smith, Lineaweaver & Co., $3.96; Meeker & Co., $3.46; Pattison & Bowns, $4.03.

4800 TONS NO. 3 BUCKWHEAT—Charles D. Norton & Co., $2.89; Smith, Lineaweaver & Co., $2.89; Meeker & Co., $3.46; Pattison & Bowns, $2.93.

Contract No. 14—Panama, C. Z.—The following are the bids received by the Panama R.R. Co. for furnishing all or any part of the company's requirements, estimated at 500,000 tons of coal:

500,000 TONS—F. R. Long & Co., $2.70 (contingent on increase in freight rate) for Rockhill Smokeless and Georges Creek, delivery at Philadelphia; C. F. Blake Co., $2.80 (subject to change in freight rate and supply not to exceed 45,000 tons per month) for New River coal, delivery at Newport News and Sewalls Point; C. P. Burton Coal Co., $2.50 (not guaranteeing analysis as per specifications), delivery at Baltimore; White Oak Coal Co., $2.85 for White Oak and New River, delivery at Newport News and Sewalls Point; Pocahontas Fuel Co., $2.75 for Pocahontas and New River, delivery at Hampton Roads.

350,000 TONS—William C. Atwater & Co., Inc., $2.70 for Pocahontas semibituminous steam, delivery at Lamberts Point.

250,000 TONS—A. McNeil & Sons, Inc., $2.60 (under different specifications) for Toms River, delivery at Lamberts Point.

200,000 TONS—A. McNeil & Sons, Inc., $2.48 for Jamison, delivery at Baltimore, and $2.55 for delivery at Philadelphia; J. H. Weaver & Co., $2.68 (subject to change in freight rates, but not to exceed 5c. per ton) for Colver, delivery at Philadelphia; Delaware Carbo Coal & Coke Co., $2.65 (under different specifications) for Eagle, delivery at Newport News; B. Nicholl & Co., $2.47 (under different specifications) for Davis Big Vein, delivery at Baltimore; Flat Top Fuel Co., Inc., $2.85 for Pocahontas, delivery at Norfolk; Castner, Curran & Bullit, Inc., $2.83 (at the option of bidder as to the kind to be supplied) for Pocahontas and New River, delivery at Norfolk.

150,000 TONS—West Virginia Coal Co., $2.38 for New River, delivery at Newport News and Sewalls Point.

100,000 TONS—New River Coal Co., $2.85 for New River, delivery at Sewalls Point; Pennsylvania Coal & Coke Corporation, $2.85 for Webster, delivery at Philadelphia; Crozier Pocahontas Coal Co., $2.85 for Crozier Pocahontas, delivery at Lamberts Point; Chesapeake & Ohio Coal & Coke Co., $2.80 for Admiralty New River Smokeless; Maryland Coal & Coke Co., $2.80 for M. C. & C. New River.

70,000 TONS—New England Coal & Coke Co., $2.70 (subject to increase in freight rates) for Beacon, delivery at Boston.

50,000 TONS—Chesapeake & Ohio Coal Agency, $2.85 for New River, delivery at Newport News and Sewalls Point; A. McNeil & Sons, Inc., $2.58 and $2.63 for South Fork, delivery at Baltimore; $2.65 for delivery at Philadelphia, and $2.73 for Miller, delivery at Baltimore.

Contract No. 19—New York—Sealed bids are requested by the Department of Public Works for furnishing, delivering, storing and trimming coal for use in the various public buildings, courts, etc., in Manhattan, as follows: About 3,000,000 lb. buckwheat No. 1, 26,000,000 lb. buckwheat No. 2, 13,000,000 lb. buckwheat No. 3, 1,300,000 lb. broken coal, 4,000,000 lb. bituminous coal, run-of-mine. The security required on each bid will be $20,000, and a deposit of 5% of the security must accompany each bid. Bids will be opened at 2 p.m., Dec. 3, Room 2034, Municipal Building, Borough of Manhattan. Time for completion of this contract will not be later than Dec. 31. Blank forms and further information can be obtained on application to the auditor, Room 2141, Municipal Building.

Contract No. 20—New York—Bids will be received by the Board of Trustees, Bellevue Hospital, until 3 p.m., Dec. 4, for furnishing and delivering 300 gross tons buckwheat coal No. 1. The security required will be 30% of the total amount of the bid and a deposit of 1½% shall accompany each bid. The time for completion of this contract shall not be later than Dec. 31. Blank forms and further information can be obtained on application to the auditor, 400 East 29th St., Borough of Manhattan.

Contract No. 21—Cleveland, Ohio—Sealed proposals for furnishing and delivering 2000 tons of Pittsburgh nut coal, 100 tons of the best grade soft lump coal and 50 tons of the best grade Lackawanna egg coal will be received by the County Commissioner until 10 a.m., Dec. 12, each bid to be accompanied by samples of not less than 25 lb. A certified check for $500 must accompany each bid. Address E. G. Krause, Clerk of the Board of County Commissioners, Cuyahoga County, Cleveland, Ohio.

CONTRACTS LET

Contract No. 12—New York—This contract, which provides for furnishing 2600 tons of anthracite buckwheat and chestnut, was awarded to John S. Conabeer, whose bid was $3.95 on buckwheat and $7.44 on nut, the gross consideration being $10,793.50. For a complete list of the bids made on this contract, see the last issue of "Coal Age." Address C. B. Rhinehart, Secretary, Armory Board, Hall of Records, New York City.

Contract No. 15—New York Harbor—This contract, which provides for furnishing 20,000 tons of steam coal, has been awarded to the J. H. Weaver Co., whose bid, delivered f.o.b. suitable lighters or barges alongside at Navy Yard, Brooklyn, was $3.25, with a guarauteed heat value of 14,567 B.t.u. Complete list of all bids submitted appeared in last week's issue of "Coal Age." Address Navy Department, Bureau of Supplies and Accounts, Washington, D. C.

Contract No. 16—New York Harbor—It has been recommended that the bid of Hite & Rafetto be accepted on this contract, which provides for furnishing and trimming approximately 17,000 tons of bituminous coal to be used by the United States dredges in New York Harbor. This bid was $3.43 per ton for Bird Quemahoning coal with a guaranteed heat value of 14,400 B.t.u. Maj. G. J. Dent, Corps of Engineers, Army Building, New York.

COAL AGE

Vol. 6 NEW YORK, DECEMBER 5, 1914 No. 23

Did You Ever Think of Pausing to Size Yourself Up?

Many a man never thinks of pausing to size himself up, to formulate a definite plan for his life, or to consider his mental equipment. Yet the same fellow would heartily condemn a mine where no plans were made for the future and no thought was paid to the condition of the equipment.

ABOUT A YEAR AGO A FIREBOSS IN a mining institute arose to object to the study of English grammar in mining classes, on the ground that he could see no need of it for a practical workingman. He showed clearly enough by that statement that he was unwilling to advance—to grow in the most effective direction, namely, to develop his ability to think and to express his thoughts intelligently.

Had he stopped to reflect, he would have remembered that in order to advance above the grade of fireboss, he must pass the state examinations for mine foreman or assistant. Even with a good practical knowledge of mining, men fail year after year to pass the examinations because they are unable to express their thoughts accurately, due to lack of training in the application of the simple principles of English grammar. If we are to make a success of life, we must willingly grasp the opportunities to learn to develop brain-power.

Just as a man must exercise his body to develop it, so he must study to develop his brain. And when a man makes up his mind to study, he can best spend his first efforts in trying to find out what real study means.

Study is not the mere memorizing of facts, however valuable these facts may be. A certain fireboss in Pennsylvania has spent many earnest hours, yes years, in committing facts to memory in the belief that he was studying. Yet the piecemeal knowledge that he has acquired by those efforts corresponds to the parts of a great engine spread out on the manufacturer's assembling-room floor. No matter how excellent they are in themselves, the parts are of no real use until they are fitted together in their proper relation to each other to make up a single workable unit. It is this ability then to acquire facts and place them in their proper relation to each other that constitutes real study and useful mental effort.

It is remarkable that those men who have studied most seem to realize so much more than other men the decided advantages of study. Not long ago, a patient in a doctor's office remarked upon the amount of studying that doctor was doing; the patient being aware that the doctor had spent over seven years in this country and abroad on the professional part of his education before he began to practice. The doctor promptly replied: "The minute I stop studying I shall begin to fall behind my fellows." Recently, a superintendent remarked: "I've studied some from time to time, but now I am so busy I do not even take the covers off the mining papers I get." He has lost his sense of proportion, and he is standing still.

One reason why the educated man has always recognized the benefits of continued study has been the training he has received in how to study. But today, with the great number of schools and institutes open to every class of mining men, there is coming to be less reason for any one's failing to secure the advantages of their guidance.

Study

is more important today than ever before. The opportunities for study are far greater. When any man thinks he has reached the point where study is no longer necessary, he has ceased to progress; either he is stagnating or else he is going backward.

Electricity in Coal Mining

By Eric A. Lof*

This article is the longest ever published in one issue of Coal Age; however, it is complete as it stands, and is of such great interest and technical value, we especially recommend it to the attention of all coal men from miner to president.—Editor.

SYNOPSIS—Enormous advances have been made in the use of electricity in mining operations in the past few years. The principal applications of electric power in coal-producing work are here described, together with the advantages and disadvantages of the different types of motors available for the given service.

While electricity has been used in mining work for nearly 30 years, or almost since the practical introduction of the electric motor, it is especially during the past decade that the enormous advance of this system has taken place. In no other field than the coal-mining industry has electricity been of greater benefit to mankind, and only through its medium has it been possible to meet the ever-growing demand for fuel.

On the other hand, it has prevented or at least greatly reduced the use of animal power in mines, the cruelty of which could almost be considered as a crime, and this also to a great extent spurred the engineers to devise a means whereby this abuse could be abolished.

The advantages of using electric power for mining operations are now so fully realized that no other system whatever is being considered when a new installation is planned, while hundreds of old mines are changing over to this modern method of power application.

The nature of mining operations necessitates that the machinery must be located at many different places, while on the other hand a large number of small units may have to be used, resulting in a low efficiency. Electric power can be cheaply produced in a single generating station and transmitted to any distance within the mining district without excessive increase in the cost, provided that a suitable pressure is used for the transmission. The power consumed in each district or by any individual machine can be measured by suitable meters or instruments, and in this manner any excess consumption can at once be detected and the defect remedied, while an accurate record can be kept on the different operations.

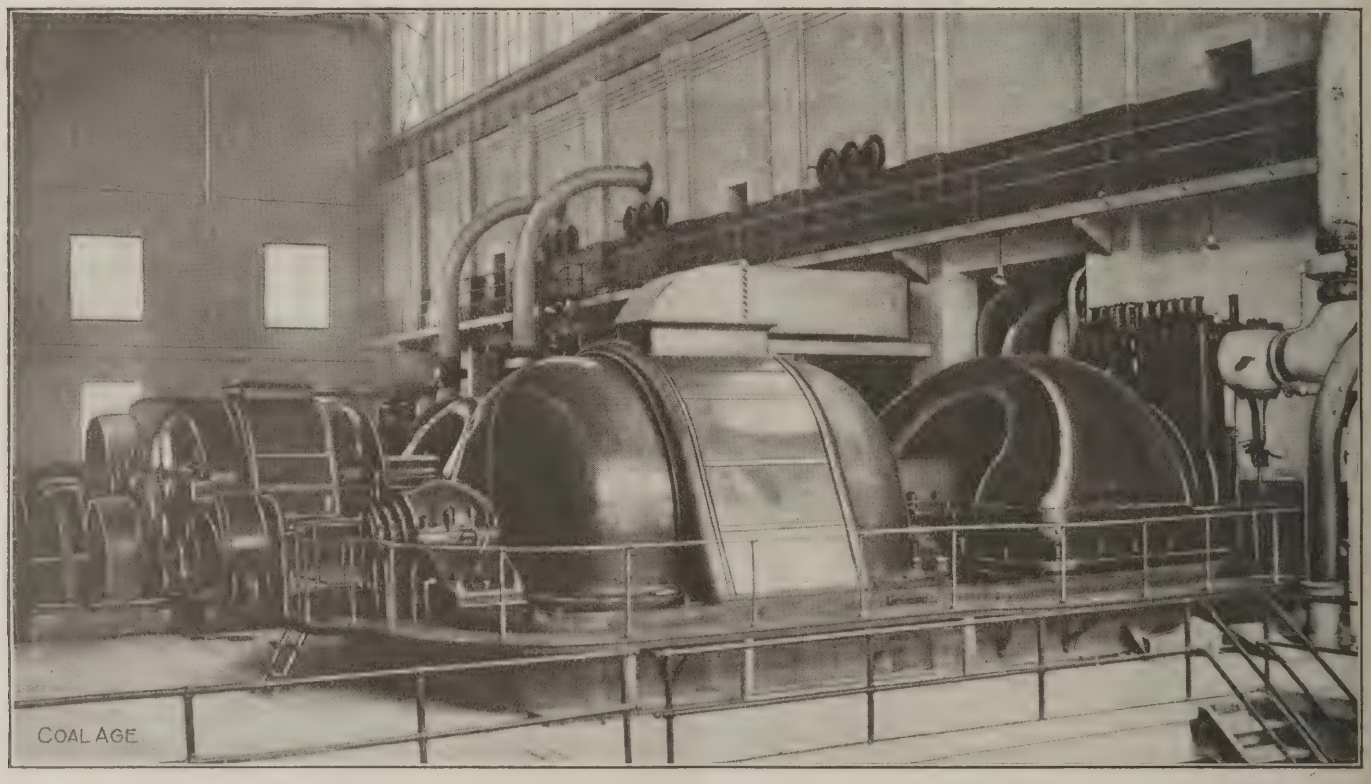


Fig. 1. Interior of Lehigh Navigation Electric Co.'s Plant, at Hauto, Penn. A Steam-Electric Plant at the Mines for High Tension, Long-Distance Transmission

There is no restriction as to the location of the machinery, as the distributing lines can be carried to any part of the mine and occupy but little space. They eliminate long and expensive steam and air lines, with which the danger of breakdown and the difficulty encountered in keeping up the necessary working pressure increase for every extension to the service. With the flexible electric system, on the other hand, additions and alterations can always be made without any difficulty whatsoever.

Electric motors are highly efficient, even down to the smallest sizes. They take but little space and are readily

*Power and Mining Engineering Department, General Electric Co., Schenectady, N. Y.

adapted to the machines which they are to drive. Perfect control is also possible at all times, and simple automatic safety devices can readily be installed.

Power Supply

The power supply for a coal operation can be obtained in many different ways. Steam power can be generated directly at the mine, and the stations may either be of a capacity just sufficient to supply the need of that mine alone, or they may be of a considerably greater capacity, in which case the surplus power may be transmitted electrically to profitable market centers. On the other hand, power may be purchased from hydro-electric or other public-service companies.

As a rule, it is generated directly at the mine, and steam turbines having an exceedingly high efficiency are used as prime movers. Their steam consumption is low, being for condensing units sometimes more than 50 per cent. better than for the single slide-valve engines formerly quite generally used in mining districts, and from 10 to 15 per cent. better than for modern compound condensing engines. The space they occupy is small, which in turn reduces the cost of the station.

The new and immense power plant of the Lehigh Navigation Electric Co., Fig. 1, represents the beginning of a most important step toward the economic use of coal directly at the mines. By transforming the heat energy of the fuel at the point of origin into electrical energy and transmitting this to the consumers at profitable market centers, one of the biggest factors that enters into the cost of coal—the transportation thereof—will be eliminated.

Still another economic saving is, however, realized, in that the enormous waste product, consisting of coal particles and dust which pass through the screens and are entirely unmarketable, can be successfully burned under the boilers by providing specially designed furnaces therefor. The cost of transportation for low-grade coal is approximately the same as for the higher grades, and consequently the demand for low-grade coal is limited. The Lehigh mines produce enough refuse coal to maintain the continuous generation of 100,000 kw., and this is the ultimate capacity for which the new station at Hauto, Penn., has been designed, the present capacity being 37,500 kw. The electric energy is being transmitted at a pressure of 100,000 volts.

The Appalachian Power Co.'s plant, on the New River, in Virginia, Figs. 2 and 3, is, on the other hand, an example of the advantages which may be derived from using hydro-electric power for coal-mine operation, this company furnishing power to the Pocahontas coal fields.

In the supplanting of steam power, produced at the mouth of the pit, with hydro-electric energy generated 50 to 70 miles distant, the question of power cost is not entirely the ruling factor, although in many cases the purchase of central-station energy is cheaper than individual production. Central-station energy relieves the coal operators from the power-plant investment, which can be used for other profitable improvements. The service is of a much higher quality than is, as a rule, obtained in an ordinary individual plant. This is a factor of importance in that it greatly improves the operating conditions of the mine.



Fig. 2. One of Appalachian Power Co.'s Stations Transmitting Electric Power to the Pocahontas Coal Fields

Often formerly it was necessary for the coal operator to establish his own power plant in inaccessible locations, to which water had to be pumped against considerable heads. Not infrequently also this water was of poor quality for boiler use, resulting in excessive maintenance costs. It was difficult to retain skilled engineers and station operators, owing to the remoteness of many of the mines from community advantages. A definite contract for central-station energy insures the operator against these unfavorable conditions.

Choice of Systems

Two systems are available for the distribution of electric power in mines; i.e., the alternating-current and the direct-current, the choice depending upon the particular

conditions of the project. For smaller installations, with short distributing lines, the direct-current system can be used, the motor of this type being well adapted for the operation of hoists, mining locomotives, blowers, etc.

When, on the other hand, power has to be distributed over greater distances, as in larger mining districts with scattered shafts, the alternating-current system will generally be found more advantageous. Due to the possibility of using a higher voltage, a more economical distribution can be obtained, and the simplicity of the induction motor makes this system especially suitable for the severe service encountered in mining work. For the operation of mining locomotives or other machinery requiring it, direct current can readily be obtained by motor generators or rotary converters, so that in general it can be said that the alternating-current system offers many advantages for mining operations.

The selection of the proper voltage at which the power should be generated depends to a great extent on local conditions. Mining motors are, as a rule, operated at from 220 to 550 volts, but occasionally 2300 volts is used for pump motors, etc. The restrictions imposed by the commutators of direct-current motors for mining work limit the potential of such a system to a maximum of 550 volts. Furthermore, the electrical pressure which is in use in one part of the mine generally determines that for the entire installation when the direct-current system is used.

A working potential of 550 volts, however, is only economically feasible for mines whose workings above and below ground have a maximum extent of a few hundred yards, while on the other hand it is as high as is advisable for small motors working underground, considering the safety of the operators.

When the extent of the mines is such that the above



FIG. 3. INTERIOR OF THE STATION SHOWN IN FIG. 2, SHOWING THE VERTICAL GENERATORS

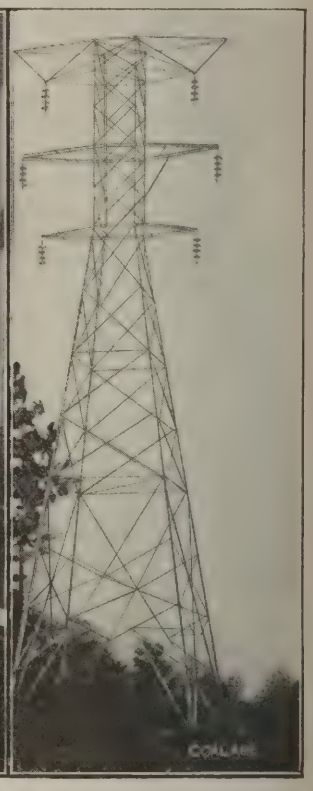


FIG. 4. STEEL TOWER FOR HIGH-TENSION TRANSMISSION

The two standard frequencies in this country are 60 and 25 cycles per second. Where purely alternating current is used, the former is preferable. The speeds of 25-cycle induction motors for general application are practically limited to 750, 500 and 375 r.p.m., while the corresponding speeds for 60-cycle motors would be 1200, 900, 720, 600, 514, 450 and 400 r.p.m. Twenty-five-cycle motors could, of course, be wound with two poles, giving a speed of 1500 revolutions, but this is rarely done, except in the very small sizes. The 60-cycle frequency also permits its use for lighting. If, on the other hand, the distribution is done wholly or partly with direct current, 25 cycles may prove the best, the lighting in such a case being obtained from the direct-current circuits.

voltage is not sufficiently high, the alternating-current system of transmission or distribution must be resorted to. With this system the voltage can be transformed up or down as may be desired in static transformers, operating at a very high efficiency. It is, therefore, possible on the one hand to transform up to such values that the transmission can be carried out economically for any practicable distance, while, on the other hand, the pressure can be reduced to any extent necessary for its safe use in small motors, for lighting, etc.

TRANSMISSION AND DISTRIBUTION

For transmitting the energy over long distances, bare overhead wires of either copper or aluminum are used. They should preferably be supported by means of insula-

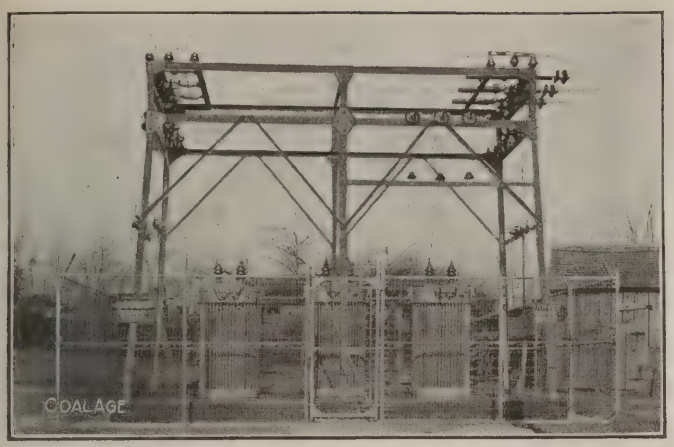


Fig. 5. Typical Outdoor Substation for Tapping Power from High-Tension Transmission Lines

tors on substantial steel towers, Fig. 4, if the transmission is to be of a permanent character. Such towers may be of considerable height, allowing greater spans, and thus a smaller number of supports, while the life and reliability of the system are greatly increased.

Double-circuit lines are preferable to single circuits. The same weight of copper divided into two conductors and supported by slightly modified towers would considerably reduce the chance of a shutdown, with only a small additional cost for towers, a second set of insulators and the labor of stringing the second circuit.

One or more substations, depending on the number and location of the different mines, will be required for housing the step-down transformers, the converting apparatus, and the control equipment. The design of the substation building and the contained apparatus should be made with a view to economy and simplicity of operation, so as to minimize the number of necessary attendants.

The design is fixed by the kind of service to be given, whether the distribution is purely either alternating or direct current, or a combination of both. The first system necessitates naturally the simplest design, as it only involves the installation of step-down transformers, and such stations are nowadays often of the outdoor type, i.e., the apparatus is installed as shown in Fig. 5 without any protecting building. If a conversion to direct current is to be made, rotary converters with transformers, or motor-generator sets with or without transformers, must be provided and a building is necessary for their protection.

The secondary distribution should be laid out in the best possible manner, both from an economical and operating standpoint, and the construction should be most substantial, so as to prevent any possible shutdown due to poor workmanship. For the overhead distributing circuits, the conductors are either bare or insulated with weatherproof braid. They are supported on insulators mounted on regular wooden poles with crossarms.

For the underground construction in the mines, it is highly desirable that the wires be erected out of easy reach. Frequently, however, the headroom available is such that this cannot be done. Owing to the excessively damp and acidulous atmosphere in many mines, it is quite difficult to maintain a high degree of insulation on the wires, and hence in many cases the low-pressure wiring is run bare, supported on glass or porcelain insulators.

Where the danger of coming in contact with the wires is great, especially in the case of high-voltage conductors, they should be thoroughly insulated and metal covered, the armoring not only protecting the insulation from deterioration, but also from mechanical injury. It seems also advisable that even with lead-covered cables, the insulation should be nonhygroscopic and as nearly as possible proof against the action of mine acids, because there is always the possibility of a defect appearing in the lead sheath, either through a faulty joint, through electrolytic action, or otherwise. If paper insulation is used, even a small opening of this sort may admit enough moisture to destroy the insulation at that point and cause a breakdown.

Haulage

The first electric locomotive for mine haulage was put into operation in 1887. From that time up to 1900, the progress of utilizing electric power for mine haulage was rather slow, but after that year it increased at a rapid rate, so that now many thousands of electric locomotives are in operation in this country alone.

Steam locomotives for underground coal mining are out of the question, on account of the smoke and steam produced by them and the danger of fire. The use of locomotives driven by internal-combustion engines is increasing, but these are also accompanied by the danger of fire, and their operation is not as reliable as that of electric machines. Compressed-air locomotives are less economical, and only occasionally come into consideration where explosive gases may be present on haulage roads.

As a fact, however, the sparks that may be caused by the setting of the brakes does not make them any more safe for such a service than the electric locomotive. Even the mule, which has been one of the chief competitors of the electric haulage, is now being displaced by gathering locomotives, and actual experience has shown that the cost of hauling by the electric method is from 50 to 75 per cent. cheaper than by mules. A consideration of the cost of feeding, the large percentage of killed or injured, the additional amount of air necessary in underground work, and finally the large number of mules and drivers required to perform the same amount of work as a locomotive, makes this evident.

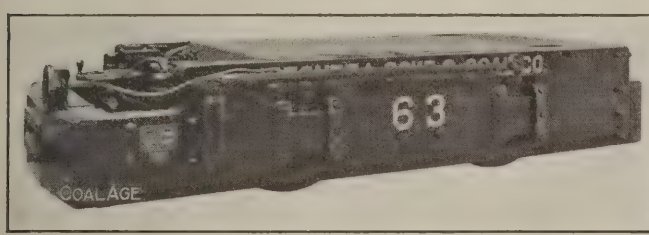


Fig. 6. A Modern Electric Mine Locomotive



Fig. 7. Storage-Battery Locomotive with Loaded Trip

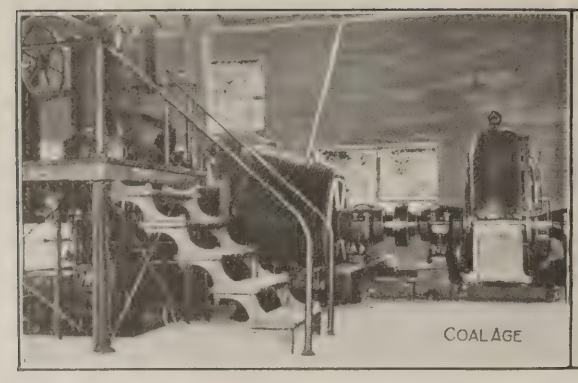


Fig. 8. Direct-Current 250-Hp. Motor Driving Double Conical-Drum Hoist

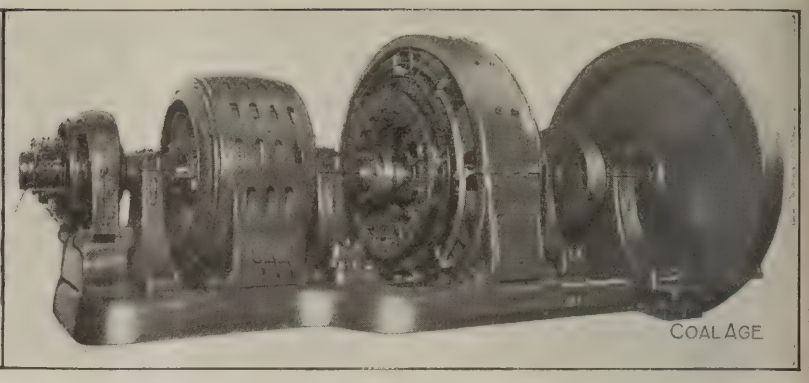


Fig. 9. Flywheel Motor-Generator Equalizing Set with Direct-Connected Exciter

Direct-current locomotives are generally recognized as standard, although in rare instances single-phase locomotives are used, due to the fact that the supply system is alternating current, and the magnitude of the work does not warrant the installation of converters. The use of three-phase locomotives is not to be recommended, as in such a case each track would require two separate trolley wires, with the rails comprising the third leg of the three-phase circuit.

The two-motor locomotive, Fig. 6, has come to be generally recognized as the standard type for mine work, and actual tests have demonstrated that this equipment will pull from 10 to 20 per cent. more than a single motor mechanically connected to the two axles. On the other hand, a higher efficiency is also realized due to the series-parallel control. So, for example, when a slow speed is required, this is efficiently attained by running the two motors in series.

With the single-motor drive, slow speed can only be secured by inserting a large resistance in series with the motor, and the current consumption would be twice that taken by the two-motor equipment under series operation. Furthermore, should one motor for some reason or other be damaged, it would entirely cripple the single-unit machine while that supplied with two motors would still be capable of performing a large part of the work.

Inside and Outside Frames

From the constructional viewpoint, there are two general forms of this type of locomotive, one in which the side frames are placed outside of the wheels, and the other in which they are placed inside of the wheels. For a given track gage, the outside-frame type allows the maximum space between the wheels for the motors and other parts of the equipment, renders the journal boxes more accessible and gives somewhat greater space at the operating end for the motorman.

The inside-frame type restricts to a certain extent the space available for motors and other equipment, but secures a minimum overall width—a construction that is necessary in those mines where the props are set close to the track or the space outside the rails is otherwise limited. The wheels being outside the frame, this type, in case of derailment, is somewhat more readily replaced.

There are two standard methods of mounting the motors: "In tandem," i.e., one motor placed between the axles and the other between the forward axle and the front end frame, and "central," or where both motors are placed between the axles. The "tandem" arrangement permits of a short wheel base and is adopted for the light- and medium-weight locomotives, as these are usually required to operate over sections of the track having short-radius curves.

On the heavier locomotives the motors are mounted "central." The longer wheel base is permissible in this case for the reason that the heavy machine operates on the main haulage roads which, as a rule, are comparatively straight and have easier curves. With either arrangement the locomotive frame is proportioned to give an equal distribution of the weight between both pairs of driving wheels.

Motors may also be "end" mounted by placing them in the spaces between the axle and the forward and rear end frames respectively. This permits the minimum wheel base, but is very seldom used and is adopted to meet exceptional conditions only.

From the viewpoint of operation, there are also two kinds of locomotives employed in coal mining; i.e., those used for main haulage and those used for gathering. This is particularly the case in mines where the headings have attained considerable length and where the output can be handled most economically by concentrating the trips over the main haulage road into trains of a capacity sufficient for a 20- or 25-ton locomotive.

On well laid tracks having 50-lb. or 60-lb. rails, four-wheel, two-motor locomotives of this weight operate successfully. Where, however, light rails exist, it is inadvisable to concentrate this weight on four drivers. Instead, therefore, of a single 20-ton locomotive, two 10-ton machines are coupled together and operated as a single unit, which, while developing the same tractive effort, has its weight distributed on eight drivers.

The tandem locomotive is also adapted for those cases where conditions of operation require trains of a certain definite tonnage and the gage is so narrow that two motors of sufficient capacity cannot be used.

The method of coupling locomotives in tandem is extremely simple and permits the complete control of motors, brakes and sand valves of both units from the operating end of one.

In order to avoid the necessity for installing overhead lines on side tracks which are only used temporarily, the gathering locomotives intended for this service are equipped with a cable drum. Before the machine leaves the overhead trolley line, the flexible cable is hooked on behind one of the line clamps. The locomotive is now able to travel for a further distance of about 500 ft. A small electric motor, which is coupled to the cable drum,

is constantly under current. This holds the cable tight as it runs out, and winds it up again at the necessary speed on the return journey.

If the gradients of the side tracks are so steep that it is no longer economical for the locomotive to traverse them, a winding drum may be provided, which enables the driver to draw in trucks from a distance of about 300 ft.

For gathering service and in other instances where for any reason it is not permissible or advisable to install an overhead trolley wire, the storage-battery locomotive, Fig. 7, may be advantageously employed. Such a locomotive possesses all the well known advantages appertaining to the ordinary electric machine, as compared to other varieties and animal haulage, among which are the following:

It consumes power only when in actual operation, and can be handled by any man of ordinary intelligence. It is ready for use at all times of the day, providing it has been given its full charge during the preceding night or idle period. It has large momentary overload capacity, and possesses an easy and perfect system of control. It can be run underground and in other localities where the smoke and fire risks of the steam locomotive would forbid its use or where the fire hazard of the trolley type is dangerous. It can be charged from a relatively small generator, as the charging period is distributed over several hours and the dynamo consequently is relieved of heavy overloads which would otherwise be incidentally demanded by trolley locomotives. The mechanical and electrical parts are few and simple, resulting in low maintenance cost. It requires minimum head room in tunnels and mines. It can be installed on track systems where animal haulage is now in use without the necessity of stringing wires, erecting poles or bonding rails.

Hoisting

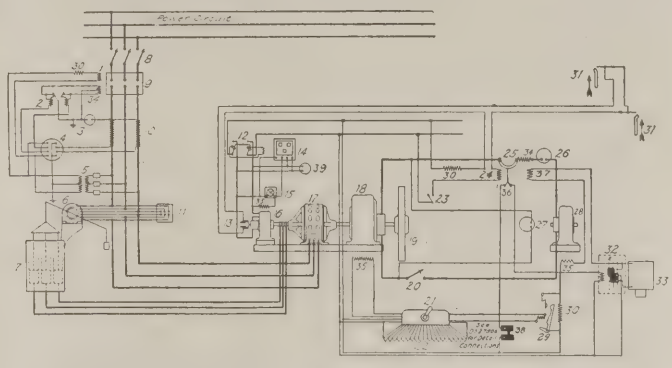
Of equal importance with the electric locomotive in the successful operation of a mine is the electric hoist. This was, however, not extensively introduced for mining work until about 1900, or not until long after the locomotive. Its importance is evident when it is considered that the main shaft represents to a certain extent the principal artery of the entire mine. It is the connecting link between the coal-handling systems above and below ground. The whole of the material mined must pass through the shaft on its way from the various points of production to the loading station. Any interruption or breakdown in the hoisting machinery is equivalent to a stoppage in the whole coal-getting work of the mine. In fact, its efficiency determines the maximum output of the development.

It is possible to arrange both the underground haulage system and the surface-railway network according to the requirements, and thus increase the efficiency as desired, and at the same time provide working reserves. This is, however, not always the case with the hoisting system.

A second or third hoisting plant would require the sinking of a second or third shaft, which would entail large extra construction costs, which, in most cases, would be economically impossible. The technical problem is, therefore, to cover the greatest possible area of a mine with one main shaft, and to install a hoist therein which combines maximum efficiency with high economy and thorough reliability. Endeavors to solve this problem have led, during the course of a century, from hoists driven by flowing water to steam engines, and from the latter to electric motors.

The successful introduction and the surprisingly rapid growth of electric hoisting are therefore primarily attributable to the fact that the electric motor is excellently adapted to hoisting work. There is scarcely another form of service which is more intermittent or in which the power required varies so greatly.

The two principal classes of electric mine-hoist equipments are: The direct-current motor operated from its own motor-generator set by generator field control, and the induction motor. The direct-current motor lends itself well to direct connection, as the characteristics of



1 Low-Voltage Trip Coil
2 Inverse Time-Limit Relay
3 Ammeter A. C.
4 Polyphase Watthour Meter
5 Potential Transformer
6 Regulating Motor
7 Liquid Rheostat
8 Disconnecting Switches
9 Oil Switch with Bell Alarm
10 Current Transformer
11 Short-Circuiting Switch
12 Exciter Switch
13 Speed-Limit Trip
14 T. D. Regulator
15 Rheostat
16 D.-C. Exciter
17 Induction Motor
18 D.-C. Generator
19 Flywheel
20 Switch
21 Controller Connected Mechanically to Hoist through Automatic Retarding Device
22 Generator Field Rheostat
23 Emergency Switch Located at Operating Stand Normally Closed
24 No-Voltage Trip Coil
25 Overload Circuit-Breaker
26 Ammeter D. C. Center Zero
27 Voltmeter Center Zero
28 D.-C. Hoist Motor
29 Contactor
30 Resistance
31 Automatic Stop Switch, One at Top of Each Shaft
32 Solenoid-Operated Emergency Switch
33 Brake Solenoid or Solenoid Air Valve
34 Overload Trip Coil
35 Shunt Field
36 Interlock Switch
37 Motor Field Trip Coil
38 Emergency Limit Switch
39 Voltmeter D. C.

Fig. 10. Diagram of Connections for Direct-Current Mine Hoist with Flywheel Motor-Generator Set

slow-speed motors of this type are excellent. The cost of a direct-connected motor will, in practically all cases, be higher than that of a geared motor, but in some instances this is largely offset by the saving in gearing, etc. Where, however, a considerable saving can be made by using a geared motor and where the mechanical advantages of a direct-connected hoist are not an important consideration, a geared direct-current motor should be employed.

Such a motor, Fig. 8, should be separately excited and shunt-wound and the current for the same obtained from a separately excited generator of similar type, both machines being driven by a direct-coupled induction motor, Fig. 9, where the source of supply is alternating current, as is almost invariably the case.

The Control of the Hoist Motor

The control of the hoist motor is effected by regulating and reversing the exciting current of the direct-current generator, thus varying the voltage impressed upon the motor terminals, Fig. 10. The current for the motor and dynamo fields is supplied from the direct-connected

exciter, and in the case of the motor it is maintained constant. As the rapidity of hoisting is practically proportional to the voltage impressed upon the motor armature, the controlling gear is arranged so that the speed will be directly proportional to the distance by which the controlling lever is moved away from the neutral position. This system of hoisting has the great advantage that the rheostatic losses are reduced to a minimum and that the operator has perfect control over the motor.

In many cases it is highly desirable to reduce the instantaneous peak loads and equalize the current input to the hoist. This is especially true where the power charge is based wholly or partly on the maximum demand, and any practicable method, therefore, by which energy may be taken from the line and stored during periods of light load and discharged when the hoist load is heavy, makes it possible to greatly reduce the maximum input and consequently the charge for power.

The simplest method of effecting this is by adding a flywheel to the motor-generator set, previously described. In order to permit the flywheel to take care of the peaks, and equalize the load, the speed of the set must be varied according to the demand for power. This is accomplished by an automatic slip regulator connected in the secondary circuit of the induction motor, which, in this case, must be of the phase-wound type.

In its most common form this regulator consists of a liquid rheostat. The resistance is varied by means of movable electrodes suspended from an arm mounted on the shaft of a small induction motor which is set on the top of the rheostat tank. The regulator motor is connected in series, either directly or through series transformers, with the induction motor of the flywheel set. It is adjusted so that its torque opposes the weight of the electrodes, which are counterbalanced to reduce the size of the regulator motor to a minimum and to permit adjustment for different values of the line current. When this exceeds the amount for which the regulator is adjusted, the torque of the motor overbalances the weight of the electrodes, lifting them, and thus inserting resistance in the rotor circuit of the induction motor of the set. This causes it to slow down and allows the flywheel to assist in driving the generator during the peak load.

The Induction-Motor Hoist

The second important class of electric hoisting systems is, as previously stated, driven by induction motors. Excessively low-speed motors of this type and of moderate capacities do not show particularly good electrical characteristics. For large-capacity hoists at high rope speeds, using as small a drum diameter as is consistent with good practice, a direct-connected induction motor is, in some instances, entirely feasible, and a number of such equipments are in actual operation abroad. However, the great majority of induction-motor-driven hoists now in use and which will be installed in the future are and will continue to be of the geared type.

The induction motor must be of the phase-wound type, and the speed control is accomplished by cutting in or out resistance in the secondary circuit. Drum controllers with grid resistances are used up to about 200 hp., while between this and 400 hp., it is customary to provide a complete magnetic-contactor control. Above 400 hp., the liquid rheostat is usually employed as a secondary resistance and control.

This rheostat has stationary electrodes, and the area of immersion and therefore the resistance is varied by raising or lowering the level of the liquid. By means of a small centrifugal pump, mounted on the rheostat, the liquid is pumped continuously into the electrode chamber and overflows a movable weir into the cooling chamber. With the weir in its lowest position the electrodes are only slightly submerged and the resistance is high. As the control lever is moved over toward the running position in either direction it raises the weir, which causes the electrode chamber gradually to fill to a level corresponding to its height. This submerges the electrodes, thereby decreasing the resistance and accelerating the motor.

By moving the control lever to any desired intermediate position, thereby lifting the weir part way, the liquid may be raised to an intermediate level. By this means an infinite number of partial-speed running points can be obtained. The time required for the pump to fill the electrode chamber serves to limit the maximum rate at which the acceleration can take place.

When the weir is swung down to the lowest position, it opens one entire side of the electrode chamber so that the liquid falls out, instead of being required to flow out through a restricted orifice. The rapid emptying thus obtained is particularly advantageous in cases where it is necessary to reverse the motor in order to retard the hoist.

For equalizing the load taken by an induction-motor-driven hoist, a flywheel motor balancer may be used. This consists of a shunt- or compound-wound direct-current motor, connected to a heavy flywheel and carrying a direct-connected exciter. The motor balancer is floated indirectly across the incoming line circuit, being tied in by means of a rotary converter or motor-generator set. A regulator actuated by the line current controls the direct-current motor field, so that when the power taken by the hoist drops below the average, the field is automatically reduced, causing the flywheel set to speed up and absorb power from the supply system and store it in the flywheel. When the load on the hoist motor exceeds the average, the operation is reversed, the flywheel set slows down and power is returned to the system through the rotary converter.

Pumping

Due to the severe service conditions ordinarily encountered in the operation of pumps in mines, the superiority of electric-motor drive has been more thoroughly demonstrated in this particular industry than in any other. The motors occupy a small amount of space, operate with high efficiency, are easily controlled, and their location in the mine may be limited solely by the work to be done.

Where conditions of extreme dampness prevail, the motors may be so constructed as to be absolutely waterproof. For temporary or intermittent service, portable pumping sets may be used either mounted on trucks or skids, and provided with cables for connection to the feeder or trolley circuit. The use of the electric motor is the only method by which a portable pumping set can be easily and economically operated in mines.

The main pumps are mostly of a large capacity and are used for emptying the sumps where the water from various parts of the mine is collected, either by gravity or by small auxiliary portable pumps. If these reservoirs are of a sufficient size for storing the water during the

day, the large pumps may be operated at night and the load factor greatly improved.

The question whether reciprocating or centrifugal pumps are to be used is difficult to determine offhand. If the amount of water to be handled is small and the head high, the reciprocating pump, Fig. 11, has generally been selected, although modern installations indicate that the centrifugal pump may be successfully used for heads up to 2000 ft. When a large amount of water has to be pumped against a small head, centrifugal pumps, Fig. 12, are always preferable.

Reciprocating pumps are less affected by gritty water, which may cause serious damage to the guide vanes and impellers of centrifugal pumps. The efficiency of reciprocating pumps is also higher than that of centrifugal pumps, but this is partly counterbalanced by the higher efficiency and power factor of high-speed motors employed to drive the latter as compared to the low-speed motors employed for driving the reciprocating machines.

The volume of water delivered by a reciprocating pump can be varied either by changing the speed or through a bypass valve. The latter method is, of course, less economical on account of the waste of water, and speed variation is therefore preferable. In starting large pumps the water may, however, be delivered through a bypass until the motor is up to speed, when the valve in this passage is gradually closed and the water delivered into the pipe system. The load at starting, therefore, only consists of the friction losses, and usually does not exceed 25 per cent. of the full-load torque.

Either Type of Motors May Be Employed

Either direct- or alternating-current motors may be used for driving reciprocating pumps. When of the former class, the compound-wound type is generally selected for single-acting pumps on account of their rather pulsating load, while for duplex and triplex pumps, having steadier characteristics of power demand, the shunt-wound motor is used to advantage. Both squirrel-cage and phase-wound induction motors are suitable, the latter as a rule being selected where it is desirable to reduce the starting current to a minimum or where a somewhat variable speed is required.

Synchronous motors may also be used for driving large pumps of moderate speed, and are admirably adapted for such service, while, on the other hand, their characteristics are such that by over-exciting their fields they may be made to considerably improve the power factor of the system. Bypass valves should preferably be provided on the pumps, when this type of motor is employed, so as to reduce the starting current as much as possible.

In selecting the motor equipment for a centrifugal pump, its characteristics as affected by the service conditions must be carefully predetermined, and in some respects the operating features of this type of water lift are entirely opposite to those of reciprocating pumps.

With constant speed an increase of the resistance against which the reciprocating pump operates, increases the water pressure and, therefore the load on the motor, while with the centrifugal pump an increase of the resistance reduces the load. The volume of water delivered by a reciprocating pump is not affected by the reduction of the head, but the required power is lessened. A reduction of the head with a centrifugal pump, however, increases the volume of water, and as the efficiency at the same time goes down rapily, the load increases. It is, therefore, of importance to know what this overload, caused by a reduction of the head, amounts to and the duration of the same; and the capacity of the motor should, as a rule, be governed by the low and not the high-head conditions.

The starting condition must be given careful consideration in selecting the motors. In starting a centrifugal pump the discharge valve may be entirely closed until the motor comes up to speed, so that the latter may start as nearly light as possible. As the machine accelerates, the water is churned around in the casing, causing the motor to load up as it approaches full speed, when, with pumps of the usual design, it takes from 40 to 50 per cent. of full-load torque to drive it even though pumping no water.

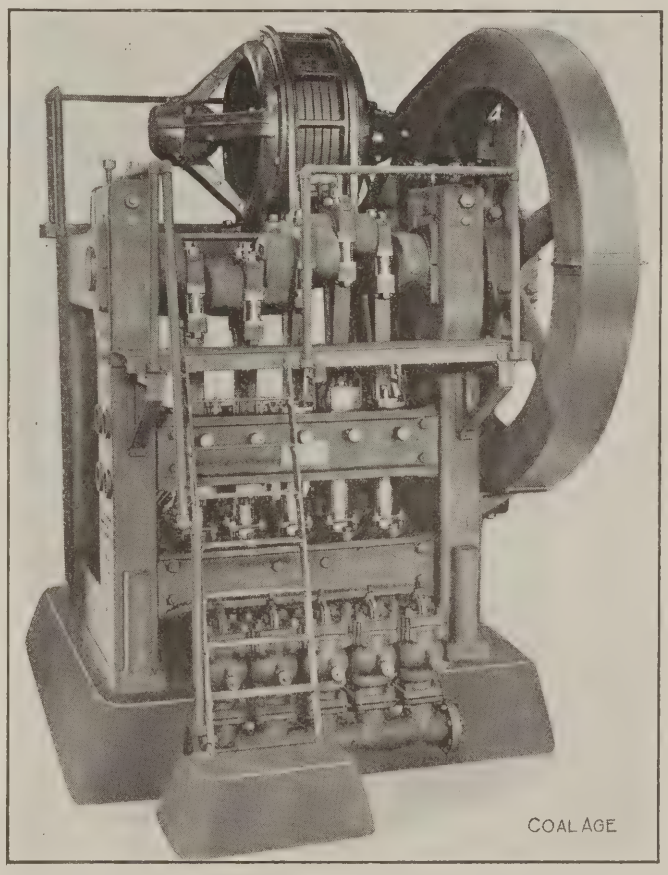


Fig. 11. Motor-Driven Reciprocating Mine Pump

Shunt-wound, direct-current motors and either squirrel-cage or phase-wound induction motors are well adapted for this type of pump and will readily meet the above conditions. A synchronous motor, however, may lead to difficulties unless precautions are taken in designing the squirrel-cage starting winding with a sufficiently low resistance so that it will develop enough torque to pull the motor into synchronism. When this is done, however, the starting current is increased and a compromise must usually be made.

The advantages of electricity for mine pumping are especially evident in the case of sinking pumps. These are intended for being lowered in a vertical shaft when flooded mines are to be drained. They are either mounted on a float or suspended from a cable so as to always operate at the surface of the water. The motors for driving these pumps can be either of the direct- or alternating-

current type, but as they are often liable to be entirely submerged the inclosed induction motor is preferable on account of its simple construction and the absence of moving contacts. In the operation of these pumps the load increases inversely as the head and the motors should be so designed that their efficiency increases with the increasing water pressure.

Ventilation

The ventilation of mines differs somewhat from other ventilation problems, in that a variable air supply is essential, while, on the other hand, an uninterrupted service is the primary requisite. For the latter reason, mine fans should, if possible, be direct-connected to the driving motor, thus avoiding the use of belts. This is entirely feasible and economical with high-speed fans, while with large slow-moving units, changed over from steam to electric drive, the retention of belting is often necessary, due to the difference between the speed of the fan and that which would prove most satisfactory for the motor.

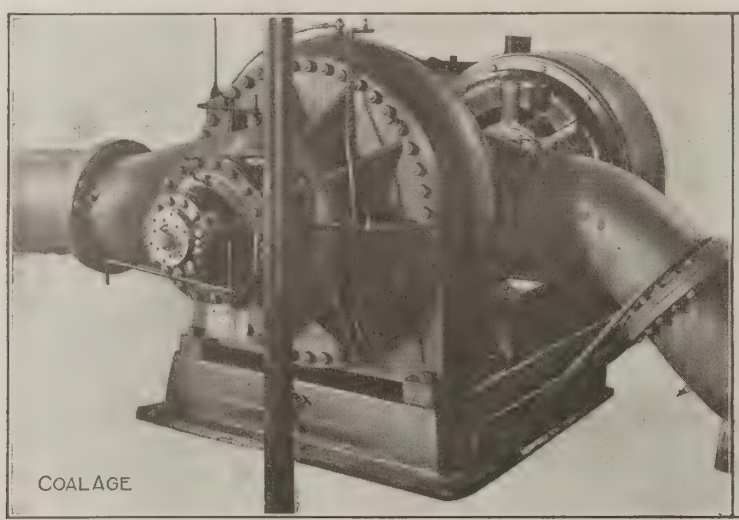


Fig. 12. Motor-Driven Centrifugal Mine Pump

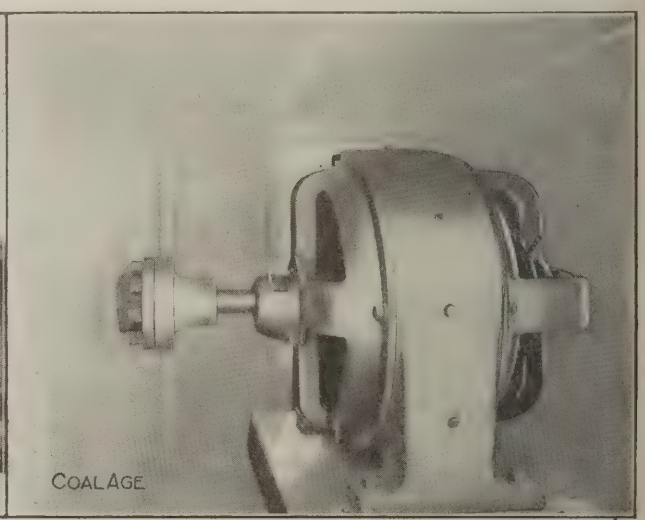


Fig. 13. Direct-Current Motor Driving a Mine Fan

For driving centrifugal mine fans either direct- or alternating-current motors may be used, the choice depending upon the nature of the power supply. The application does not differ materially from centrifugal pumps, the load increasing as the speed rises, and unless some sort of shuttering is provided, the motor will be fully loaded when it comes up to speed.

With a direct-current supply, shunt motors, Fig. 13, are generally used, the speed regulation being accomplished by field control. With alternating current, the phase-wound induction motor should be employed, and in this case the speed control is accomplished by inserting resistance in the secondary winding.

The condition of starting should be considered in selecting the control equipment for mine-fan motors. With large fans, having a high inertia, the time required for acceleration is comparatively long, and the starting resistances for such cases should, as a rule, be of a larger size than that ordinarily required.

Drills

While numerous purely electric drills have been invented and many are in actual operation, their use is, as yet, limited as compared to that of the machine known as the "electric-air drill." The latter is exactly what its name implies—an air drill distinctly, the operating power of which is electricity. It is not, however, merely an air drill driven by an individual electrical compressor, but a complete device—pulsator, hose lines and drill—making a closed circuit in which the same air is repeatedly compressed and expanded, utilizing instead of wasting its expansive power and eliminating all compression losses.

The pulsator is a motor-driven air compressor of unique design—a vertical, duplex, single-acting, self-oiling machine—without inlet or discharge valves, and, therefore, not limited by these parts in either speed or endurance. Motors are used for either direct or alternating current, motor and pulsator being connected by reduction gears. The whole equipment is mounted on a steel truck with wheels which may run on a standard mine track, or may simply roll on the floor in room, tunnel or heading. When used in connection with a track, it may be easily moved on or off the rails or held on an incline by a rope.

Two short lengths of hose form the only connection between pulsator and drill, giving a flexibility to the unit in striking contrast to the usual electrical type, involving a mechanical connection between these two elements. The air in the hose, which is simply a transmitter of power, forms an unbreakable cushion protecting the more vulnerable parts of the mechanism from shock, wear and breakage.

The drill proper is simply an air drill of the utmost simplicity, devoid of all the minor but essential accessories of the usual rock drill, and using the familiar shell and feedscrew. It is the simplest machine of its kind ever built—a plain cylinder containing a piston, mounted on a standard column, shaft bar, quarry bar or tripod.

Coal Cutters

Of the various coal cutters, the chain type is considered the most satisfactory and is in quite general use. The chain is driven by an electric motor and the whole mechanism is mounted on a truck. Through the electric drive it has been possible to make the machine entirely self-propelling, securing a movement from one side of the room to the other, thus completing the cutting in one operation. The cutter is also so arranged that the electric

power can be used for unloading, moving to position at the face, loading upon the truck and moving about the mine, making a large saving in time and labor over other designs.

While direct-current motors are generally used for driving coal cutters, alternating-current machines may also be successfully employed. Many important improvements have been made of late in the construction of coal-cutter motors, one of the most important being the gas-proof design which has been sanctioned with the Government's approval.

Auxiliaries

Besides the previously mentioned applications, there are numerous others about a coal mine, in which electricity has played a most important part in improving the working conditions and increasing the output. Among these may be mentioned the various machines used in breakers and tipples, such as crushers, picking tables, screens, conveyors, etc. These are preferably driven by induction motors, either connected to driving shafts or to individual machines. The absence of commutator troubles, which may be aggravated by the severe vibrations frequently encountered in this service, makes such motors preferable to those employing direct current.

The use of electricity for lighting, particularly its employment in the miner's cap lamp, and for signaling and telephone communication, is too well known to need any comment.

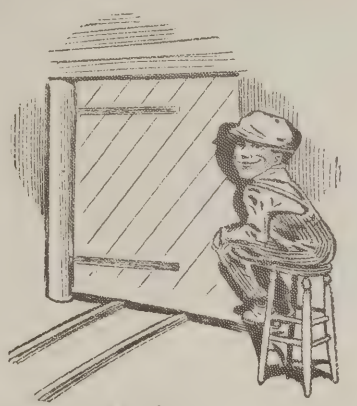
Since a trolley wire serves the double purpose of a conductor and a feeder to the moving current collector, it must be of high conductivity, also strong and durable. Trolley wire is generally made of hard drawn copper in three shapes, round, grooved and figure 8. The latter form is not extensively used for two principal reasons. Owing to its unsymmetrical section, it is difficult to handle and to place in position. The nonuniformity in the sections as made by different manufacturers has rendered it impossible to make a uniform style of mechanical clamp for supporting the trolley wire. Trolley wires are seldom made larger than $^1/_0$ or smaller than $^1/_0$, B. & S. gage. They may, however, be made either larger or smaller than these sizes.

The Trapper

Written Expressly for COAL AGE *By* BERTON BRALEY

HE'S only a kid with a grimy face
Who sits by a door all day,
His job's not much of a fancy place,
He'll never get rich that way;
He's deep, deep down from the light and sun,
But he whistles with careless glee,
For the heart of a boy is full of fun
Wherever that boy may be.

So here's to the happy trapper
Whose grin is a full yard wide;
He comes in a small sized wrapper,
But there's pretty good stuff inside!



HIS *Grin is a Full Yard Wide.*

His cheek quite often contains a quid,
His language is not refined,
He isn't the Sunday School sort of kid
Not being that way inclined;
He can give and take in the miner's slang
And his wit is far from flat,
And though he runs with a roughhouse gang,
He's a pretty good boy, at that!

So here's to the snappy trapper
Whose impudent ways we know;
He comes in a small sized wrapper,
But give him a chance—he'll grow!



HE *can Give and Take in the Miner's Slang.*

He must "swing her wide" when he hears the roar
Of a mule train coming on,
Or the train may crash on the heavy door
And a first-class mule be gone;
He must watch his work with a careful eye
Lest the air in the rooms grow stale,
And firedamp gather and good men die,
And mothers and children wail.

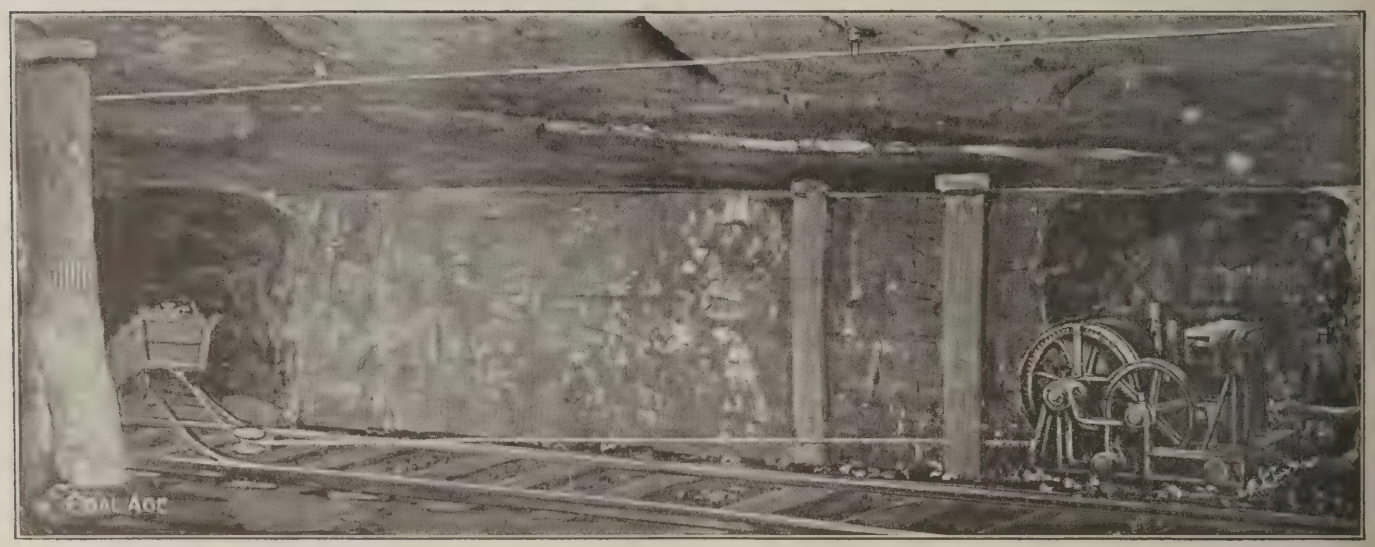
So here's to the humble trapper
And all of his youthful band;
He comes in a small sized wrapper,
But holds men's lives in his hand!

The Development of the Ebensburg Coal Co. Mines

By H. V. Brown

SYNOPSIS—In order to hasten the advance of the mine entries, the headingmen at the Ebensburg mine both cut and load the coal in the haulageways and air courses, placing the cars for loading with the aid of a hoist whenever the grades would otherwise be prohibitive.

Modern progress in coal mining tends toward larger capacities, which must be obtained under conditions that are becoming more and more difficult. To produce large tonnages, especially in the thinner beds, it is vitally necessary that careful attention be given to the development of the headings. No. 1 mine, of the Ebensburg Coal Co., at Colver, Penn., is a good example of a large capacity mine working a thin seam, and the methods employed in its heading development are worthy of note.



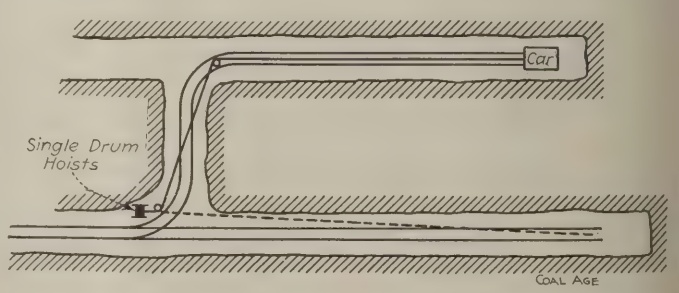
Room Hoist Pulling a Loaded Car Out of a Dipping Back Heading

Development of the Ebensburg No. 1 mine was started in the early part of 1911, this work consisting of the general preliminaries, and the starting of the rock tunnel. About Apr. 1, 1911, coal was reached in the air shaft, also in a slope which was used for the initial development of the mine. Some of the first heading work was done by means of compressed air, which was furnished from a temporary plant. When the permanent power plant was completed in the early part of 1912, careful consideration was given to the problem of obtaining an electrically operated machine, especially suited for heading development work. The Pneumelectric electrically operated coal puncher was adopted for this purpose. The first unit was installed in April, 1912, and more were added from time to time, so that now 42 of these machines are used, practically all on development work. In this time the output of the mine has increased to an average capacity of four thousand tons per day.

Transferring Cars at Entry Face

As the mine progressed, local grades which were encountered on some of the headings made it necessary to consider some reliable method of handling cars at the entry faces. Mules could not be considered, as the mine was electrically operated, and the management felt that it could not use gathering motors without materially retarding the advancement of the headings. It was apparent that a small electric hoist which was readily portable and could be made to serve a pair of headings and so simple that a miner could operate it would best meet the conditions, and the Pneumelectric room hoist was therefore adopted for use in all headings having a grade of over 3 per cent.

The main headings are driven 18 ft. wide, all other headings 10 to 15 ft. and other narrow work, such as crosscuts, etc., being driven 10 ft. wide. Four men are usually employed to drive a heading, its accompanying air course and the necessary crosscuts, and one electric puncher working on the cutting-and-loading system does the undercutting in these places. The machine is, of course, not in use continually, but is always instantly available when there is a place to be undercut. This system of driving headings is much superior to that in which the same machine undercuts in both rooms and headings.

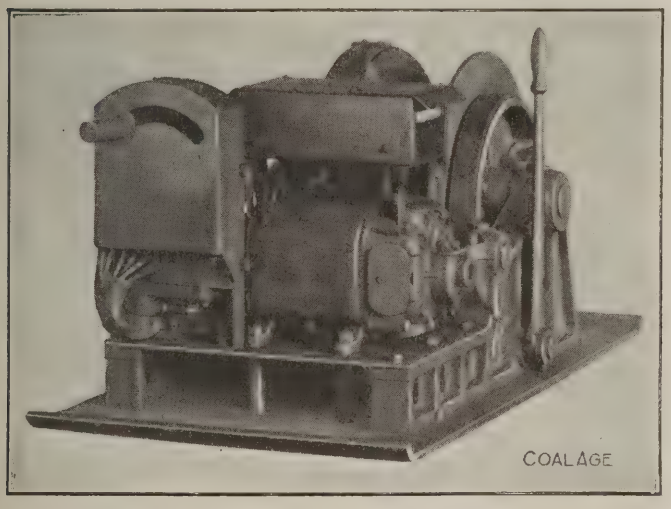


Method of Pulling Cars from Dipping Faces of both Haulageway and Aircourse by a Single Hoist

With such a plan there is almost always a considerable delay in undercutting the heading after it is "cleaned up," because the machine has many other places to serve, also because of blocked roadways and other causes of delay. Too often the result is that the headingmen leave their places, and thus the entry stands idle for that shift. No such delays are possible when the cutting-and-loading system is adopted. The accompanying illustration gives a good idea of the way the electric puncher does its work; one feature which is especially noteworthy being the character of undercut, which assures greatest safety in "shooting," uniform ribs and the best condition of roof, since the charges of explosive are light.

Hoists Operated by Headingmen

The method of using the room hoist is illustrated by the accompanying sketch. The hoist is placed just outside the crosscut and, by means of spool sheaves set on the ties, the rope can be taken to the face in either the heading or air course. When necessary, the empty cars can, of course, be drawn to the face by means of a suitable sheave and jack set near the face. The miners operate these hoists and are thus enabled to take the trip of five or six empty cars, which the locomotive may leave, load them all, and have them back on the heading outside the crosscut ready for the next trip of the motor. Since the rope drum on these hoists holds over 500 ft. of rope, it is only necessary to move the machine and extend the trolley wire when the heading has advanced that distance.



Electric Room Hoist or Car Puller

The advantages of this system of driving headings can be summed up briefly in the statement that the headingmen are never delayed by waiting, either for their places to be undercut or for their loaded cars to be shifted. The time of making the undercut is less, when all things are considered, than in the case of undercutting by pick or by any other type of machine. The net result therefore is that the miner is enabled to spend practically all his working time in shooting and loading the coal, and thus advancing the heading.

That this system works out well is best illustrated by the fact that the Pneumelectric coal punchers and hoists produced, last month, over 17,000 ft. of narrow work, this figure including headings, air courses and crosscuts, but making no allowance for room necks. Stating the figure in another manner, these machines have produced an



The Conversion of Electric Energy into Energy of Compression, and Then into the Translative Energy of the Pick Plunger Is Performed without the Introduction of Any Elaborate or Weighty Machinery

equivalent of over 6700 ft. of heading progress with accompanying air course, crosscuts, etc.

The writer of this article is indebted to T. R. Johns, general superintendent of the Ebensburg Coal Co., for the information forming the basis of this article.

Extracts from a Superintendent's Diary

I have never found it possible to lay down a rigid rule of conduct for my own guidance covering the acceptance of gifts. I do not enjoy receiving presents of any kind from any source and never have. They all seem to belong to one of two classes; those given with affection and those given for affection. The givers of gifts that come under the first class can generally ill afford the gifts they make and often inconvenience themselves to a point of embarrassment as a consequence. The ones that come under the second class embarrass both the giver and the receiver eventually.

If it were possible to always determine positively before accepting a present to which class it belongs, it would at least be possible to avoid wounding sensitive hearts, and yet administer telling rebukes occasionally when circumstances demanded; but it is very often not possible to draw the line with any degree of certainty.

Some of our foreign-born citizens are among the worst offenders in the matter of trying to curry favor by means of gifts.

We have one such family in our camp in particular (they are Italians) that has persistently exhausted my patience. So long as their tactics were confined to the men folks of the family, I managed to make the proper allowances, but when the wife and the mother began to work on my wife, I became disgusted. Even at that they have the laugh on me for right now the father is working every day in our blacksmith shop, while two men who are more competent and really worthier are working two days a week, because of the slackness in business.

They began by sending over fruits for my younger children. They are related to an Italian in town who conducts a wholesale tropical fruit business and in conse-

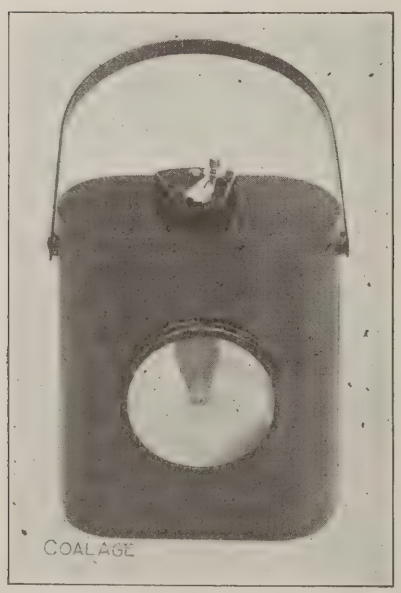
quence they are always well supplied with rather choice fruits. My wife was at a loss to know just how to meet their advances. She did not want to offend them and ended up by doing nothing at all, hoping they would not repeat the occurrence, but they did repeat the incident time and again and gradually varied the gifts to include wines, cheese, etc.

Then followed an exchange of confidences between the women folks and my wife learned that the family were living from hand to mouth, and they should never have thought of making presents out of their meager store. For three months now my wife has been drumming into my ears this family's affairs and when it became necessary to put some of the men on short time last week, fear of what my wife would surely say influenced my decision and I spared the Italian and swallowed my disgust.

Years ago, when I was a young fellow getting my first experience around mining camps, nearly every man in authority had some kind of a perquisite that went along with his regular salary, and as a matter of course the underbosses who were not so fortunate managed to tack on a few perquisites and did so without any stretching of their consciences. Back in those days my Italian and his family would have been general favorites, and a few fat years would have been sufficient to have enabled them to return to their native land. But now with the word perquisite almost an obsolete term, their future cannot be very rosy. Eventually I will be compelled to get rid of them and each move means for them the entire undoing of all of their carefully prepared plan of campaign, and a reduced fund with which to begin the new assault.

A New Portable Electric Lamp

A novel form of portable electric lamp has recently been placed on the market by H. W. Johns-Manville Co., New York City. The particular feature of this lamp that appeals to the user is the fact that two ordinary dry batteries are used to maintain the light. The advantage of this is apparent, since these dry cells can be procured quickly and readily at almost any point, when it is necessary to replenish the battery of the lamp.



A Portable Electric Lamp

The lamp consists, as shown in the accompanying illustration, of a light tin case, which holds the batteries. A small one-fifth ampere, 2½-volt, tungsten bulb is set in the center of a 3-in., silver-plated reflector. A switch shown at the top of the lamp turns the current on or off, as desired. It is claimed that, with this reflector, the lamp projects a beam of light that renders objects clearly visible at a distance of 100 ft. The two dry cells, it is stated, are sufficient to maintain the light for at least 100 hr.

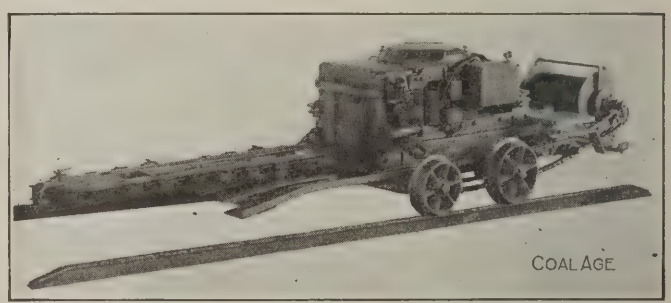
The lamp is furnished with a handle by which it can be carried or swung on the arm. The weight of the lamp is chiefly the weight of the two dry cells, and is about 5 lb. This lamp is a convenient one for many purposes. It was originally designed for the farm; but has been found useful in coal mines in the pumproom, toolhouse and other shanties, as well as on the shaft bottom. For these purposes it is a very convenient form of portable electric lamp. The price of the lamp complete is $3.50.

A New Tack in Undercutting Coal

By Ralph E. Noble*

SYNOPSIS—The possibilities involved in decreasing the width of the kerf made by coal undercutters of the chain type are here set forth.

Ever since the introduction of successful chain mining machines, the standard kerfs cut have ranged from about 4½ to 6 in. in height.



Narrow-Kerf Shortwall Machine on Reversible Self-Propelling Truck

In the design of the machines in order to use the class of material available at that time for the chains, and frames carrying the same, it was felt that this amount of space was needed. Furthermore, this large kerf was in every way acceptable, since it was a material reduction compared with the undercuts made by punchers or by hand. In some mines the fine coal produced was not objectionable, for the cuttings were used, together with the balance of the output, in making coke or sold as run-of-mine.

However, in certain beds, where the whole profit depended on lump coal, strong objections were raised and efforts were made to cut in the clay or rock underneath the coal measure. Where this was free from grit and fairly soft, good results were obtained, but if hard and gritty, the small amount of undercutting done and the excessive wear on certain parts of the machine made the operation impracticable.

As the use of chain cutters became more general and spread to various fields, much attention had to be given to their development in order to meet the cutting conditions found and much larger and stronger machines were brought out to do the work required. In the anthracite fields, large motor equipments and stronger parts were considered necessary to cut the coal without excessive maintenance cost, and a number of such machines were

*Works manager, Morgan-Gardner Electric Co., Chicago, Ill.

produced and put into operation. These, however, still adhered to the large kerfs.

In certain beds there would be found several inches of free-cutting coal at the bottom of the measure, then a band of rock or sulphur, and then the principal coal stratum. If the kerf was put above the rock, too much bottom was left to take up by hand, while if it was cut in the bottom coal, the bits would hit the band and make the cutting difficult.

Since there has now been put upon the market strong alloy steels, better electrical and insulating materials, bearings, etc., the necessity for making large frames and chains no longer exists. Realizing this, a machine to cut a smaller kerf was developed.

Tests have shown that, at the same rate of feed, the power required is practically proportional to the height of kerf cut; i.e., a 5-in. kerf requires about one-fifth more power than a 4-in. kerf. This is a waste of power which should be avoided, not only for itself, but because the economy is accompanied by a reduced investment in copper for transmission lines.

After studying the problem, it was decided that the kerf could be reduced to 3¼ in., and machines were built for this size of cut. The benefits resulting are manifold, such as lessening the duty and strains on the machine, which increases their life and reduces the upkeep cost; a direct saving in power, copper and bits; being able to cut in the bottom coal and avoid rock bands, sulphur balls, and places that would otherwise be troublesome, and a direct saving in coal, which amounts to a surprising sum in many localities.



NARROW-KERF CUTTER ARM, SHOWING SINGLE-REDUCTION GEAR DRIVE FOR CUTTING CHAIN

For example, a Morgan-Gardner 6-ft., type SA, short-wall mining machine, cutting 200 ft. of face in a day with a 3¼-in. kerf, produces 13 tons of cuttings. If a 6-in. kerf is cut, 24 tons of cuttings would be made, showing a saving of 11 tons in large coal in favor of the 3¼-in. kerf.

Meeting of Illinois Mining Institute

SPECIAL CORRESPONDENCE

SYNOPSIS—Discussions on the relative safety of continuous and alternating current, on the sealing off as against the ventilating of idle workings and on the value of panels for the prevention or the control of squeezes marked the successful winter meeting of the Illinois Mining Institute.

The second annual meeting of the Illinois Mining Institute was held in Springfield, Ill., on Nov. 19, 1914. Two sessions were held in the Council Chamber of the City Hall, one opening at 9:30 a.m. and the other at 2 p.m. In the evening a banquet was provided at the St. Nicholas Hotel.

The Illinois Mining Institute is open to "any person engaged or interested in any branch of mining," and it "has for its object the advancement of the mining industry in Illinois, by encouraging and promoting the study and investigation of mining problems, by encouraging education in practical and scientific mining, and by diffusing information in regard to mining that would be of a benefit to its members." Meetings are held twice each year, this being the fourth semiannual meeting.

About 50 per Cent. of Membership Present

While the attendance was small, less than one hundred members being present out of a total membership of about 180, yet it was a thoroughly representative body of interested men, comprising operators, mine inspectors, representatives of mining-machine companies, educators, practical miners, etc. The keynote of the session was strict attention to business and a desire to make the day profitable to all present.

The meeting was called to order promptly at 9:30 by President Thomas Moses, superintendent of the Bunsen Coal Co., who introduced the mayor of Springfield, John S. Schnepp. He delivered a cordial and brief address of welcome to the visitors.

In the absence of ex-President John P. Reese, general superintendent of the Superior Coal Co., who was to respond to the address of welcome, President Moses called upon W. C. Adams, electrical engineer of the Allen & Garcia Co., Chicago, to deliver his paper, entitled "Electrification of Coal Mines."

Electrification of Coal Mines

Mr. Adams' paper covered the many lines to which electric power can be applied in and about coal mines, paying special attention to electric haulage.

A warm discussion followed the presentation of his paper. It was pointed out that the storage-battery locomotive does not require as large a plant for its operation as a trolley locomotive, there being a light load factor due to the charging on night shifts. In fact, owing to the great demand for power where storage-battery locomotives are being used at night, public-service power is well suited for such locomotives.

Relative Danger of Direct and Alternating Current

The question of the relative danger to men of alternating current and direct current was opened by Patrick Hogan, who stated that danger must be considered as well as efficiency, in deciding whether to use direct or alternating current. Two men were killed in his inspection district by the latter.

John Dunlop, ex-state mine inspector, referred to the deaths of two men from alternating current at the Brewster & Evans mine. These men were killed by the cur-

rent from a supposedly insulated wire. In case of an accident of this kind where alternating current is used, it is necessary to cut the wire or shut off the power before the victim can be freed, so strong is its grip on hands placed upon the conductor.

The discussion was finally closed by a motion that the chair appoint a committee of three to prepare a paper for presentation at the next meeting, on the relative danger of direct and alternating current in mines. It is hoped that by obtaining the joint opinion of three separate authorities, no one point of view will be given undue importance. The committee was not named before the meeting closed.

Panel System of Mining

Mr. Reese, having come in during the discussion of Mr. Adams' paper, was called upon for a short speech, and when the paper of Patrick Hogan, state mine inspector, Third District, Canton, Ill., on the "Panel System of Mining" was read, Mr. Hogan brought out the following points as advantages of the panel over the usual room-and-pillar system:

1. The panel system offers the best facilities for ventilation, next to longwall.

2. Old and abandoned sections of a mine should be sealed and this is easier to accomplish where the panel system is in operation.

3. Gob fires should be closed off. Abandoned room-and-pillar workings, where the panel system was not used, cannot be sealed up, for there is too much to seal.

4. Squeezes cause trouble and expense. The panel system is not proof against them, but if panels are laid off carefully, a squeeze within a panel will not close the haulage road.

5. The haulage system has the main roads in solid coal. There is a concentration of work that gives big trips and a large output from a small territory.

6. Close supervision results from concentration in panels, also a saving in materials and a reduction in accidents.

How to Handle Gas in Gobs

In the discussion following this paper, objection was raised to sealing up large bodies of gas within a panel because of the risk of holing through when working the next set of rooms on the following panel. Of course, the new workings can be kept from approaching the old, but this entails leaving large bodies of coal as barriers between panels. Mr. Hogan thought that such pillars must be left intact indefinitely.

He stated that ventilating the old works would be best were that possible, but a large territory will have many holes due to falls of roof, and that large bodies of gas may accumulate in such places, as the air cannot enter them. Such bodies of gas are a menace to a mine. It may rush out when a roof fall occurs or a fall of the barometer may allow it to flow out or a windy shot may drive it to a point where it may be ignited. A sealed body of gas is not explosive because there is not enough oxygen present to provide combustion.

A Gob Which Defied Ventilation

J. W. Starks instanced a case at No. 11 West Frankfort where the room-and-pillar system was in use. A bad top caused a squeeze that left some 10 to 15 acres in such a condition that it could not be ventilated and became filled with gas. Concrete walls were built to close it in and stood for five or six years. A pipe leading from this area showed that the gas had finally been rendered harmless by blackdamp. The walls were blasted out and the workings laid out in panels. Mr. Starks recommends the sealing of such areas, seeing that it is impossible to ventilate them.

President Moses explained that he had to deal with some 30 to 40 ft. of soft shale above a coal, with a solid stratum above the shale. Large cavities were formed and these became filled with gas. A disaster would have resulted if the gas had been allowed to enter the working portions of the mine. Such gas, in any event, should be carried away from the men by a gas entry, regardless of whether the panel or room-and-pillar system is used. This is the practice in western Pennsylvania.

Panels Limit but Do Not Prevent Squeezes

Mr. Reese stated that his company is operating large mines on the panel system. It does not prevent squeezes and his mines have had many which were the occasion of much expense. A total of at least twenty have occurred in two mines. None of these squeezes ever came over the haulageway. The squeezed panels are sealed off by two or four stoppings.

In his mines he finds that an extraction of 60 per cent. of the coal brings on squeezes, so only half of the whole seam is taken now in hope that this trouble can be avoided. Mr. Reese claims that at least as much coal can be extracted by the panel as by the room-and-pillar method, while the panel system has a great advantage in ventilation. But the haulage is more expensive in panel than in room-and-pillar workings, this being due to the long distance, nearly 1500 ft., over which a mule must haul coal while developing up to the first room in the panel.

New Officials Elected

The afternoon session was opened at 2 p.m. as a business meeting. Officers were elected for the coming year as follows:

President, J. W. Starks, state mine inspector, Fifth district, Georgetown, Ill.

First vice-president, W. M. Burton, Herrin, Ill.

Second vice-president, F. S. Phaller, Belleville, Ill.

Secretary and treasurer, Martin Bolt, chief clerk of the State Mining Board, Springfield, Ill. Mr. Bolt has held this position ever since the Institute was organized.

Executive Committee—John Dunlop, Peoria, Ill.; Patrick Hogan, Canton, Ill.; John Bohlander, Pekin, Ill.; John P. Reese, Gillespie, Ill.; J. S. Reid, Cartersville, Ill.

John Bohlander is president of the State Mining Board and Mr. Reid is state mine inspector of the 12th district.

It was decided to hold the next meeting at Danville, Ill., at the time fixed by the constitution, which is May, 1915.

Following the business meeting, a paper was read by R. M. Gambol, of the Hirsch Electric Mine Lamp Co., Philadelphia, Penn., on "The Advantage of the Electric Cap Lamp for Coal Miners." A number of questions were asked and answered concerning the details of the Hirsch cap lamp, and the session adjourned for the afternoon.

Banquet

The banquet was held at the St. Nicholas Hotel at 8 p.m., with Thomas Moses as toastmaster and 49 members present. Patrick Hogan favored the party with a few songs. Short talks were made by John Bohlander, Prof. H. H. Stock, of the University of Illinois, F. W. De Wolf, state geologist, Charley Kane, Martin Bolt, David Ross, and others.

A New Type of Electric Locomotive

By Frank H. Kneeland

SYNOPSIS—The basic principle of the induction motor applied to a locomotive produces a machine which is independent of grades and the adhesion of wheels to rails.

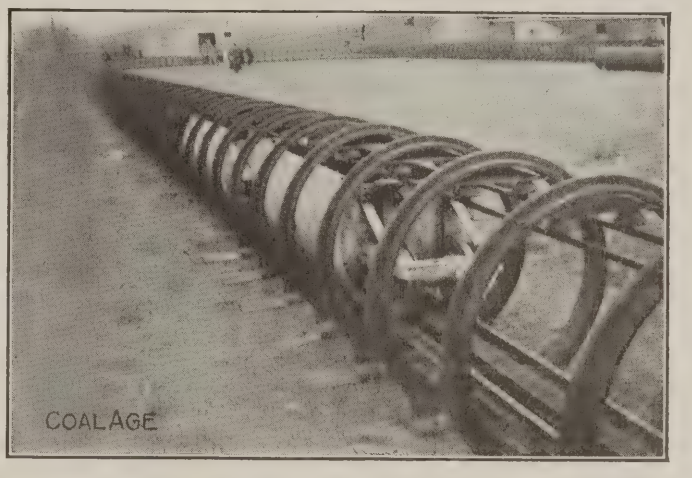
We are all accustomed to think of the electric motor as a machine for revolving a shaft. In this construction the elements of the rotor receive electrical energy and moving through space and time transform it into mechanical power. The construction is such that the parts travel in circular paths around the shaft of the motor. It is perfectly possible, however, to so construct and arrange the stationary and moving units of the ordinary motor as to get a motion in a straight line.

Take as an example the common induction motor with which all coal-mining men are familiar. Suppose that we cut the rotor and stator in two and straighten each element out, supporting them in proximity to each other, leaving the customary air gap between them but in such a manner that one is held stationary while the other is free to move in a straight line. Now should we pass the electric current for which the machine is wound through the device in the ordinary manner, a motion would be induced in the movable part relative to the stationary one. The speed of travel in this case would be exactly the same as the circumferential speed of the rotor in the ordinary motor.

Now to carry this idea a step further toward practical application, let us support the stationary element of the device between the rails of a track, and carry the moving element beneath the truck of a car traveling thereon, maintaining a suitable air gap at all times between these two elements. Now when both elements are suitably energized from a source of current supply we have an electric locomotive which is absolutely independent of grades and the friction between wheel and rail. This machine will travel along the track at a practically uniform and predetermined speed, regardless of grades, curves or other obstructions.

This is the fundamental idea which is embodied in the apparatus, the patents for which are controlled by the Electric Carrier Co., of No. 220 Broadway, New York City. This firm has constructed a demonstration plant at Paterson, N. J. This plant was built, however, with the primary idea of demonstrating the possibilities of this method of transportation in the handling of mail or express matter underground in large cities, and consequently differs radically in detail from that which would be employed in coal mining.

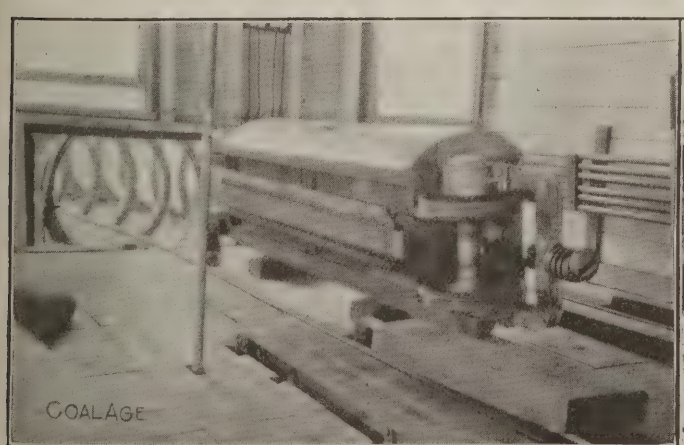
Two phases of the 100-volt, 55-cycle, 3-phase current are carried by overhead conductors which make contact



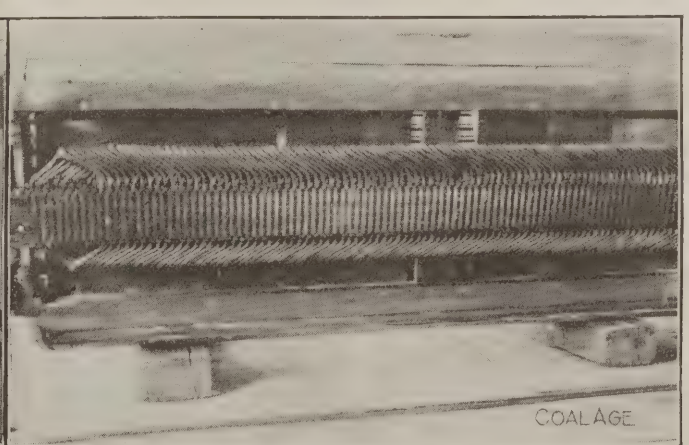
Locomotive and Trailer on Demonstration Track at Paterson, N. J.

with suitable shoes upon one end of the locomotive. The third phase is taken by the rails and the stationary element in the center of the track, which in this case correspond in general construction to the rotor of the induction motor. The moving element which is carried on the bottom of the car is equivalent to the field of the ordinary induction motor, and in this plant is composed of 12 poles. The wheels of the truck are, of course, practically independent of all electrical connections.

The lineal speed of the machine is uniform, or as nearly so as the revolutions per minute of the induction motor under load. This speed is determined by the pitch of the poles on the moving element and the frequency of alternations of the current. A reversal of one phase of the current reverses the direction of travel of the locomotive.



Bottom View of Locomotive



Nearer View of Locomotive Windings

The air gaps maintained between the stationary and moving elements of the device may be varied between say ⅛ and ½ in., the only difference in operation being a difference in the power factor on the system.

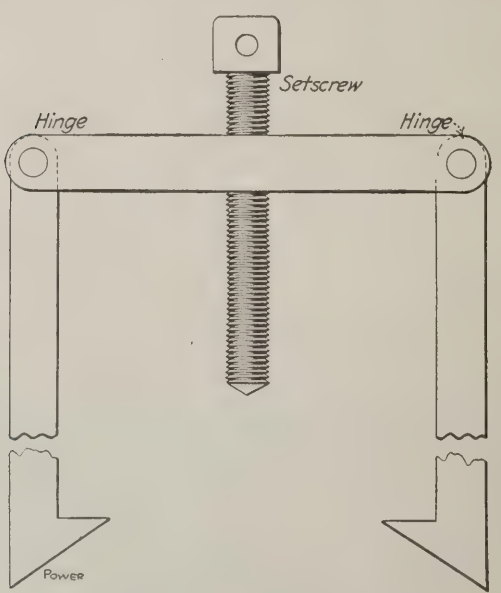
It will be at once evident that a system of this kind presents a wide range of possibility. On adverse grades or heavy curves the stationary, or track, element may be constructed with heavier copper, and the impressed voltage increased, thus augmenting the pull where such an increase is necessary. On favoring grades, where the speed of the locomotive and trip tends to increase, when a velocity 5 to 10 per cent. above synchronism is reached, current is generated and returned to the line. This on down grades offers a braking effect to the movement of the trip, which is practically ideal.

This system may be built to be operated either in the ordinary way with a motorman upon each locomotive, or each car may be run entirely automatically. The former would probably be the more preferable method in coal or metal mines, while the latter lends itself readily to the transportation of mail matter and express in cities.

As stated above, the operation of this device is independent absolutely of the friction between wheels and rails. As a result, loads may be successfully handled upon either favoring or adverse grades which would be utterly impossible for the ordinary mine locomotive. Inclinations of 20 to 30 per cent., or even higher, may be negotiated without the slightest difficulty, while on systems which have a general down grade favoring the load, a considerable amount of power may be generated and returned to the system, balancing that required to haul the empties back up the hill.

Clamp for Safety Valve

A clamp for a safety valve to prevent its opening when applying a hydrostatic test to a boiler is described by Wrightson in *Power* for Nov. 3 and shown in the accompanying illustration. The clamp is placed over the valve, the arms hooked under the valve body and the setscrew set down on the spindle, preventing the disk from lifting. This saves the trouble of increasing the tension on the spring and resetting to the right pressure after the test.



Adjustable Valve Clamp

COMING MEETINGS

The American Mining Congress' seventeenth annual session will be held at Phœnix, Ariz., Dec. 7, 8, 9, 10 and 11, 1914. J. F. Callbreath, secretary, Denver, Colo.

The Coal Mining Institute of America will hold its winter meeting Dec. 8 and 9, 1914, at the Fort Pitt Hotel, Pittsburgh, Penn. Charles L. Fay, secretary-treasurer, Wilkes-Barre, Penn.

The West Virginia Coal Mining Institute's winter meeting will be held at Huntington, W. Va., Dec. 9, 10 and 11, 1914. Prof. E. N. Zern, secretary-treasurer, Morgantown, W. Va.

The American Institute of Mining Engineers will hold its annual meeting in New York City, beginning Feb. 16, 1915. Bradley Stoughton, secretary, New York City.

Who Are "Brokers" under the War Tax Bill?

The provision of the War Tax Bill of Oct. 22, 1914, for levy of a $20 tax on "commercial brokers," promises to raise controversies as to just who fall within that term, since the same question arose frequently under a similar provision in the War Tax Bill of 1898. Under the latter measure it was decided by the Commissioner of Internal Revenue that persons who were employed by a coal company to negotiate sales for it on a commission basis were not subject to tax as "brokers"; it appearing that they were regular employees. The ruling in this case conformed to other decisions of the Commissioner to the effect that a "commercial broker" was one who, without being an exclusive agent, made a business of negotiating sales or purchases for others on commission, without taking title or possession of the goods. Since there does not appear to be any good ground for reaching different conclusions under the present bill, it is a fair assumption that the same rulings will be made under it.

Itinerary of Bureau of Mines Rescue Cars

CAR NO. 8

Welch, W. Va.—Dec. 9 to Dec. 19.
Gary, W. Va.—Dec. 20 to Dec. 29.
Davy, W. Va.—Dec. 30 to Jan. 9, 1915.
Roderfield, W. Va.—Jan. 10 to Jan. 19.
Coalwood, W. Va.—Jan. 20 to Jan. 29.
Berwind, W. Va.—Jan. 30 to Feb. 9.
Panther, W. Va.—Feb. 10 to Feb. 18.
Glenalum, W. Va.—Feb. 19 to Feb. 28.
Thacker, W. Va.—Mar. 1 to Mar. 9.
Matewan, W. Va.—Mar. 10 to Mar. 19.
Williamson, W. Va.—Mar. 20 to Mar. 29.
Chattaroy, W. Va.—Mar. 30 to Apr. 9.

CAR NO. 6

Luzerne, Penn. (mail, Homer City, Penn.)—Nov. 30, 1914. to Jan. 23, 1915.

Erratum

The account of the Royalton Explosion published in our issue of Nov. 7, 1914, should have stated that the disaster occurred on Oct. 27 and not on Oct. 29.

If heat be developed in an electrical conductor faster than it can be dissipated from its surface by radiation and convection, the temperature will rise. The allowable rise in temperature is one of the limiting features of the current-carrying capacity of any conductor, since the rate at which heat will be dissipated will depend upon many conditions, such as the size and structure of the conductor, the kind and amount of insulation, if any, and the location with respect to other bodies. It is not possible to give any general definite rule for carrying capacity that will be true for all conditions.

Who's Who in Coal Mining

Everett Drennen

There is a young fellow down in Virginia who has accomplished quite a lot since he first became engaged in coal mining—about seven years ago. His name is Everett Drennen, and he first saw the light of day out in Minneapolis, about the year 1881. He's quite a bashful, backward sort of chap; so it is hard to understand just how he came to inject himself so violently and so deeply into the coal industry. However, he's there with both feet, and that's about all that counts in these days of dealing in actualities. Furthermore, we can't complain about



Everett Drennen

Everett's presence among us, for we are obliged to admit that the coal-mining business is all the better because of his activities.

After finishing the usual course of study in the public schools, Everett somehow or other managed to register himself as a student in the engineering department of the University of Michigan. Two years of study at the Ann Arbor institution satisfied him and he showed up next at Cornell—that far-famed knowledge factory situated midst the quiet scholastic atmosphere of lake and mountains in the central part of New York State. Just three years later he emerged from the classic halls of Cornell with a sheepskin credential tucked snugly under his arm.

Everett's first work was out in Ohio, where he spent a few months building roads for the Commissioners of Belmont County. However, this line of engineering did not hold attraction for him, so when an opportunity presented itself in the coal fields of West Virginia, he was quick to accept the chance, and in October, 1907, we find him serving the Fairmont Coal Co. as superintendent of their power and mechanical departments. In this position he was in charge of all the electrical and mechanical equipment of 47 operating mines. It isn't necessary to dilate on the value of the experience he gained while holding this position; suffice it to say there can be no doubt concerning the quality of the service he rendered, for in 1909 he was advanced to the position of superintendent of the entire power and mechanical departments of the Consolidation Coal Co., having charge of this class of work in all the company's mines in Maryland, Pennsylvania, West Virginia and Kentucky.

While filling this last mentioned position, he also served as general manager of the Fairmont Mining Machinery Co., consulting engineer of the Monongahela Valley Traction Co. and managing director of the Black Diamond Products Co., all of Fairmont, W. Va.

From March, 1913, to June, 1914, Everett was actively engaged in managing the 14 mines of the Consolidation Coal Co. in the Elkhorn division, Jenkins, Ky. Other duties which he assumed at this time were vice-president and director of the First National Bank at Jenkins, director in the Bank of McRoberts, Fleming, Ky., president Sandy Valley Light & Power Co., director of the Prestonburg Light Co., director of the Paintsville Water & Light Co., and director of the Standard Tie & Mfg. Co.

In June of the present year, Mr. Drennen was appointed vice-president and general manager of the Stonega Coal & Coke Co. at Big Stone Gap, Va. This corporation is one of the largest producers of coal in this Virginia-Kentucky territory.

One of his most notable achievements was the construction of a 10,000-kw. steam-electric turbo-generator central power plant for the Consolidation Coal Co. at Jenkins, Ky. Other large central plants that were built under his supervision are at Hutchinson, W. Va., Van Lear, Ky., and Fairmont, W. Va. He also accomplished some notable results in the construction of two three-phase, 40,000-volt transmission circuits for the Consolidation Co. One of these lines was in Kentucky and is 40 miles long; the other line is in West Virginia and is 25 miles in length.

In 1911, while connected with the Consolidation Coal Co. at Fairmont, Everett conceived and developed the idea of the Jeffrey-Drennen turret mining machine. It was about this same time that he organized the Standard Tie & Mfg. Co., at Fairmont, which developed the well known Fairmont steel tie.

Mr. Drennen is a member of the American Institute of Mining Engineers; he is also a member of the West Virginia Coal Mining Institute and the Kentucky State Mining Institute. Few young men connected with the American coal industry have accomplished more, or advanced so rapidly to a position of such high trust, as Everett Drennen.

Editorials

The New Haven's Purchase of Canadian Coal

Announcement has been made that the New Haven R.R. has contracted one-half its annual requirements at Boston, or approximately 200,000 tons, with the interests that ship Provincial coal, and there is now a well defined rumor that the Boston & Maine has closed a similar contract for about 75,000 tons for delivery at the same point. These two items have occasioned a great deal of comment unfavorable to the new officials of the two railroads in question.

The New Haven deal is especially significant, and in the view of many is bound to be heard from in months to come. A great American railroad dependent for its earnings on the general prosperity of the country has placed a large contract with a foreign corporation operating mines in a foreign country. This would be bad enough by itself under ordinary conditions, but to do it at a time when the American coal trade is almost stagnant, when mines in West Virginia and Pennsylvania are shut down for lack of business, and American shippers are resorting to every known expedient to carry them over one of the softest markets they have experienced in years, is exasperating in the extreme.

Particularly is this so when it is remembered that the coal from Cape Breton Island cannot compare in heating value with any of our recognized grades; it is well known that the steadily increasing discrimination against fuels that are too high in ash or low in fusing temperature has resulted in a consistent restriction in the markets for these particular coals.

Portland and Boston are the only centers where Cape Breton coal is imported in any quantity, and in 1913 the entire tonnage received at Boston was only slightly over 265,000 tons, 40,000 tons less than in 1912, and less than 5½ per cent. of the total tonnage of bituminous received by water. In other words, the New Haven R.R. buys for half its Boston requirements a coal that practically no other steam-user feels he can afford; in addition to this it is buying foreign coal, which inevitably deprives the American mine worker, operator, railroad and vessel owner of their fair share of participation in an American contract. In fact, it affects even the market for supplies at the mines where the coal might originate.

There are some very pertinent questions that might be asked in this connection. For instance, the Cape Breton coal entered at Boston has been exclusively for one of the large gas-producing companies, under an old, and what has been understood to be, a long-term contract, and the gradual reduction in the shipments from Louisburg and Sidney was due to the larger tonnages received each year from West Virginia and apparently the same holding company controls both the mines and the gas company. This particular holding company is not only engaged in the mining of coal, but in the shipping, the transportation, and the sale of it.

The New England Coal & Coke Co., which sold the Cape Breton coal to the New Haven, is controlled by the same interests that dominate the gas company, which has been practically the exclusive customer for Cape Breton coal in the Boston market. The president of both of these is a prominent and conspicuous member of the executive committee of the board of directors of the New Haven R.R. This savors strongly of "interlocking arrangements"; it certainly looks as if the New Haven director had been transacting business with himself in the person of the coal company and gas company president; and ordinary citizens are wondering if antitrust acts apply. This, we remember, is the *"reform management"* of the New Haven R.R.!

Careful consideration of the subject leads one to the inevitable conclusion that the New Haven's poor orphan, the Boston & Maine, is making up the difference between the 200,000 tons the New Haven bought and the 275,000 tons or so the gas company has usually taken. Did the gas company want to be relieved of an undesirable obligation? Is the New Haven once more to be the goat?

Presidential Conciliation Boards

On Sept. 5 the President sent, unsigned, to the operators of Colorado, a paper entitled "Draft of a Tentative Basis for the Adjustment of the Colorado Strike." With it was forwarded a letter signed by the President containing the following enigmatical statement.

> Two representatives of the Government of the United States have been actively engaged in investigating the whole situation. . . . The result of their investigations and of their very thoughtful consideration has been the drafting of the inclosed "tentative basis for the adjustment" of the strike.

It seemed to us then that this paper while outwardly appearing to be approved by the conciliators, Davies and Fairley, was really written by the President. We wrote to Hywell Davies to ascertain the facts on Oct. 2, and up to the present no answer has been made except in the morning papers of Nov. 30, where we read under the President's signature, the following clearer statement of the events as they actually happened.

> After long waiting, therefore, and the disappointment of many hopes, I ventured, after taking counsel with representatives of the government who had been on the field and made themselves thoroughly familiar with all the circumstances of the case, to propose a plan of temporary settlement.

So it is clear that the proposals, declared from end to end of the United States to be those of the conciliators were not theirs at all but were written and should have been signed by our absentee President. Apparently Davies and Fairley never reached an agreement or if they did, the President did not like it and prepared an independent paper.

But now another board of conciliation is proposed with three members. One is Seth Low, a man who will give the decisions of the commission some weight. He was mayor of Brooklyn, 1881-85, president of Columbia University, 1890-1901, mayor of Greater New York, 1902-03,

and delegate to the Hague Peace Conference, 1899. He is now trustee of the Carnegie Institute at Washington and president of the National Civic Federation. Moreover, he helped to settle the Anthracite Strike, being one of the conciliators named by President Roosevelt.

With him on the committee are two lesser lights, one of whom is Patrick Gilday, president of the second district of the United Mine Workers of America and resident of Morrisdale Mines, Clearfield Co., Penn. He is an agitator who has some merits. It is true he has been unable to make his followers in the second district keep their contracts but he has been in favor of a fining system which he trusted would make the miners keep their engagements.

The third man, Charles W. Mills, is being widely heralded as an operator and he is, in some measure, entitled to that distinction. We cannot say we know much about him, but we learn he is general superintendent of mines at Somerset, Penn., of which he is in part owner. These mines are small; one produced 45,757 tons and the other 2752 tons in 1912.

The larger mine is ventilated by a 7-ft. fan, the smaller by a furnace. No machines were used in the mine in the year 1912 and the power was all furnished by horses or mules. No permissible powder was used, and in the larger mine, the ventilation was not satisfactory to the inspector on the occasion of his last visit in 1912. In the smaller mine the ventilation was fair. While No. 1 mine had defective drainage in some headings, the drainage was good in No. 2 Mine.

One man was killed in 1912, which is equivalent to a loss of about 12 men per thousand or a fatal accident for less than 50,000 tons. The rate for the inspection district is about 2.8 men per thousand or a fatal accident for 334,089 tons. Of course, as only one accident occurred, no far-reaching conclusions should be drawn from the one fatality as has too often been done by the Pennsylvania Department of Mines.

This is all the information we can find about the operating appointee of the president except that he is a partner of the firm of Swayne & Mills, and that the mines in which he has interest and which we have just described are operated by the Climax Coal Co. He was appointed a conciliator in the Westinghouse strike last June and in the Kanawha, W. Va., strike.

By looking back to our files of July 4, 1914, the reader may see that both Gilday and Mills reported in favor of the checkoff, if they can be said to have come to any conclusion at all because they offered the miners a choice between alternatives, one of which proposed the formation of another commission to do what Gilday and Mills had avoided doing, though appointed for that purpose. They sidestepped the issue apparently as gracefully as that other partnership, Davies and Fairley, which has now been removed to make place for Low, Gilday and Mills.

We have not chosen to point to the report of the Climax Coal Co. out of any malice. The important matter to the public and Colorado is that a man has been chosen whose mines have, perhaps by chance, been shown not to be uptodate or leaders in safety. Charles W. Mills may be a most estimable and capable man, but we think it would have been well in view of the clamor which has willfully dubbed the operations of Colorado as being unsafe and inefficient, to have put an operator in the conciliation board who would have been able to point to his own mines as an evidence of what might be done by wise counsels and due care. That judge is indeed in an unfortunate predicament when the man who appears before his bar has a clearer record than his own.

A Welfare Association

Some time ago, May 23 of this year, we wrote an editorial entitled, "A Trust in Virtue." Such a trust we see has been started in Colorado. We hope it will be found in every coal-mining state of America and will be imitated by the unions.

The United Mine Workers of America make much sport of this new movement in the editorial columns of their journal. They say it shows that the laws have been violated. It does truly show that some of the operators, like some of the miners, are crooked. If the miners would spend the same time, energy and money in rooting out these people as the new association purposes to do, it would throw a bright halo over unionism. Then violence, dishonesty, violation of contracts and needless agitation would pass as a dream.

The miners can do it, and if we thought the United Mine Workers of America or any other body had half the virtuous determination of this new body known as "The Coal Mines Welfare Association," we would herald the renovated union as a new ray of hope in a sadly perverse world.

Here are the words showing the purposes of the organization. It is intended to "promote the welfare and safety of the employees of the members, to assist in the enforcement of all laws pertaining to coal mining, and to promote the accurate weighing of coal on the basis of which the miners are paid."

Let us quote what we said before on this matter because we believe it shows what the new association can and will do.

> It is necessary, therefore, that there should be a strong attempt among all right-thinking, right-acting corporations to bear on all those who use their men wrongfully and who do not seek safety in operation.
>
> There are several ways in which a union of operators, a trust of virtue, could be formed, which would make everyone, operator, miner and public, better satisfied. The agreement of the operators is made as a result of their combined effort; but never do those same coal-mine operators join hand in hand to force all the members of the organization to keep the agreement to the letter.
>
> We would urge that all the associations of operators use their coercion not only on their employees, but on themselves, to the end that the agreements made shall be kept to the letter, and to so modify those agreements that unsanitary and unsafe conditions in camps and mines may not be possible.

Let us request the United Mine Workers of America to formulate a similar program and hold meetings for the purpose. It is time that that organization also spent some energy in house-cleaning instead of devoting its time and efforts wholly in correcting the faults of others. Like many people with much work undone and needing doing, it persists in reading the Golden Rule to others and neglecting its observance itself.

The men in control of the new operators' organization are as follows:

> Incorporators—John M. Osgood, president of the Victor-American Fuel Co.; S. M. Perry and C. L. Baum. Directors—George C. Manly, C. L. Baum, S. M. Perry, G. F. Bartlett, D. W. Brown, president of the Rocky Mountain Fuel Co.; J. F. Welborn, president of the Colorado Fuel & Iron Co.; S. S. Murphy, George D. Kimball and D. M. Harrington.

Sociological Department

A Plea for the West Virginia Miner

By Margaret Walker Jordan*

SYNOPSIS—The writer, a settlement worker who has had experience in various lines of work, pays a visit to the "Winding Gulf" section in West Virginia and gives a description of her trip, explaining the needs of the mountaineer miners.

In the course of my studies at Columbia University, I heard much of Ellis Island, that door of hope to the yearly increasing multitude of immigrants, and much concerning the obligations which we owe to these our foreign brothers.

Ellis Island, however, is not the only place that challenges our sense of duty to our fellowman. Being a native of the Southern Alleghany mountains, where the purest Anglo-Saxon blood of the world is found, and where in recent years, with the opening of vast coal operations, communities have suddenly sprung up with their attendant chain of serious problems, both social and economic, I am naturally strikingly impressed with a sense of duty to our brother in that section, and I have been wondering what we are doing to uplift him.



Boys of the King Arthur Club

These boys cleaned up that part of "Winding Gulf" which flows through the mining village of Tams



Bright Little Foreign Youngsters

The girl with the child speaks five distinct languages, and with all the others should make the best type of a citizen

The Mountaineer's New Environment

The man who makes up the mining population of the West Virginia camps is of a type which for generations had been isolated in the mountains, where hunting wild game and chopping timber "offen his patch" were the only sources of livelihood. But today his patch is no more. An absentee owner cut the timber from the whole range and sent the mountaineer with pick and shovel under the surface to dig coal.

Literally buried from sight of sun and progress, no one seems to know him. Little thought had been given to his welfare and uplift, until a strike followed by bloodshed brought him prominently to attention. Then the declaration of martial law in West Virginia, followed later by the memorable occurrence in Colorado, which now occupies so much of our attention, made the miner, his life, conditions and surroundings the topic of the hour. The world generally does not know of these people, and what is more, few people have seemed to care to investigate.

I was particularly fortunate in getting my information first hand in the field itself. My sense of fair play was aroused by the false opinions and unjust criticisms of people who know nothing of the actual situation in these mining communities. I realized that the only way to learn and know conditions is to *live* in them. Therefore, with the twofold object of both learning and improving their methods of life, I went into several of the typical mining towns. I took with me two special teachers in home-making with a view of securing the confidence and interest of parents through effective work with the children.

The coal operators were favorably inclined toward the experiment. Owing to my inexperience, I could outline the work only vaguely in the beginning. But from the day of our arrival, we aimed to bring something of happiness, contentment and economy into the homes of the community. We saw at once that the situation would demand tact, patience and, above all else, no outward affiliation with the company itself, for the operator as an operator is sincerely hated.

Social Experiment on "Winding Gulf"

The place we chose for the beginning of our work was on a branch of the Virginian R.R. known as the "Winding Gulf." Four years ago it was virgin forest, but now little mining towns have sprung up like mushrooms all along the steep, denuded mountain sides. We were to work in a series of three of these towns, strung along the "Gulf" about two miles apart.

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Thus it was that on a hot August day, three university girls found themselves in a dirty little street of a dirty little town, surrounded by dirty little children and grunting pigs. The question of at least temporary accommodation was soon solved. We approached the one building which was somewhat more pretentious in size than its neighbors. We assumed the role of teachers and began to organize sewing and kindergarten classes. In this way we finally got started, though at first we had considerable trouble.

The Men More Approachable Than the Women

Our calls on the neighbors began immediately. Most of the faces were unsmiling and stern, but they showed us the hospitality of "have a toter stranger." One dear woman wished us "succession;" another showed us her photographs. One man proudly brought out the gun and hound which he had received in exchange for his last wife. We became acquainted and our room on the third floor of the boarding house became a classroom. Boys up to 30 years old came to that "kindergard" school.

With their help we cleared the space for a playground. Their fathers moved the heavy timber left by the lumbermen and built swings. Later, this cleared space was used not only by the children, but as an assembly room for evening socials and outdoor classes. This work in the other two towns was carried on along similar lines and always with patience and with almost immediate interest and enthusiasm on the part of the children.

With the women we were not so successful. A coal town is of necessity dirty. Water must be carried and housework is not systematized. Payday was announced every two weeks by the drinking of whisky, playing of cards and the flourishing of pistols. On these occasions, we kept a nightly watch, sitting on the edge of our wire cots very close to our thin, lockless door. The hours never dragged at such times, for our men folks liked a good time. These little amusements made our lives interesting, and at times exciting. Besides, the condition of the food and the wretchedness of the sanitation offered little to make living pleasant. Accordingly, we were glad to find in the next town a fairly comfortable four-room house.

The valley consists of a creek with a railroad on both sides. The mountains rise almost perpendicularly; the sun beats fiercely down at noon and in the evening drops quickly behind the mountains. Often while walking home from work along the lonely stretches of the valley in the somber dusk we, with faces blanched with fear, would pass negroes or Italians. At such times we would bolster up courage by humming a tune, the favorite being "I've been working on the railroad." But no matter whom we met, the "howdy" was always passed and the hats would invariably come off. In time, we became known by such names as "Mrs. Teachers Nice" or "Quality Ladies." The distances we had to cover took much of our time and energy. This gave us much concern, for we saw an ever increasing number of things to do, but we realized our time and strength were limited.

Even Providence itself seemed at times to be allied with other forces in trying our mettle, for we continually worked under great difficulties, and it was only our ability to see the amusing side that often saved the situation.

Difficulties in Overcoming Conservatism

In one town the building which we expected to use was not completed; an available schoolhouse was too small; another school was closed on account of diphtheria. In that same town, a well equipped building which was offered to us burned. Drizzling fall rains and the earliest snows for "well nigh forty years" made walking bad and a playground impossible. In addition to these handicaps, there was marked opposition from local mountain teachers and school boards who had never heard of manual training, domestic art or science.

Naturally, then, we were forced, on account of this opposition, to confine ourselves to evening club work. We taught something, of course, and sowed the seed for effective future work, but we learned much more than we ever taught, and undoubtedly received more than we gave.



One of the Many Seventeen-Year-Old Mothers

Schoolhouse "Steps" in West Virginia

We were forced to admire the conservatism and shrewd native ability of the mountaineer. We saw at once that knowledge for him must be simple, definite and shorn of all artificialities. The domestic science of a white marble kitchen left me somewhat at sea when I found myself equipped with nothing but a "two-eyed coal stove" and a frying pan. I didn't give up, for I realized that much is spent unwisely in equipment and that the problem of more wholesome and attractive food and greater efficiency and economy in cooking were to play a vitally important part in the ultimate success of the work which I had undertaken.

At this stage I realized that I was fortunate in having the coöperation of Mrs. Hanna B. Scott, of Philadelphia, whose 40 years of experience in teaching the wage-earner better and more economical cooking and homemaking, have made her recognized as an expert authority in this

important work. The interest which her remarkable demonstrations aroused in the community among men as well as women, employers as well as employees, gave me a new light and inspiration on the great ultimate possibilities of such work in a field like this.

The Lack of Ambitions and Desires

Before anything can be taught, even to children, the desire to *want* must first be instilled. We want because our neighbors *have,* but in this community, lacking the education of environment, even that of the newspapers and department store windows, there is little to want. Your neighbor lives as you do. Life down there is a very simple, very elemental process. The people talk little, and they have gradually become like the mountains that surround them, reserved, conservative, showing neither pain nor pleasure, suspicious of all strangers and anything or anybody connected with the company.

Socialism there becomes violent anarchy. No demands are made by union leaders for better schools, hygiene or sanitation, but always for an increase in wage. Neither the man nor his wife knows how to make a dollar do



Looking from the Schoolhouse up the Gulf. Some of the Citizens of Tams

a dollar's work. The wage increase goes for gambling and cheap whisky. One even sees a native driving mules on Monday morning in six-dollar patent-leather shoes which were purchased Saturday evening. The best grade of foodstuffs is demanded, and much of it ruined in the preparation or thrown out the back door. This extravagance is responsible for a large part of the discontent. It is the old, old story of "the high cost of ignorance."

The only hope for the situation is education. These people must be brought back to the simple, sensible way of living and be shown that work is a blessing, not a curse. We must teach mothers how to prepare wholesome, economical food. The task is a difficult one, requiring money, ability, skill and patience. But it can and will be started and accomplished when Capital realizes its importance and possibility.

The Labor Problem at Mines Similar to That Elsewhere

The coal operator, as any other business man, must see a profit for his investment. He is neither a philanthropist nor a missionary. His position differs from that of the New England mill owner in that he does not create the present conditions under which he works. When people in the city talk of those terrible mines, I wonder if they know of their own department stores, which are supposedly model, and the factory and child-labor laws, which should be enforced. Maids in their own kitchens may be finishing 10- or 12-hr. days. The whole thing seems to resolve itself to this, that we are often conscious of the evils of the labor question in the distance, but not in our own home and environment.

When the ambition of the mountaineer is aroused, he seldom goes back. It is true that we were never quite sure just how our work was received, and because there was no outspoken appreciation we could not tell what lasting impression we had made. Some time after leaving, however, I wrote the girls' club about some work I was doing in one of the paper-box factories in the North, and in a few days I received a large, soft package, which contained hundreds of short-stemmed mountain violets, tied into small bunches with calico strings. The note accompanying them read: "You showed us as how they were pretty, and we reckon the girls up there don't have none."

The whole problem, after all, is teaching the laborer how to live. Simple, wholesome food makes a man better physically and mentally. A warped mind and soul may be the direct result of food and home surroundings, and corporations today are beginning to realize that the efficiency of a plant depends not only upon the latest improved mechanical inventions, but upon the food and care of the man who works in that plant.

To summarize what I have said, my object has been to outline conditions as they exist in the West Virginia and other mining towns, to tell what we tried to do to help the people there, and to make an appeal, as far as it is expedient, for improving conditions in the future.

The Gillespie Meet

An open meet for all teams in the state of Illinois will be held at Gillespie, Ill., on Dec. 8, under the united auspices of the American Mine Safety Association, Local Union No. 730 of Mine No. 1 and the Superior Coal Co. Headquarters will be at the Colonial Theater, Gillespie, Ill.

At 9 a.m. the mayor of Gillespie will make his address of welcome and James Boston will respond. At 9:30, the one-man events will be held. Two-man contests commence at 1 p.m. At 2 p.m. the schoolboys exhibit their proficiency and at 2:15 the team events are contested. At 7 p.m. prizes are awarded and following this event prominent men in the community will address the assembled crowd.

In the evening at 8:30, moving pictures will be exhibited showing safe methods of mining coal, these exhibits being made by the Federal Bureau of Mines. The list of prizes seems as if chosen by the Society for the Prevention of Useless Giving for most of the awards are useful articles and money.

The Golden Rule of First Aid Work consists of attending to accidents on the spot; stopping all bleeding by pressure; covering all wounds at once; preventing all unnecessary movement; keeping the patient warm; providing easy methods of removal; avoiding unnecessary interference and being yourself gentle, quick and cool.

Discussion By Readers

An Electric Mine-Haulage Problem

Letter No. 1—In the issue of Coal Age, Oct. 24, p. 686, Fred Vinton asks the following question:

Why will an electric mine locomotive pull more on series than on parallel? For example, should a motor stall on account of defective bonding when running on parallel, it will at once start and haul the trip if thrown over on series.

The answer given takes up in detail many interesting questions concerning motor losses, but, I believe, misses the point that Mr. Vinton intended to bring out. The reasons given in the last paragraph of this answer are hardly sufficient to produce the result noted by Mr. Vinton. It will be noticed that the question asked ascribes the trouble that caused the motor to "stall" to "defective bonding."

I want to suggest that the proper answer to this question is that the high resistance in the circuit, due to the defective bonding, causes practically the same current to flow through the locomotive whether the motors are in series or in parallel. When the motors are in parallel, this current is equally divided between the two motors and each exerts a torque corresponding to one-half of the total current taken by the locomotive; but when the motors are in series, the total current flows through each motor, causing a corresponding torque very much greater than was obtained when the motors were in parallel.

The following example will bring out the facts a little more clearly. Assume that we have a 10-ton locomotive equipped with two 50-hp. motors, hauling a load of 20 cars up a 1-per-cent. grade, each car weighing 3 tons when loaded. Now, taking the frictional resistance of the cars as 30 lb. per ton, the tractive effort necessary to haul this trip up a 1-per-cent. grade at a constant speed, will be 3000 lb. The locomotive has a frictional resistance of, say, 20 lb. per ton, which makes the tractive effort necessary to operate the locomotive on this grade 400 lb. The total tractive effort required to operate the entire trip, including locomotive and cars, will be therefore 3400 lb.

Assume that the defective bonding makes the total resistance of trolley and track 1 ohm; the total resistance of a 50-hp., series motor will be about 0.16 ohm. The resistance of the two motors in parallel will be one-half of this amount, or 0.08 ohm, and in series 0.32 ohm. With the motors in parallel, the total resistance in circuit would be 1.08 ohms, which, at 250 volts, would produce a current of 231 amp.; and the motors being in parallel, each motor will then take one-half the current, or 115 amp. From the tractive effort curve of the motor, it will probably be found that this current will produce a tractive effort of 1300 lb., so that the total tractive effort for both motors will be 2600 lb., under the assumed conditions.

On the other hand, with the motors in series, the total resistance of the circuit will be 1.32 ohms, which at 250 volts, would produce a current of 190 amp. This current passes through both motors and, from the tractive-effort curve of the motor, will give a tractive effort of 2600 lb., which makes the total tractive effort, for both motors, 5200 lb.

Now, the total tractive effort necessary to operate the trip is 3400 lb. With the motors in parallel, the locomotive can exert only a 2600-lb. pull, which is insufficient to start the trip. But, in series, the total tractive effort, which is then 5200 lb., gives an ample margin to start the trip.

Graham Bright, Engineer,
Westinghouse Electric & Mfg. Co.
East Pittsburgh, Penn.

Letter No. 2—Referring to the inquiry of Fred Vinton, of the Penn-Mary Coal Co., asking why an electric mine locomotive will pull more on series than on parallel, Coal Age, Oct. 24, p. 686, I desire to add a few comments.

In your explanation of the circumstance mentioned by Mr. Vinton, you endeavor to show how the motors in the locomotive operate when in series and in parallel, and make the statement that "the tractive force or drawbar pull of the locomotive depends as much on the adhesion of the wheels to the rails as on the power exerted by the motor itself." This would indicate that you regard the *tractive force* and *drawbar pull* as one and the same thing. Is it not true that the tractive force may exceed the drawbar pull of the locomotive?

Your statement is equivalent to saying that a mine locomotive will exert a drawbar pull that is limited by the adhesion of the wheels to the rails, and is not measured by the power exerted by the motor itself.

[It is proper to make a distinction between the **tractive effort** of a locomotive, which depends on the power of the motors; and the "tractive force," which, as stated, is limited by the adhesion of the wheels to the rails, as determined by the weight of the locomotive and the coefficient of friction. It is always possible that the "effort" to exert force is less than the force exerted.—Editor.]

After explaining that, in a direct-connected motor, the torque varies practically with the speed, except for certain losses to which reference was previously made; and, further, that the torque is practically independent of the voltage, the statement is made that "by reason of this condition, motors operated in series present a slight advantage in respect to torque, which measures the *tractive effort* of the locomotive." From this statement, it would appear that the case is viewed entirely from the efficiency of the motors, neglecting the *weight* of the locomotive.

[Again, permit us to say, the "tractive effort" that the motors can exert should not be confused with the "tractive force," which is limited by the adhesion of the wheels to the rails as well as by the possible torque of the motors; while the drawbar pull must be determined by the load hauled.—Editor.]

In this connection, permit me to state that, ten years ago, the Baldwin-Westinghouse Co. frequently equipped a locomotive with a series-parallel controller. It worked with fair success, because the horsepower, per ton of weight on the driving wheels, was so small that a loco-

motive of six or seven horsepower per ton when operating in series would hardly slip its wheels. Today, when electric locomotives, made by the Baldwin-Westinghouse companies, are sold to mines, they are equipped with motors ranging from 12 to 14 hp. per ton and are seldom, if ever, constructed with a series-parallel controller (rheostatic, with commutating switch).

The reason for this is that if you attempt to start a full-load trip, in series, the locomotive will stand still and slip its front wheels continuously, while the rear wheels will not move at all. If, then, the commutating switch be thrown into parallel position, the locomotive will start off with a jerk and frequently break a coupling. The result is that series-parallel controllers are not used on uptodate mine locomotives; and the only reason why the one in operation at Penn-Mary mine will start and haul its trip over the defective bonding, is because the horsepower of the motors, per ton of weight on the driving wheels, is low; and because when operating at about 120 volts, the rails and defective bonds can carry away the current from the return. In addition to this, a well made series-parallel controller of the General Electric or Westinghouse companies is usually too high for mine service if used on a powerful locomotive. In mine work, while theory is useful, it is of small value as compared with practical experience in securing the output required under all conditions.

G. W. Hamilton, Mining Engineer,
Milwaukee Locomotive Mfg. Co.

Chicago, Ill.

Merging the Interests of Coal Exporters

Letter No. 1—I have read with much interest the suggestions in regard to merging the interests of exporters of coal, which appeared in Coal Age, Nov. 21, p. 820. At your request, though I must acknowledge it is with some diffidence, I will offer a brief criticism of the paper. I submit these comments for what they may be worth.

The suggestion appears to be that coal operators, instead of employing individual representatives, should jointly engage one or more representatives to act for the common weal.

Bearing in mind, then, that the constituent members of such an association are, when at home, in active competition with each other, it would seem that the success of such an arrangement will depend, *prima facie,* upon the assurance to each member that he would receive fair and equal treatment, and that no one else would get the "thick end of the stick." In other words, competition should be eliminated, as far as regards exports. This, however, would have a tendency to prevent the more important operators from joining the association, as they are unaccustomed and unwilling to be placed on the same footing with smaller operations. But, assuming that the association is formed, I am afraid it would fail in its purpose, for a reason similar to that given for the failure of the New River scheme; namely, "*internal disagreements.*"

I have seen ideas of this nature attempted at various times, but they have never come to anything; and I think you may take it for granted that each seller will consider it more satisfactory to retain his individual agent, and conduct his business without reference to or interference by anyone else, than to enter any joint agreement with his competitors.

As to the 12 advantages claimed, I am not very clear whether these claims are most on behalf of the suggestion offered or of the coal-export trade. If the latter, most of the claims would apply; except only if No. 11 is read in conjunction with No. 4 the effect would be to the contrary. Increased exports and the consequent increased demand for ships, *unless accompanied by an increase of imports from the same locality,* would, of course, have a tendency to *raise* ocean freight rates. Claims Nos. 2 and 6 I expect are made solely on behalf of the suggestion, as possessing advantages over the usual method of selling coal. Claim No. 12 I do not quite understand. I would ask, "more easily handled" than what?

In closing, the correspondent says he "will not go into details of such a plan." In this he is right, as it would be for the members to determine these; but it is on the details that the whole proposition will depend, and no operator could give an opinion on its merits until a *pro forma* proposal is laid before him.

New York City. George Breffit.

The Ohio Situation

Letter No. 4—George N. Lantz, Coal Age, Nov. 28, p. 877, has made a clever reply to the editorial of Oct. 17, p. 637, entitled "Small Potatoes." He has declared that when men come into the market to buy labor they must pay the price regardless of the value of the products that the laborer is able to produce in a given amount of time.

As a matter of fact, this is not true: (1) Because no employer enters the labor market without some idea of what profit he can make by the purchase of labor. He may make an erroneous estimate, but if he cannot make a profit, he either ceases to employ labor or makes a new contract. (2) Because the laborer is often wedded to a certain locality, job or mine; or bound to a certain spot by his investments; or too poor to move; or too ill-acquainted with conditions elsewhere to pack up and leave; or too lacking in enterprise. Labor is by no means a mobile commodity, even in mining and in America, and it is notorious that wages vary considerably in different districts. Consequently wages are largely determined by the value of the product of labor as the editorial writer stated. Mr. Lantz, in urging that eastern Ohio operators could pay better wages if they would use better mining methods, quotes Supt. J. D. Jones, writing on "The Foreigner in Mining," Coal Age, Oct. 17, p. 643, where he states that "Many coal-mine operators have been so engrossed in their sales department and other matters that they have given no attention to the introduction of mining machines and other improvements."

Now, it is not true that Ohio is backward in the use of mining machines, though possibly the type in use may not be the most modern. For years, Ohio has led in the percentage of coal mined mechanically. In 1913, the U. S. Geological Survey placed the percentage of machine-mined coal of Ohio as *first* among the American states, no less than 90.2 per cent. of the coal being dug by machines. The retrogressiveness does not lie so much in that direction, and the editorial does not so state, though it is true that improvements in equipment other than undermining are needed, as also doubtless some better machines than those now in use. But not even that was

asserted in the editorial. Let me quote the words as they appeared: "The wage scale of Ohio has made the state backward in conservation, negligent of first-aid, indifferent as to housing and largely unprogressive." There is not a word written there as to mechanical equipment.

Mr. Lantz seems to think that the Ohio operators should risk their money in experiments in welfare work, and so escape the desperate straits thrust upon them by those whom the welfare work would benefit. Welfare work may "pay," it is true, but who will be willing to risk it when each year now sees a deficit?

The eastern Ohio operators evidently did not believe, in 1913, that conservation, first-aid and good housing would enable them to make a profit, or they would have embarked with much energy in these projects. Why increase their difficulties now by higher wages and ask them to make "a venture of faith" by adding welfare-work burdens to their other enhanced expenditures, at a time when the condition of the coal market is more seriously demoralized than it has been for a decade?

Mr. Lantz declares that Illinois, like Ohio, is "admittedly progressive." He apparently thinks the Ohio operators should blame themselves and not their wage scale for their lack of progress. In reply, I would say that equal scales may have unequal results in unequal markets. Moreover, it must be remembered that Illinois is, by no means, uniformly progressive, and some of the newer and finer plants of Illinois owe their existence to the superior quality of their coal and to a difference of wage scale. Thus their erection would witness rather in favor of the writer of the editorial than against him when he urged that fair wage scales result in bettered conditions, had he asserted that the Ohio mines were poorly equipped. But he did not. Let me repeat that he spoke only of *"conservation, first aid* and *housing."*

Conservation limps in all parts of Illinois except in the longwall districts. Work there was started long ago, and if the Ohio scale were applied in those mines, mining would not pay. And as to housing, many of the men in the newer and better mining sections of Illinois live in their own homes. There is in such parts, of course, no welfare or housing work whatever, though there is a large amount of first-aid and mine-rescue work, fostered largely by the profits made from thicker and better coal and from wage differentials that are the outcome of such favorable mining conditions. As a whole, Illinois is not a mining state in which adequate profits are made, and as a result the operators are not leaders in welfare work, though they have shown a most enlightened interest in backing the activities of state institutions.

R. Dawson Hall.

New York City.

Study Course in Coal Mining

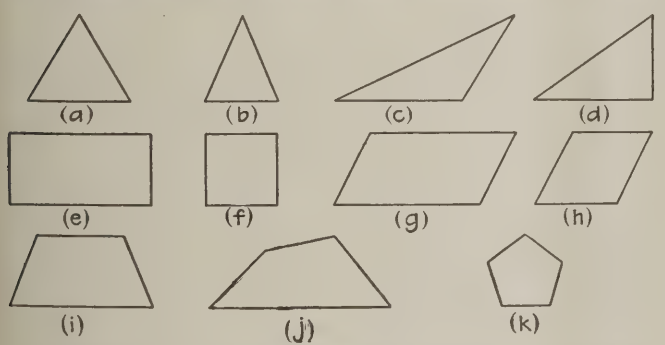
By J. T. Beard

The Coal Age Pocket Book

Polygons—A polygon is a plane figure bounded by any number of straight lines, which are the **sides of the polygon,** and which taken together form its **perimeter.**

Polygons are named, according to the number of their sides and their shape, as follows:

A **triangle** is a plane figure having three sides. A triangle



is **equilateral** (a) when its sides are equal. An equilateral triangle is always **equiangular.**

An **isosceles** triangle (b) is one having two equal sides. The angles lying opposite the equal sides are likewise equal each to each. Hence, a triangle having two equal angles is always isosceles.

A **scalene** triangle (c) is one having no two of its sides equal. Likewise, the angles are all unequal.

A triangle is **acute** when all of its angles are acute or **oblique** if one of its angles is **oblique.**

A **right triangle** (d) is one in which one of the angles is a right angle or 90 deg.

A **quadrilateral** is a plane figure having four sides. If the opposite sides of a quadrilateral are parallel, each to each, the figure is a **parallelogram.**

A **rectangle** (e) is a parallelogram whose angles are all right angles.

A **square** (f) is an equilateral rectangle.

A **rhomboid** (g) is an oblique parallelogram.

A **rhomb** or **rhombus** (h) is an equilateral rhomboid.

A **trapezoid** (i) is a quadrilateral having two of its sides parallel.

A **trapezium** (j) is a quadrilateral having no two of its sides parallel.

A **regular polygon** (k) is one that is equilateral.

An equilateral polygon of any number of sides is always equiangular; but, except in the case of a triangle, an equiangular polygon is not necessarily equilateral.

The Coal Age Pocket Book

QUALITIES OF POLYGONS

1. The sum of the interior angles of any polygon is equal to twice as many right angles as the polygon has sides, less four right angles.

2. The interior angles of a regular polygon are all equal, each to each; and each of these angles is therefore equal to their sum divided by the number of sides.

Or, to calculate an interior angle of any regular polygon, divide 360° by the number of sides and subtract the result from 180°.

3. A regular polygon can always be inscribed in a circle whose radius is equal to a side divided by twice the sine of one-half the subtended angle, which is equal to 180° divided by the number of sides.

The radius of the circumscribing circle of a regular hexagon is equal to one of its sides.

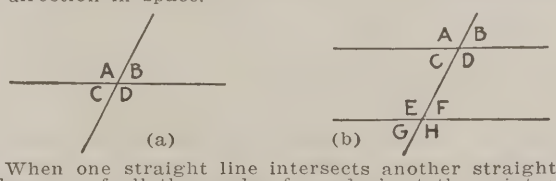
4. A regular polygon is divisible into as many equal isosceles triangles as it has sides.

LINES AND ANGLES

1. The straight line joining two points is the shortest distance between them.

2. Two straight lines can intersect in but one point, which is common to both. Two intersecting straight lines always lie in the same plane.

3. Two straight lines are parallel when they lie in the same plane and can be produced or extended indefinitely, in either direction, without meeting. Parallel lines have the same direction in space.



4. When one straight line intersects another straight line (a) the sum of all the angles formed about the point of intersection is equal to four right angles or 360 deg. Any two angles lying on the same side of one of these lines and on opposite sides of the other are **"adjacent"** angles, as A, B; A, C; B, D; or C, D; while any two angles lying on opposite sides of both lines are **"opposite"** or **"vertical"** angles; as A, D; or B, C.

The sum of any two adjacent angles formed by two intersecting straight lines is always 180 deg.; as A + B = 180°; A + C = 180°; etc. If the adjacent angles are equal, the intersecting lines are **perpendicular** to each other.

Opposite or vertical angles are always equal; as A = D; and B = C.

When a straight line cuts two parallels (b) the angles formed are as follows: **Adjacent exterior,** A, G; or B, H; **adjacent interior,** C, D; or E, F; **alternate exterior,** A, H; or B, G; **alternate interior,** C, F; or D, E.

Inquiries of General Interest

Loading Coal by Machinery at the Face

I am working a thin seam of bituminous coal, which is only 2 ft. 8 in. in thickness and overlaid with a hard sandrock roof, while the floor is an almost equally hard limestone. From my own practical experience, in the working of coal, I would prefer to give each man a place by himself; but this is impossible here, under the present conditions. Moreover, the cars we are using are too large and heavy for one man to handle.

I would very much appreciate any information you can give me in regard to the use of a chain machine for loading out the coal at the face. I have been much interested in the many subjects discussed in COAL AGE, but have seen nothing in regard to this matter.

JOHN HARVEY,
Grazier Coal Mining Co.

Foustwell, Penn.

We are somewhat in doubt as to whether correspondent refers to a loading machine, as, for example, the Jeffrey-Hamilton loading machine, which is designed to follow any coal-cutting machine and to gather up the coal and load it into the mine cars after it has been shot down. This machine is operated by two men; and it is claimed will load 1000 lb. of coal per min. into the mine cars at the face. The machine can only be used, of course, where the conditions of roof and floor will permit. It is equipped with a 12-hp. electric motor.

The time saved in the loading of coal by the use of this machine is said to reduce the number of working places required for a given output fully one-half. If this result is realized, in actual practice, there can be no doubt of the advantage gained thereby wherever the conditions will permit of its employment. A greater concentration of the work means less length of entries, air courses and track to maintain; a quicker advance of the working face, whereby the danger incident to bad roof is reduced, less timber destroyed and the coal mined in better condition. The concentration of work at the face also reduces the cost of underground haulage; and this, together with the other advantages named, greatly reduces the cost of production per ton of coal mined.

It is possible that this inquiry refers to the use of a chain conveyor at the working face. Such conveyors are frequently used on a longwall face, in the working of thin seams of coal or where bad roof conditions will not permit the car to be taken along the face.

If any readers have had experience in the loading of coal by machinery at the working face, we should be glad to hear from them and to know the comparative results obtained by the employment of such method. We would also be glad to receive and publish any data of interest in reference to the use of chain conveyors on a longwall face, giving the results obtained thereby, as compared with the use of a track laid along the face of the coal. Any device that will reduce the cost of handling the coal along the face reduces, to the same extent, the cost of production per ton of coal mined, and should receive the most careful consideration by every coal operator and mine superintendent.

Size of Intake and Return Airways

Assuming that the main intake airways in a large gaseous mine are used as haulage roads and traveling ways and that the mine is in full operation, requiring a ventilating current of 300,000 cu.ft. per min.; which should have the larger sectional area, the intake or the return airways? In answering this question, kindly explain fully, stating the practical conditions that determine the choice.

MINE FOREMAN.

Southwest, Penn.

It is generally stated that the return airways of a mine should have a larger sectional area than the intake airways. The reasons given for this statement are mainly two; namely, the expansion of the return air by reason of its higher temperature due to the heat absorbed in its passage through the mine workings, as well as the increased volume of the return current due to the presence of the gases generated in the mine.

As a matter of fact, however, the cold intake air current, even in the winter season when the outside temperature is much below that of the mine, very quickly partakes of the higher mine temperature, so that there is very little difference observed, in passing from an intake airway to the return, at almost any point in the mine, except in close proximity to the downcast shaft or main intake airways. At the most, this difference will rarely exceed 10 or 15 deg. F.

Since the expansion of the air is proportional to its absolute temperature, it is readily seen that an increase of, say 15 deg. in the mine, for an outside temperature of 32 deg., would only call for an increase of sectional area barely exceeding 3 per cent., which would only mean an increase of 3 per cent. in the velocity of the return air current.

The increase in volume, due to the gases generated in a mine, rarely exceeds 3 per cent. and is generally much less. Taking both of these effects into consideration, it is safe to say that, in general mining practice, the increase in the volume of the return air current will seldom exceed 5 per cent.

There is, however, in a gaseous mine where men enter the main return airway, the danger of the lamps being exposed to a velocity above what is safe in a gas-charged current. For this reason, under such conditions it is often necessary that the area of the return airways shall be such that the velocity will not exceed, say 200 or 300 ft. per minute.

Examination Questions

Hoisting Engineers' Examination, Held at Albia, Sept. 23 and 24, 1914

(*Selected Questions*)

Ques.—(a) How much will pure water expand? (b) What is the weight of one gallon of pure water?

Ans.—(a) The coefficient of expansion of pure water, referred to its volume at maximum density (39.2° F.) as unity, is expressed by the following formula:

$$coef.\ of\ expansion\ (water) = \frac{(T - 500)^2}{1000\ T}$$

In this formula, T represents the absolute temperature of the water, using 460 as the absolute zero of the Fahrenheit scale. Since water attains its maximum density at, practically, 40 deg. F., it is observed in the formula that the coefficient of expansion becomes zero, at this temperature (460 + 40 = 500° F., abs.)

Applying this formula to find the volume of 1 cu.ft. of water at 200 deg. F., we have

$$volume = 1 + \frac{(460 + 200 - 500)^2}{1000\ (460 + 200)} = 1.03878 + cu.ft.$$

From this it appears that 1000 cu.ft. of water at 40 deg. F. will increase in volume 38.78 cu.ft., at a temperature of 200 deg. F.

(b) The weight of 1 gal. of pure water, at a maximum density of 39.2° F., taking the weight of 1 cu.ft. of water, at this temperature, as 62.4283 lb., is

$$w = \frac{62.4283 \times 231}{1728} = 8.345\ lb.\ per\ gal.$$

To find the weight of water at any other temperature, this weight must be multiplied by the density of the water as calculated by the formula

$$D = \frac{1000\ T}{500^2 + T^2}$$

in which T equals the absolute temperature of the water, in the Fahrenheit scale, using 460 as the absolute zero.

Ques.—(a) How can the accuracy of a steam gage be tested? (b) What kind of pressure does a steam gage indicate?

Ans.—(a) The accuracy of a steam gage is determined by a steam-gage tester, which consists of a handpump, to which is attached an accurate gage. The steam gage to be tested is connected with this apparatus, and its indications are compared with those of the standard gage.

(b) The pressure indicated by a steam gage is the pressure above that of the atmosphere, expressed in pounds per square inch.

Ques.—(a) Define the different kinds of steam. (b) Has steam weight; and, if so, is it lighter or heavier than air?

Ans.—(a) Steam is described as "saturated," "superheated," or "gaseous," "dry" or "wet." When water is heated, it passes into steam, at a temperature corresponding to the pressure supported by the liquid. At normal atmospheric pressure, sea level (14.696 lb. per sq.in.), water is converted into steam at a temperature of 212 deg. F. At a pressure greater or less than this amount, the temperature of evaporation is above or below 212 deg. F. *Saturated steam* is steam having a temperature corresponding to its pressure.

When saturated steam, not in contact with water, is heated, it follows the law of gases and becomes an unsaturated vapor, which is often spoken of as "gaseous steam." The steam is then said to be "superheated." In other words, *superheated* or *gaseous steam* is steam having a temperature higher than that corresponding to its pressure as a vapor.

Steam is "dry" when it contains no entrained moisture. *Dry steam* may be either saturated or superheated. *Wet steam,* on the contrary, is steam containing some entrained moisture. If wet steam, not in contact with water, is heated, it will first become dry and saturated, the entrained moisture being converted into steam by the added heat. A further application of heat would convert this dry saturated steam into superheated steam, which would then follow, more or less closely, the law of gases known as Boyle's law.

(b) Steam has weight; but its weight is less than that of air, volume for volume. The density of saturated steam is approximately that of water vapor or, say 0.6235, as referred to air of the same temperature and pressure. The density of superheated steam varies directly as its pressure and inversely as its absolute temperature.

Ques.—Describe fully the theory of draft; and explain what causes draft.

Ans.—"Draft," in this connection, is a current of air passing through the furnace. When this current is the result of the heating of the air by the furnace, before the air passes up the chimney, the current is described as "natural draft." On the other hand, a "forced draft" is a current of air that is *forced* through the furnace, by the action of a fan or blower.

Natural draft is caused by the difference in weight between the heated air column in the chimney and a similar column of outside air. The weight of the heated column of air in the chimney is always less than that of the outside air column, for the same cross-section or unit area. These two air columns are in dynamic equilibrium, and the heavier outside column forces the lighter chimney column to rise. *Forced draft,* on the other hand, is caused by the pressure due to the centrifugal force developed in a fan or blower, which pressure drives the air through the furnace and up the chimney, assisted by the natural draft of the chimney column.

Ques.—(a) Is it possible to build and maintain a fire without air? (b) What is the mechanical equivalent of heat?

Ans.—(a) Fire will not burn in the absence of a sufficient quantity of air or oxygen to support the combustion. Draft, by increasing the air supply, increases the rapidity of the combustion.

(b) The mechanical equivalent of heat is 778 ft.-lb., which is the theoretical work performed by 1 B.t.u.

Book Review Department

OUR MINERAL RESERVES. HOW TO MAKE AMERICA INDUSTRIALLY INDEPENDENT. By George Otis Smith, director, U. S. Geological Survey, Washington, D. C. 6x9 in. No illus. Paper cover. Sent free on application.

In this bulletin, under the two headings, "Opportunity for Export" and "Coal," the director of the U. S. Geological Survey discusses the possibilities of our exporting coal, the coals available, etc. The appearance of the statements contained under the second heading, "Coal," in your Sept. 26 issue, prompts me to make some comments and criticisms. The reader will find the quotation, to which I refer, under the caption "The U. S. Geological Survey on the Export Question," on pages 504 and 505 of the present volume of "Coal Age."

In criticism, I would say that, in the first place, it should always be borne in mind, when speaking of our coal exports, that about 50 per cent. of these go to Canada, a market where we have no competition. Furthermore, about half a million tons of the so called exports go to Panama and Porto Rico, our own possessions and places where we have no competition. Deducting these quantities from the 1913 exports, leaves only 4,600,000 net tons exported to the foreign markets where other countries compete with us.

The monograph makes this pronouncement:

"At present, however, while the six European nations that rank next to the United States as coal-mining countries are at war, the demand for export coal from neutral countries is inevitable." Does this mean that the six European nations at war, England, Germany, France, Russia, Austria and Belgium, demand "export" coal from neutral countries, or that the neutral countries demand "export" coal? If the first is meant, the statement is not true, as none of these countries have demanded any coal from the neutral nations. I presume that the meaning the Survey desires to convey is that neutral countries which do not produce sufficient coal for their own use will inevitably demand coal from other neutral countries.

EUROPE AND SOUTH AMERICA TOOK COAL FROM US BEFORE THE WAR

"Already shipments to European and South American countries have begun," says the Survey, and that is, indeed, true, but the beginning was about 16 years ago. Then the text continues: "There is a demand for authoritative information regarding the quality of coal from the different fields accessible to the seaboard." To get such data, we are then referred to the Bureau of Mines Bulletin No. 22 for analyses of coal.

Now, in the first place, these analyses are nearly all of mine samples, which do not represent the coal as it is shipped, and may be very misleading to buyers. Take a concrete case. An English company wishes to buy coal from the best New River mines, to take the place of the best Welsh Admiralty. They go through Bulletin No. 22 and look up the mines showing the best analysis, which gives 15,442 B.t.u. for the dry coal, and 2.40 per cent. ash. They then find out, if they can, who sells this coal, and make their contract for a supply of coal from this mine. Will they get any coal of such quality, even if they do get all the coal from the mine named, which is unlikely? They will not. Nor is the coal from this particular mine one whit better, as put on the market, than the coal from another New River mine, which Bulletin No. 22 gives, for a composite sample, as containing 14,897 B.t.u. and 5.26 per cent. ash. In fact, a large shipment of coal delivered to the government from the latter mine yielded, on analysis by government chemists, 15,314 B.t.u. and 4.28 per cent. ash.

POSITION OF GREAT BRITAIN

"Until the present war broke out," says the Survey, "Great Britain was the only country that exported coal in considerable quantity." What about Germany, with exports last year of 38,722,000 short tons, or 12 per cent. of her total output of 312,062,796 tons?

"But," the Survey adds, complacently, "Great Britain is already beginning to feel the pinch of poverty in her coal supplies." The "pinch" has not yet become apparent to the outsider.

The Oct. 3 issue of the "Iron and Coal Trades Review," one of the two leading British coal papers, says, speaking of collieries supplying Admiralty coals: "In the majority of cases, stocks (of coal) are excessive." "Secondary and lower qualities are plentiful." "All the cheaper classes of coking and bunker coals are plentiful and easy."

The "Weekly Coal Review" of the "Liverpool Journal of Commerce" says of South Wales coals, under date of Oct. 2, "Buyers are holding off, with supplies of large coal plentiful." "Secondary descriptions and inferiors were plentiful." "Stocks of free coal have accumulated to such an extent that it was difficult to keep collieries going 'owing to shortage of empties.'" "Inferior coals were very plentiful, collieries extending good reduction (in price) for immediate shipment." "Monmouthshires were weak owing to the heavy stocks." These quotations do not seem to the outsiders to indicate a shortage in coal supplies in Great Britain.

During the week ending Oct. 1, there were 81 ships actually chartered to take coal to foreign ports from that island. Of this total, 11 ships were for South America, with a total cargo tonnage of 58,300 tons, and there were 15 ships chartered for Italy to carry 69,600 tons. This looks as if Great Britain was still in the export business, notwithstanding the war and the bad financial conditions in other countries.

THE FUTURE EMBARGO ON COAL

The Survey then ventures on a prediction:

"It is highly probable that when peace is once more established, she (Great Britain) will place restrictions upon her exports of coal." To an outsider, this supposition looks highly improbable.

England's consumption of coal in normal times is only about 66 per cent. of her production; if, after the war is over, her colliery output is decreased, her home consumption will also be less, and the balance between exports and home consumption remain about the same.

But a further quotation must be made from the bulletin of the Survey:

"The total foreign bunker trade at the principal ports, New York, Philadelphia, Baltimore and Hampton Roads, was only about 7,500,000 tons, indicating that most of the transatlantic liners, the majority of which are English, have been carrying from the other side a sufficient quantity of coal for the round trip."

Now, in the first place, the foreign bunkers at the ports mentioned supplied only 6,352,000 tons, and not 7,500,000, the latter being the foreign bunker tonnage for the whole United States.

Of this amount, 4,192,000 tons were supplied at New York alone, which indicates that the transatlantic liners actually did get large supplies of coal on this side, and that is indeed a fact. The large liners have not sufficient bunker space to hold enough coal for the round trip. Take the Lusitania; her bunkers hold 6000 tons, and she uses 840 tons per day. It is a common sight at New York to see coal barges alongside the big liners, from which coal is put in the latter's bunkers.

THE COALS SUITABLE FOR EXPORT

"The high-grade steaming coals of the United States which would be the coals in chief demand for export trade," are given in the bulletin as follows:

Pennsylvania: Clearfield, Allegheny, Somerset; Maryland: Cumberland; West Virginia: Elk Garden, Fairmont, New River, Pocahontas; Virginia: Southwest counties: Tennessee and Kentucky: Eastern counties; Alabama: Birmingham and other districts of Alabama on the south.

The Pittsburgh field of Pennsylvania should be included. Large amounts of Pittsburgh coals are used at New Orleans in foreign trade; also the Kanawha field of West Virginia, while there is no demand for east Kentucky and Tennessee coals for export, and probably never will be, with present freight rates.

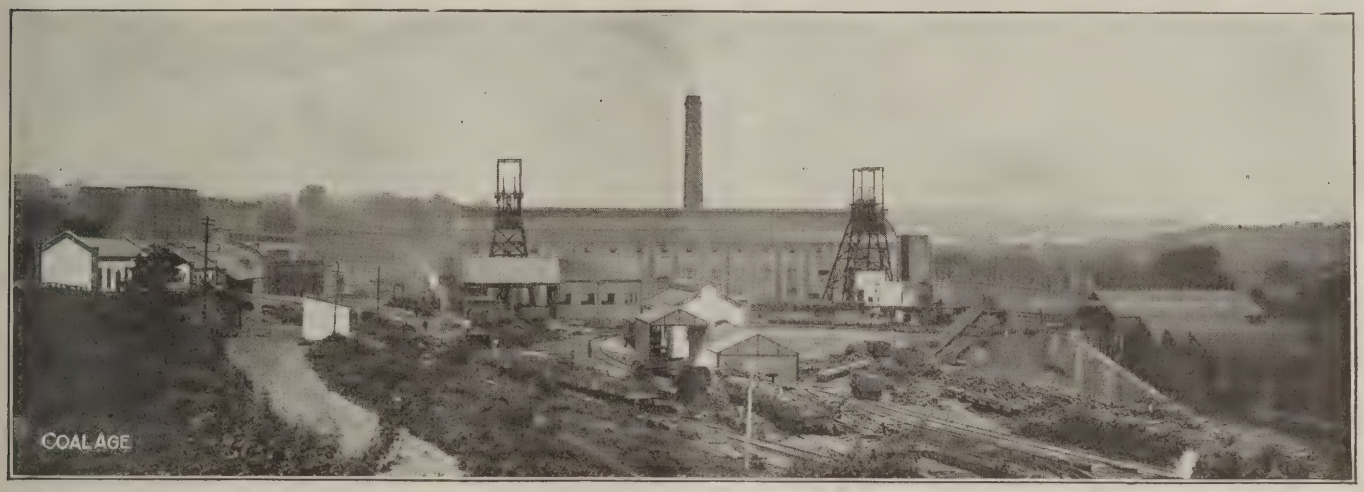
In speaking of the coals "available in highest quality," Clearfield is the only Pennsylvania coal mentioned. Why leave out Somerset and Cambria County coals? There is more fuel and of better quality in those counties than in that of Clearfield; their production is also greater. In 1913, Cambria County produced 19,265,000 tons and Somerset 9,454,000, while Clearfield produced only 8,097,000 tons.

It would be of more help to our coal interests if they were given information on the foreign markets and on the coals

with which they must compete. Any well informed coal man in the tidewater business would know the main facts given in the Survey's article, and would not fall into the errors of assumption by which they are accompanied.—**F. R. Wadleigh.***

THE POWELL DUFFRYN STEAM COAL CO., LTD., 1864-1914. 95 pp. 6¾x9¾ in., 1 map and 51 illustrations. Cloth boards.

This book is published by a Welsh coal company, the name of which it bears as title. Ordinarily we do not publish any comment on such books which are rather regarded as pretentious circulars than volumes of public interest. However seeing the present interest in the Welsh coals, this somewhat comprehensive circular beautifully illustrated and extremely interesting, deserves some notice.



THE PENALTTA COLLIERY OF THE POWELL DUFFRYN STEAM COAL CO., LTD.

The colliery is located 15 miles from Cardiff, Wales, and has an annual output of a half million long tons. The two shafts are 21 ft. in diameter and about 2300 ft. deep. The mine is ventilated by a 154-in. Sirocco fan, driven both by steam and electric units. The power is generated by two 3000-kw. Westinghouse Rateau turbines.

We are assured that the company holds up as its motto "Per ardua ad alta" which roughly means "No matter how hard the going we aspire to reach the top." On page 16, we learn how truly that motto has been followed. Since and including 1910 the company has paid a 20 per cent. dividend, free of tax. In 1907 and 1908 a similar dividend was paid, that in 1907, however, not being tax free. It is clear that some companies in Great Britain are not running on a hand-to-mouth basis. Most of our corporations would conceive that they were top notchers if they paid year by year a 20-per-cent. dividend.

Possibly, however, the acquirement of the property in 1864 when the Welsh coal did not have its present standing may have been a cause for the excellent financial position of the corporation. Such a few analyses of Welsh coal are at hand that we feel justified in repeating those of the Bargoed colliery quoted in this book. There is no statement as to the manner in which the samples were collected.

Coal Seam	Fixed Carbon	Ash	Volatile Matter	Moisture
Ras Las	80.22	2.88	16.24	0.66
Brithdir	67.51	5.90	25.76	0.83

The plants are uptodate both in equipment and in rescue work. The Aberaman and Rhymney Valley rescue plants are remarkably well fitted having automobile rescue cars which were purchased long before the U. S. Bureau of Mines ordered one for the Pittsburgh station. These rescue stations are owned in common with some other firms operating in the same neighborhood.

FACTS CONCERNING THE STRUGGLE IN COLORADO FOR INDUSTRIAL FREEDOM. Series I, issued by the Coal Mine Managers of Colorado. 72 pp., 6x9 in.; no illustrations or tables. Paper cover.

This book comes to us without even the imprint of the publisher, but we surmise it can be obtained on request by writing to any of the larger operating concerns in Colorado. The preface is signed by the Committee of Coal Mine Managers, J. F. Welborn, John C. Osgood and D. W. Brown. It consists of 15 bulletins entitled "The Struggle in Colorado for Industrial Freedom," issued between June 22 and Sept. 4, 1914, with an introduction entitled "What Has Happened." If the public, including our well-meaning but absentee President, would only read it, we are sure its message would sink home. Just casually we pick out a striking passage.

"Instead of the managers hiring miners, the Union is hiring 'strikers.'"

"That the union men of the country who are contributing to maintain this appearance of an effective strike are being misled is indicated by the following statement by Captain Hildreth Frost, of Company A, Second Infantry, National Guard of Colorado, who was also judge advocate in one of the districts of Colorado during the military occupation of the strike zone:

My district included the producing mines of Wootton, Morley, Starkville, Piedmont, Sopris, Cokedale and McLaughlin and the coke ovens of Sopris and Cokedale, the population of the district being between six and eight thousand. There was one tent colony in my district and a large number of strikers and their supporters. I took a careful census of the entire district and either myself or one of my lieutenants personally examined the union cards of practically every union man in the district. We found approximately 700 men holding such cards. They all bore a stamp showing the date when the men to whom they respectively belonged had joined the union.

I found only one resident who carried a card showing that he was a member of the United Mine Workers of America prior to or at the time the strike was ordered a year ago this July, and only four or five who were members of the union prior to the time the strike was actually commenced on Sept. 23, 1913.

I found that less than 300 of the approximately 700 union card holders in my district were actually in any coal mine in southern Colorado at the time the strike was called. The balance of the 700 had simply joined the union to swell its apparent strength and to draw the stipend of $3 a week.

PROCEEDINGS OF THE KENTUCKY MINING INSTITUTE FOR THE THIRD ANNUAL MEETING AND MIDWINTER SESSION PRECEDING. Edited by Ivan P. Tashof, secretary-treasurer, Kentucky Mining Institute, Lexington, Ky. 5⅞x9 in. One illustration. 134 pp. Paper cover. Free to members.

When proceedings of the smaller mining institutes, which have only a localized membership fall into the hands of the reviewer he does well to deal with them charitably and to remember the difficulties the editor has to meet and that the work is a labor of love and not of compensation. We use the word "love," of course, in its tennis significance for no one becomes so "enthused" in his work of editing proceedings that he becomes seriously enamored of his task.

When, therefore, we receive proceedings adequately edited and without flaws, so far as we can discover from cover to cover, and know that the editor is also grand factotum of the institute and has to perform all the duties of secretary and treasurer, where only too many members forebear to pay unless dunned, we feel like expressing ourselves in the highest of praise.

The papers in this work are of excellent quality, for the Kentucky Institute is a lively body. No one appears before it to rehash material taken from some time-honored textbook. On the whole too there is little space taken up with the usual regrets that the price of coal is no higher than it is. As much of the material is in 6-point type for purposes of condensation, the book contains more information than most books of similar size. A photograph of H. L. Viers, the Institute president, appears on the front page.

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Coal and Coke News

Washington, D. C.

President Wilson has seemingly taken a step toward the settlement of the Colorado mining troubles by appointing a committee to take the matter in hand, investigate the circumstances, and if possible, dispose of it.

The strike of the miners in Colorado, which has now lasted for 12 months, has attracted the attention of the whole country, and has been accompanied by many distressing and tragic circumstances. The mediation of the government of the United States was offered early in the struggle, but the operators of the mines were unwilling to avail themselves of it, or to act upon the suggestions made by representatives of the Department of Labor. It became necessary to send Federal troops to the district affected by the strike in order to preserve the peace; but their presence could of itself accomplish nothing affirmative.

On a statement issued, the President says:

I do not feel that I am at liberty to do nothing in the presence of circumstances so serious and distressing. Merely to withdraw the Federal troops and leave the situation to clear and settle itself would seem to me to be doing something less than my duty after all that has occurred.

I have, therefore, determined to appoint the commission contemplated in the plan of temporary settlement, notwithstanding the rejection of that plan by the mine operators, and thus at least to create the instrumentality by which like troubles and disputes may be amicably and honorably settled in the future, in the hope that both parties may see it to be not merely to their own best interest, but also a duty which they owe to the communities they serve, and to the nation itself to make use of this instrumentality of peace, and render strife of the kind which has threatened the order and prosperity of the great State of Colorado a thing of the past.

The Hon. Seth Low, of New York, Charles W. Mills, of Philadelphia, and Patrick Gilday, of Clearfield, Penn., have most generously and unselfishly consented, at my request, to serve as members of the commission. I owe to these gentlemen my own warm thanks not only, but also, I believe, the thanks of their fellow citizens throughout the country. They will place themselves at the service alike of the miners and the operators of the mines in Colorado in case controversy between them should in the future develop circumstances which would render mediation the obvious way of peace and just settlement.

That the strike in Colorado is now entirely over, insofar as it affects the ability of the Colorado Fuel & Iron Co. to supply the market requirements of coal, is set forth in the annual report to the stockholders of that company by President J. F. Wellborn, which states:

Our former employees have been very anxious to secure work again at our mines, and we have quite willingly taken back such as we had reason to believe were not connected with past violence. The result is now a working force that is producing sufficient coal to more than supply the somewhat reduced market requirements. At no time during this struggle would we have been unable to produce sufficient coal to meet all demands, had order been maintained and the men desiring to work been free from violence.

The charge has often been made that the state troops were under the control of the coal companies. There is no foundation in fact for this charge. The relations between ourselves and the state soldiers were the same in every essential particular as those that have existed between us and the Federal troops. We have looked upon both as the proper peace officers of the district. Our employment of camp marshals in normal times has been heralded broadcast by the so-called labor leaders as a "notorious and criminal guard system." Our practice, in fact, has been to employ the smallest possible number of such men, and for a long time before the strike was called we had but seven camp marshals at our 22 working properties. They also acted as sanitary and truant officers, as well as being charged with the care of miners' houses.

PENNSYLVANIA

Anthracite

Harrisburg—The blank forms for returns of industrial incomes under the income tax are now ready. They will be mailed by the collector of the district about Jan. 1, and must be returned before Mar. 1. It is specifically stated that royalties on coal will be subject to taxation.

Wilkes-Barre—Members of the Tri-District Executive Board, which includes districts Nos. 1, 7 and 9 of the anthracite region, United Mine Workers of America met here on Nov. 28, to prepare a legislative program. The officers of District No. 1 named David Fowler, of Scranton, a board member, to fill the vacancy caused by the death of M. J. Healey.

West Mahanoy—The Board of City Trusts of Philadelphia has applied to the Schuylkill county court for permission to make the public roads in the township. This is one of the wealthiest townships in the state, the coal lands owned by the Girard estate being worth many millions of dollars. As the estate is the largest taxpayer in the district, the right to make the roads is claimed under the Losch act. The Philadelphia & Reading Coal & Iron Co. and the Lehigh Coal & Navigation Co. also asked to be permitted to make contracts with a score of townships.

Hazleton—Between 3000 and 4000 Italians employed in the anthracite coal fields in this immediate district were notified by mail on Nov. 25, that they must report for military service to the nearest Italian consul for enrollment before Dec. 31, or be adjudged deserters. The notice is construed to denote the speedy entrance of Italy into the European conflict.

Drifton—Thousands of miners' families in the Lehigh region sent congratulations on Nov. 26, her 73d birthday, to Mrs. Eckley B. Coxe, widow of the Drifton coal operator and called the "angel of the coal fields" because of her many years of benefactions. Mrs. Coxe is now actively engaged in preparation of Christmas presents for 3500 children of the towns on the Coxe lands.

Shenandoah—A serious fire broke out on South Mountain on Nov. 26, and destroyed much valuable timberland. The McTurk breaker and washery, employing hundreds of men and boys, were on fire a number of times, but each time the fire companies extinguished the blaze and did heroic work in diverting and checking the flames. The breaker and washery were only slightly damaged.

Hazleton—So many quarrels developed over the hostilities in Europe among the English, Irish, German, Slavish, Russian and Balkan mine employees that the output at the Cranberry mine of A. Pardee & Co. was reduced. An order has accordingly been issued to the effect that anyone of the 1500 employees who discusses European conflicts will be promptly discharged. The management is evidently attempting to enforce its neutrality.

Wilkes-Barre—A recent explosion of gas in the No. 20 Maxwell colliery of the Lehigh & Wilkes-Barre Coal Co., caused the serious injury of a miner and his laborer. Both were seriously burned, and were taken to the city hospital, where the condition of one of the men was pronounced serious.

Shenandoah—The Mill Creek Coal Co. which a short time ago opened up the old workings of the Wolf Creek Coal Co. near St. Clair, recently made its first shipment. The coal is being sent to the new Boston colliery for preparation.

Bituminous

Jerome—The big tipple of the No. 3 mine of the Jenner-Quemahoning Coal Co. was badly damaged by fire recently and would probably have been totally destroyed, but for the heroic efforts of miners. The mine is now running without the use of the tipple, which will be repaired immediately. The mine has plenty of orders and is working steadily, in contrast with many other of the coal operations of this place.

Connellsville—The production of the Connellsville region is still above 200,000 tons per week. This will be reduced slightly for a short time, due to the fact that some of the furnaces of the U. S. Steel Corporation have been overstocked with fuel and are cleaning up their stock piles to a certain extent. Many of the Frick ovens are now banked, but have not been put out of blast.

Bellefonte—Two new coal deposits were recently found in the Snow Shoe region, one being a 4-ft. measure belonging to the Lehigh Valley Coal Co., and the other a 5-ft. bed at the mouth at Beauty Run, belonging to the Kelly Bros. Both owners recently completed a thorough test by drills in the territory underlaid, and each will develop the property by opening extensive operations. Modern machinery will be employed, and a large number of miners will be put to work.

Pittsburgh—The John B. Shannon Co. has recently sold for James B. Manning, of New York, to the National Coal & Fuel Supply Co., of Columbus, Ohio, 5000 acres of coal property near Grundy in Buchanan County, Va., for $150,000. The

sale includes not only the mineral rights, but the timber and surface as well. The new owners expect to operate the property, the Norfolk & Western R.R. passing through the tract.

Pittsburgh—In an opinion handed down Nov. 7, Judge Charles B. Orr in the United States District Court, refused the petition of the Girard Trust Co. to join the receiver of the Pittsburgh-Westmoreland Coal Co. in the foreclosure of a mortgage given by that company to secure payment of 6 per cent. two-year gold notes in denominations of $1000 each to the aggregate sum of $900,000. Leave was granted to the receivers of the coal company to issue certificates in the sum of $350,000 to carry on the business.

WEST VIRGINIA

Welch—All the mines owned by the U. S. Steel Corporation in the Pocahontas and Thacker fields will resume operations at once. This means the employment of many men who have been idle or working only part time. The demand for the output of these mines has not been sufficient during the last few months to justify their full operation, and consequently a large reduction in working forces was made.

Herberton—The property of the Herberton Collieries Co. has been purchased by the Willis Branch Coal Co., of Beckley, W. Va. It is understood that the new owners will not open the mines formerly operated by the other concern, but will start new operations.

ALABAMA

Sayreton—The Republic Iron & Steel Co., of Birmingham, is making extensive improvements at Sayreton, the banner coal mines of the state. Automatic doors are being installed and the mine is being electrified.

Charles M. Barnett, formerly president of the Chesapeake & Ohio Coal & Coke Co., has been elected president of the Atlantic States Coal & Coke Co., of Richmond, Va., to succeed C. E. Bockus. The policy of the company has broadened considerably in the export business, and it expects also to participate largely in the coal trade of the Middle West.

Birmingham—J. P. Pearson and R. A. Monagham have been named by E. M. Dryer, referee in bankruptcy, as receivers for the Central Coal Co., which concern recently filed a voluntary petition in bankruptcy. The liabilities of the Central Coal Co. are listed at $292,697.97, and the assets at $190,300.

Approximately 16,000,000 tons of coal were mined in the State of Alabama last year. The value of this output was $21,000,000. During the time there were 125 fatal accidents, according to the report of J. T. Gorman, examiner of public accounts. There are 302 coal mines, in which 25,000 men are employed.

A voluntary petition in bankruptcy was filed in court by the Mountain Valley Coal & Coke Co. of Jefferson County. Liabilities were placed at $52,596, and assets at $30,203.21. John W. Cook was appointed receiver.

D. J. Parker, of Birmingham, has gone to Pittsburgh to assume the duties of mining engineer in the government service. The appointment was the result of an examination in which he took third place out of a thousand competitors.

KENTUCKY

Berea—Coal companies in this part of the state are preparing to take advantage of the Workmen's Compensation Act which is to become effective on the first of the year. The cost of going in with the state is little more than that of liability insurance and it is said that numbers of the companies in this section have been refused liability insurance because of the frequency of accidents.

Greenville—Activities of the "'Possum Hunters" are declared to have practically ceased in this part of western Kentucky where there was considerable violence in the last several weeks. It is reported that there is much apprehension as to recurrence of the troubles but no particularly notorious cases have been reported. Judge J. J. Rice has added another $200 to the reward offered for apprehension and conviction of the persons who hanged Henry Allen and for those who later whipped Frank Lee and I. E. Covington.

Pineville—Although the coal-mining operations in this part of the state have been on a reduced scale for several weeks, conditions are showing steady improvement. Many mines which have been running on short time are working longer hours and prospects are considered to be favorable to more extended operations in the near future. The fact that the Harlan Coal Mining Co. has recently opened up a second operation at Kayu, near Coxton, its original operation, is considered a special indication of better times. The Harlan company has just completed 100 new houses for its employees and is making other improvements in its settlement.

Whitesburg—Since the advent of rough, snowy weather, with extreme cold there has been considerable improvement in the eastern Kentucky coal fields, especially in the Jenkins-McRoberts-Fleming fields, and a number of mines have resumed operations after being closed down for several days. In fact all over the coal fields there has been a notable improvement, and a better market now exists generally. As a result a large number of miners are now working.

Hazard—All the mines around Hazard, especially those of the Ashless Coal Co., the Hazard Coal Co., the Hazard-Dean Coal Co., the Kentucky Jewel Coal Co., the East Tennessee Coal Co., and the Wolf Creek Coal Co., are all running full time, and a general improvement of market conditions is noted. There is especially great activity in and around the Hazard field.

OHIO

Pomeroy—The two mines of the Essex Coal Co., located in the Pomeroy Bend field, have been opened and each is shipping about 500 tons daily. Both are electrically equipped and the capacity will be increased to about 1500 tons each by spring.

Cleveland—Operators and miners of No. 8 field held a joint conference in Cleveland, Wednesday morning. National President John P. White and National Secretary William Green, of the United Mine Workers of America, President John Moore, of the Ohio district, President Charles Albasin, of the eastern Ohio sub-district union, and delegates from the unions attended. This was the largest gathering of miners since the Wheeling conferences. No preliminary arrangements had been made and the whole situation was gone over as if nothing had previously been done.

Martins Ferry—It was reported recently that the Gaylord mine, which has been idle since Apr. 1, when the miners went on strike, will probably never again be opened. It is certain that this mine in filling up with water and several falls of rock have already occurred. No men have been employed to keep the mine clean, and it is said that it is in a bad condition from the long idleness. It is believed that many mines in this vicinity are in the same condition.

Cincinnati—The city has brought suit against the Paint Creek Collieries Co. for $7000, which is claimed to be due for the use of the water front for the past three or four years. The suit was filed in Scranton, Penn. It is alleged that the company, which has been using a certain space along the water front for a number of years, paid the city $500 every three months for the privilege, up to three and a half years ago, when payments ceased, and the suit has been brought to compel the payment of dues, and to adjust the rights of all parties.

INDIANA

Paxton—A strike at the J. Wooley Coal Co.'s mine has been settled by the state board of miners and operators. The company has been charging $3.25 for 25 lb. of permissible powder and the miners held that black powder, costing $2.72 would do the same amount of blasting. The company agreed to sell the former powder at the price of the latter, the miners to furnish their own detonating caps.

ILLINOIS

Sesser—Plans are under way for another mine near here, which will be sunk by A. Watts, Sr., and his son, in connection with Jesse Diamond, who is already interested in other Franklin County mines.

Royalton—The report made during the past week to the Governor of Illinois, by United Mine Workers officials, that the widows and orphans of the 52 miners, who lost their lives in the Royalton explosion, were destitute, is entirely without foundation. The operators claim that this malicious report has been spread to create an ill feeling against the unfortunate operators. J. L. Mitchell, principal owner of the Royalton property, is taking care of every one of the defendants of the deceased miners who might be in need, and there is absolutely no suffering or destitution of any kind.

East St. Louis—The Interstate Commerce Commisison is holding a hearing, in an effort to determine whether some of the coal roads entering East St. Louis should be classified as industrial roads or as common carriers. At the present time they enjoy the privileges of common carriers, and if they are classified as industrial lines, they will be allowed a switching charge on coal from the mines to East St. Louis, and will not participate in the through coal rates.

Cantine—Mine No. 3 of the Lumaghi Coal Co. has been shut down permanently, on account of lack of business. This mine had an output of 1000 tons a day, and up until a month ago, worked steadily.

Percy—Finding the mining business in anything but a flourishing condition, the Willis Coal & Mining Co. has decided to go into the dairy business, and several hundred acres of land, which has been undermined, has been laid out by the Willis people in a $75,000 dairy farm, $25,000 being paid for the milk cows alone.

Staunton—A short time ago the DeCamp coal mine was sold for $5000. Recently the president of the company applied to the Circuit Court of Madison County, asking that approval of the sale be withheld, as the figure named is far below the value of the property, which is estimated to be $51,000.

ARKANSAS

Fort Smith—Practically every miner who was arrested last week on indictment returned by the Federal Grand Jury, investigating the Hartford Valley mining troubles, has been released on bond. Latest reports from Prairie Creek are to the effect that everything is quiet and work has been resumed, although not on a large scale.

Heber Springs—Plans are almost completed for the development of coal mines near here, by Mortimer Frauenthal.

OKLAHOMA

McAlester—Sixty-seven tracts, including about 10,000 acres of segregated coal lands, were withdrawn from the market when the government sale was opened Nov. 25, because of protests by coal operators. Nearly 100,000 acres of leased land has already been withheld.

FOREIGN NEWS

Sydney, Nova Scotia—The Dominion Coal Co. has completed its shipments from Sydney to the St. Lawrence market for the season. In consequence, work at the various mines has run slack, and will probably continue so until banking operations are resumed about the middle of December. After the beginning of the new year, operations will be good, it being said that the collieries will work about three-quarter time.

PERSONALS

J. H. Tidmore, superintendent of the Banner mines of the Pratt Consolidated Coal Co., Birmingham, Ala., recently resigned.

James S. Thompson, formerly of Colorado, has accepted the position of general superintendent for the Utah Fuel Co., with offices at Castle Gate, Utah.

Robert M. Irving, of Terre Haute, Ind., has resigned his position as general superintendent of the Monon Coal Co. His successor has not yet been appointed.

James M. Page, who recently resigned as superintendent of Rex No. 1 Mine, at LaFollette, Tenn., is now superintendent for Gaviano & Co., coal operators, at Ludlow, Colorado.

J. F. Webb, assistant state mine inspector of Alabama, in charge of the Third District, recently resigned his position, to take charge of the Banner mines of the Pratt Consolidated Coal Co. as superintendent.

Julius Bierach, manager of the Louisville office of the St. Bernard Coal Mining Co., is confined to his bed at the Deaconess Hospital in Louisville, where he recently underwent an operation. He is reported progressing favorably and is expected to be able to return to his desk by the middle of December.

E. T. Stotesbury, president of the Piney, Crab Orchard and White Stick coal companies, announces their dissolution, having surrendered to the State of West Virginia their charters and corporate franchises. After the sale of said properties and all debts and obligations are discharged, the balance will be divided pro-rata among the stockholders.

T. R. Ragland, formerly superintendent of the Fort Defiance Coal & Coke Co.'s operation at Gauley Bridge, W. Va., has taken charge of the new mines of the West Virginia Coal Mining Co. at Skeleton. This operation is on land leased from the Beaver Coal Co., and over 2000 tons were shipped last month.

In the accident on a Burlington suburban train recently, in which several cars caught fire, P. C. Richards, of Richards & Ambler Co., was severely burned about the head and hands. He is now in St. Anthony's Hospital, Chicago, and it is reported that he will not be able to be out for at least 10 days. A number of other coal men were on the train, but Mr. Richards was the only one injured.

Colonel R. J. Stegall, for the past 10 years purchasing agent for the New River Co. at Macdonald, W. Va., recently severed his connection with that company preparatory to assuming his new duties as clerk of the County Court, to which office he was recently elected. M. C. Moore, who has been in the purchasing department for the past two years, succeeds Colonel Stegall.

W. L. Moke, of Adena, Ohio, head of the Roby Coal Co., the Roby-Somers Coal Co. and the A. G. Blair Mining Co., was recently made general manager of the Lehigh Valley Coal Co.'s properties. The latter firm has had a million tons annual output, but will open another mine and develop a new property which will mean a considerable increase in the tonnage under Mr. Moke's supervision.

CONSTRUCTION NEWS

Martins Ferry, Ohio—A new coal mine has been recently opened on the narrows south of Shadyside.

Shenandoah, Penn.—Work on the new steel and concrete breaker of the Lehigh Valley Coal Co. at Packer No. 5, is being pushed with all possible speed.

Scranton, Penn.—The Lehigh Valley Co. recently placed a force of men at work repairing the Yorktown Washery of the Spring Brook Colliery which has long been idle. Operations at this development will be resumed at once.

Johnstown, Penn.—The W. H. Hughes Coal Co. has begun the installation of an electric haulage system at its mine at Bens Creek. It will also make other improvements that will increase the capacity of the plant from 400 tons to 1200 tons per day.

Wheeling, W. Va.—A force of men was recently put to work making repairs on the Semet-Solvay coke plant at Wheeling. It is understood that two large smoke stacks will be rebuilt and other repairs requiring several weeks will be effected.

Birmingham, Ala.—The Tennessee Coal, Iron & R.R. Co. has commenced work on the construction of a building, 80x200 ft., for the manufacture of fertilizer from slag. The cost of the plant will be $250,000 and a large number of men will be employed.

Rockwood, Penn.—The coal tract northwest of Rockwood in Milford Township is again being investigated by promoters. It is proposed to build a standard gage track connecting the proposed mines with the Somerset & Cambria line. The plant, if built, will be modern in every way.

Piedmont, W. Va.—The Maryland Coal Co. has announced that improvements costing many thousands of dollars will be made at its plant. The plant will be modernized for the mining of thin coal, and more than 300 men will be employed. It is estimated that the company will ship over 1000 tons of coal daily. An electric haulage system will be installed.

Wilkes-Barre, Penn.—A large concrete shaft is being sunk by the Delaware, Lackawanna & Western R.R. Coal Dept., at Nanticoke. The caisson method, which has not been employed to any great extent in the anthracite field, is being followed. The new shaft will have two hoistways, a pipeway and an airway, while its greatest dimension will be 52 ft. 3 in.

Cincinnati, Ohio—The Reliance Coal & Coke Co., which recently made arrangements for the purchase of the property and business of the White Oak Coal Co., is building at a point 10 miles below the city a coal-handling and storage plant with a capacity of 100,000 tons, at which it will take care of coal from up the river as well as from its mines.

NEW INCORPORATIONS

Bristol, Va.—An amendment has been filed to the charter of the Blacok Coal Land Co., reducing the capital stock from $1,500,000 to $15,000.

Duquoin, Ill.—The Granger Coal Co. has been organized with a capital of $30,000. The incorporators are A. G. Graham, C. F. Quick, O. M. Roberts.

Middlesboro, Ky.—The Low Ash Mining Co. has been organized with a capital of $5000. The incorporators are E. B. Nicholson, F. D. Hart, Jr., M. H. Rohrer, and J. D. Simpson.

Switzer, W. Va.—A charter of incorporation was recently issued to the Alemma Coal Co., of Switzer, Logan County. This company has an authorized capital of $25,000 and the

incorporators are Fred C. Prichard, Rufus Switzer, Thomas A. Wiatt, R. H. Williams, and J. M. Vest.

Mullens, W. Va.—Organization has been effected by the Hardy Coal Co. with officers as follows: President, J. A. Wood; vice-president, Frank A. Prince; secretary, D. H. Mead; treasurer and manager, J. C. Sullivan. This firm plans a daily output of about 1500 tons which will be secured through electrical equipment, the machinery to be purchased during the next 30 days.

INDUSTRIAL NEWS

Cambridge, Ohio—Two mills of the American Sheet and Tin Plate Co. have posted notices that they will be closed until Jan. 1, 1915; 800 men will be idle from these plants.

Birmingham, Ala.—The Mountain Valley Coal & Coke Co. recently filed a voluntary petition in bankruptcy. The liabilities were given as $52,596 with assets of $30,203.21. John W. Cook was appointed receiver.

New Lexington, Ohio—The property of the former Lilly-Hocking Coal Co., located one mile east of New Lexington, was sold at public sale Nov. 28, by John F. Nugent, receiver for the Weaver & Dufraine Coal Co.

Washington, D. C.—Sixty vessels of the United States Navy, six of which are battleships, are now burning oil instead of coal. It has been found that the oil occupies less space, weighs less, and gives a larger steaming radius.

Viper, Ky.—The Viper Coal Co. recently organized to make developments announces that it will be ready to begin shipping coal within the next 30 or 40 days. It will have a daily capacity of about 1500 tons when fully under way.

Put-In Bay, Ohio—The "Isabella J. Boyce," a steam barge belonging to the Pringle Barge Line Co., of Cleveland, caught fire while bound from Cleveland to the upper Lakes with a load of coal, and had to be abandoned. She and her cargo are believed to be virtually a total loss.

Knoxville, Tenn.—A twenty-five per cent. improvement in the domestic coal market has resulted from the recent cold snap, according to the leading coal merchants of this section who also report that the steam market also has taken a brace.

Charlestown, W. Va.—The industrial conditions in West Virginia continue to show a slight improvement. New industries continue to announce their plans for opening business in the state. Among these the Pursglove-Maher Coal Co., of Cleveland, Ohio, is reported to have taken an option on coal land in the Island Creek district of West Virginia.

Columbus, Ohio—The Alma-Thacker Coal Co., of Columbus, of which Charles Cohenour is president, is opening four mines near Williamson, W. Va., on property recently acquired. The property consists of 2000 acres and the capacity of the mines will be 2000 tons daily. Shipping will start as soon as the spur of the Norfolk & Western Ry. to the property is completed.

Wheeling, W. Va.—Suitable mine timber is becoming an expensive problem in many of the older coal-producing districts of this state. It is believed that the steel mine prop, which has been for some time in successful use in Ohio and other states, will grow in favor as it becomes more generally understood that this prop can be removed and used oftener than wood.

Lexington, Ky.—Suspension by the Interstate Commerce Commission of the "long and short haul clause" will stimulate the coal industry of eastern Kentucky, railroad officials believe, as it will place the mines there in reach of the big coal markets in the West and North, especially for coking coal which is much in demand in the large manufacturing plants in that section of the country.

Toronto, Canada—A discovery of lignite has been made in boring for a well in North Cobalt, Ont. It was struck at a depth of 25 ft., and though of inferior quality at the top it is believed that it will improve with depth. A thorough exploration will be made next spring. In view of the fact that all coal used in North Ontario has to be imported the discovery is regarded as of considerable economic importance.

Jenkins, Ky.—The Elkhorn & Shelby Creek Coal Co., C. G. Evans president, is asking, it is said, for prices on second-hand mining machinery, the shortwall type preferred; 250 volts 48 in.; nothing less than 6-ft. bar. W. J. Christopher is manager of the company, which will develop 400 acres of coal property, expecting to have a normal output of from 600 to 700 tons. All the machinery except the mining machines is provided for.

Chicago, Ill.—The Chicago Coal Merchants Association held its biweekly meeting in the offices of the association this week, and announcement was made that arrangements have been effected with a prominent insurance company whereby members of the association can secure a saving in the cost of their insurance. Mr. Adams' article suggesting uniform screening arrangements, which has been widely discussed, was read, and the members asked to submit their opinion later in regard to the proposed plan.

Bluefield, W. Va.—As a sequel to the resumption of operations in certain of the steel works of the country, the demand being made upon the Norfolk & Western R.R. is believed to be prophetic of a lively pick-up in the mining business within a short time. It is hoped that by the first of the year the coal output will be not far short of normal. With the markets of the world opening up for new business, it is believed that coal mining will reach a high mark hardly later than the first of the year.

Fayetteville, W. Va.—The coal billing records of the Chesapeake & Ohio R.R. for the years prior to 1914 were recently destroyed when the billing office in the East Thurmond yard was burned. The fire occurred about two o'clock a.m., and the building was being fast consumed when the billing clerk who was asleep therein, was awakened. His first thought was for the records, and without dressing he rushed into the office, and succeeded in removing the books covering the past year's business. Nothing else was saved.

Whitesburg, Ky.—The middle of December will see the first trains running through the famous "breaks" of the Big Sandy River, with the completion of the Carolina, Clinchfield & Ohio R.R., between Elkhorn City, Ky., the terminus of the Chesapeake & Ohio's Big Sandy branch, and Dante, Va., 35 miles distant. This is regarded as the most important railroad connection made in years in eastern Kentucky and will open up a large area of coal and timber lands. The construction was accomplished at tremendous cost. In the 35 miles of railroad there are 34 tunnels.

Washington, D. C.—The constitutionality of the coal-mining laws of Ohio will be tested in the United States Supreme Court which will hear the argument of the Rail & River Coal Co. in its case against the Industrial Commission of Ohio. The operators will claim that because of the law recently enacted the coal-mining industry of the state is practically at a standstill; that the loss to operators and employees in profits and wages has already reached an enormous total. Another interesting argument will be heard in the case of the Jeffrey Mfg. Co. involving the validity of the Ohio Workmen's Compensation Law.

Charleston, W. Va.—Coal and coke shipments over the lines of the Chesapeake & Ohio Ry. during the month of September and the first nine months of the year, have been made public in the statement issued by O. D. James, auditor of freight traffic. These continue to show an increase over last year. The statement shows that 2,019,730 tons were shipped during the month, as against 1,612,323 tons for the same month in 1913, an increase of 407,407 tons. For the first nine months of the present year 15,860,912 tons were shipped, as against 12,854,766 tons for the corresponding period in 1913, an increase of 3,006,146 tons.

Birmingham, Ala.—Coal companies with properties along the Warrior River are preparing for the completion of lock No. 17. The Pratt Consolidated Coal & Coke Co. is leading in this work. This firm is constructing barges at Holt where it has a building plant. Seventeen coal mines are either ready or will be ready to dump coal from the mine tipple onto barges when lock 17 is completed. Before the end of 1915 the Warrior River will be navigable for vessels of 6-ft. draft the year round from Cordova, 76 miles north of Tuscaloosa, to the Gulf. This will bring coal mines in Jefferson and Walker counties in direct touch with tidewater for all time to come.

Charleston, W. Va.—The statement of shipments of coal and coke over the lines of the Norfolk & Western Ry., for the month of October and for the first 10 months of the year, has been issued by T. D. Hobart, general coal freight agent, and while the October shipments show a decrease the shipments for the 10 months of the present year still show an increase over 1913. According to the statement 2,061,464 tons were shipped during October, as compared with 2,209,261 for the same month in 1913, a decrease of 147,797 tons. For the 10 months of the year the statement shows 22,849,014 tons, as against 21,325,120 tons for the same period last year, or an increase of 1,523,894 tons.

Coal Trade Reviews

General Review

Warm weather threatens the anthracite market with a general slump. Bituminous situation dull and no improvement in sight. Middle Western market beginning to stiffen up notably.

The warm weather has slowed up the demand for anthracite to such an extent that the market is being maintained with the greatest difficulty. The independent operators are curtailing operations heavily, and the large companies are forcing the market in every direction in order to maintain their working schedules. The domestic sizes are failing utterly to show their customary form, but the weakness centers more particularly on the steam grades, due to the excessive production, mild temperatures, decreased industrial activity and general demoralization in bituminous coals with which they are in close competition. If the high temperatures continue much longer, a general slump in anthracite is inevitable.

While basic conditions in bituminous continue to show indications of a turn for the better, the closest scrutiny of the market fails to disclose any important change. Some slight improvement is apparent in the movement on contracts, but the spot demand continues as dull as ever and occasional market cargoes are still noticed; as a matter of fact, were it not that operators are more cautious than ever before about shipping consignment coal, the market would probably be demoralized.

Under the stimulus of a slightly improved tone in general manufacturing, the Pittsburgh district has withstood the reverse incident to the cessation of Lake shipping in a most excellent manner. Some forced sales were, of course, hardly to be avoided, and there are still sufficient cut prices in evidence to cover all the spot demand but producers are showing an increasing determination to obtain full circular prices.

In spite of the return of warm weather, Ohio consumers seem to have felt the danger of low stocks, and buying is still continuing. Dealers are placing immediate, if not urgent, orders, and there is a better tone in evidence in all directions. Screenings have stiffened up in excellent shape, and the outlook in steam coal seems more hopeful. Some inclement weather has also had a stimulating effect on the Southern markets, though the situation is not appreciably changed as yet, and it will require considerable cold weather to create any great activity.

It is evident that the Middle-Western consumers have not stocked their usual winter requirements as a great many orders are still arriving in spite of the return of warm weather. These orders are quite frequently urgent, and a good many companies are now on full working schedules. Practically all the demurrage coal seems to be cleaned up, and a fair business is anticipated throughout the balance of the season.

ATLANTIC SEABOARD

BOSTON

Little change in situation of Pocahontas and New River. Panama R.R. bids considered significant. "Market cargoes" still in evidence. Dull outlook for Pennsylvania grades. Anthracite demand slow.

Bituminous—The market this week is almost featureless. Prices on Pocahontas and New River are practically unchanged, a few spot sales still being made at prices little if any in excess of $2.50. The amount of tonnage of standard West Virginia coals offered the Panama R.R. at $2.70 or less is some indication of the view certain shippers take of the market for several months ahead, and it is extremely doubtful now if the $2.85 basis can be maintained next spring. The year of 1914 as a whole has been an object lesson to New England buyers who rushed in to tie themselves up with long-term contracts, and it will probably be hard persuading many of the important buyers to make contracts for 1915.

In New England the spot demand is light, but an improvement is shown in the call for shipments on contract. The improvement, however, is not sufficient to have any appreciable effect on the large volume of coal still standing at the Virginia terminals. It is generally understood now that the Boston & Maine, as well as the New Haven R.R., is to take Cape Breton coal as a part of its requirements, and the whole transaction has called forth a lot of comment.

An occasional "market cargo" of Pocahontas or New River is still heard from. Unsold balances at Providence have lately been sold as low as $3.20 on cars, a price that can hardly net $2.50 f.o.b. Hampton Roads. Georges Creek is in better supply than when last reported; cargoes are coming forward with normal regularity, and there is no longer any fear of a shortage of this grade later in the season.

The outlook for the Pennsylvania coals is no brighter than for several weeks past. The last cargoes for the season have now gone forward to points like Bangor, which will soon close to navigation and general inquiry is light. It is interesting to see that some of the higher grades are active competitors for Government business at Philadelphia as against the Pocahontas and New River shippers at Hampton Roads.

Anthracite—The state of trade is much dependent on the weather. A fortnight of low temperatures would create an active demand on the shippers, but as it is orders are few.

Quotations on bituminous at wholesale are about as follows:

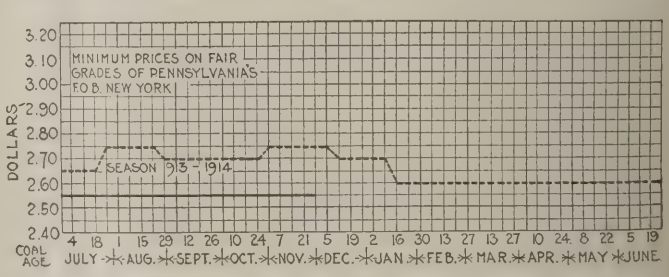
	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.85@1.45	$1.15@1.50	$1.67@1.77	
Philadelphia*.....	2.10@2.70	2.35@2.70	2.92@3.02	
New York*.....	2.40@3.10	2.65@3.05	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.50@2.75
Boston†.....	.....	.....	.....	3.40@3.73
Providence†.....	.....	.....	.....	3.20@3.58

* F.o.b. †On cars.

NEW YORK

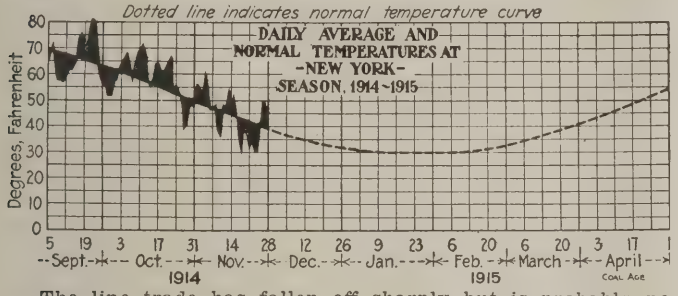
Some bituminous on demurrage and the market occasionally forced. Slack stiffer. Anthracite slowing up. Individuals curtailing production and large companies putting some sizes back into storage.

Bituminous—While many operators continue optimistic as to the future, the market still fails to show any important indications of a recovery. In fact were it not that producers have been more cautious about sending consignment coal forward than ever before, it is probable that the trade would now be utterly demoralized. Even as it is the market is occasionally being forced with coal on demurrage and there was a large tonnage unloaded from one of the German vessels last week because it was showing indications of firing. Mining schedules are heavily restricted, Pennsylvania operations being at about 50% to 60% capacity; the cessation of Lake shipments has also caused a large number of the Fairmont, W. Va., mines to close.



The closing of the Lake trade has stiffened up slack prices in all parts of the country. The heavy export business in other lines is also creating a strong bunkering demand which is probably one of the best features of the market. Among the other constructive developments are reports of heavier orders from the railroads, indications that stocks are being cleaned up and a very slight improvement in general manufacturing. Prices are not quotably changed and we continue these on the same basis as for the last several weeks as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The cold snap of two weeks ago started some activity in anthracite, but the recent warm weather has caused a slowing up and the business is scarcely holding its own. Individual operators are curtailing production probably more than is generally known and although the large companies have so far continued on full working schedules, it has been only by a decided effort. Sales agencies are experiencing great difficulty in placing the tonnage and it is understood that the Reading is now putting all of its steam sizes back into storage. If the higher temperature continues much longer a general slump in all directions is inevitable.



The line trade has fallen off sharply but is probably no worse than at Tidewater. The situation on rice and egg coal is somewhat softer than last week while pea coal is difficult to move, either all-rail or at Tidewater. The other sizes are not notably changed from last week, although prices are in some cases lower, the market now being quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.10@5.35	5.30	4.80@5.30
Stove	5.35	5.35	5 30	5.30
Chestnut	5.60	5.50@5.60	5.55	5.35@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.25@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.40@2.25
Barley	1.80	1.70@1.80	1.75	1.25@1.75

PHILADELPHIA

Anthracite market continues to lack tone. Domestic grades fairly active, but small sizes continue to hamper operations. Cold weather will be necessary to inject any snap into trade. Reports in bituminous still adverse.

Anthraite—The past week was anything but favorable to the anthracite business because of the high temperatures. Operations were continued on full time, as a rule, but some of the large companies are hard pressed to dispose of their surplus, especially of the steam sizes. It is a notable fact that the steam sizes are not moving to the extent that is naturally expected at this season of the year, and there is a general complaint in the trade about the poor demand. This is due to the depressed industrial situation, and the exceedingly low prices for bituminous.

Broken coal is not in as good demand as usual while egg is also inclined to drag, substantial concessions from the circular being frequently noted. Stove and chestnut seem to be the only sizes for which there is a ready market; reserve stocks of the latter are still being drawn on to satisfy the demand. Outside of the two last named sizes, the market is simply holding its own.

Prices at Tidewater rule about as follows:

	Circular	Individual
Broken	$4.75	$4.50 @ 4.60
Egg	5.00	4.75 @ 4.85
Stove	5.00	5.10
Chestnut	5.25	5.25

Bituminous—While there seems to be some slight indications that better conditions are coming, there is nothing to justify this at present time. There does seem to be a better demand, due to the resumption of some manufacturing establishments, but nothing in the way of better prices has been noted, and taking the week as a whole, no improvement can be recorded.

BALTIMORE

The struggle of the coal trade against general adverse business conditions continues. Slack the only branch to show strength. Anthracite business but fair.

The demand is poor in all branches of the bituminous trade. Anthracite dealers are doing a fair early winter business on household business, but the industrial fuel situation fails to show any improvement.

Reports from West Virginia show that prices there, with the exception of slack, have undergone no change. Three-quarter gas was being quoted around 85c. and steam coals at from 85 to 90c. Slack kept advancing all the week, starting at 45 to 50c. and finally selling around 75c., or on a parity with gas run-of-mine. This was not due so much to any increased demand as to the reduced output.

Pennsylvania coals are without any material change. Lower grades were offering in some small lots at 90c. Better coals sold at from $1 to $1.10, while the best grades were moved in restricted lots at from $1.25 to $1.35.

HAMPTON ROADS

Shipments only fair. Accumulation in railroad yards about normal. November dumpings lighter than anticipated.

Dumpings over the piers at Tidewater have been about average during the week. There have been some large cargoes exported and also some heavy shipments to the New England market; in addition to this there has been some little movement to Savannah and Tampa. Vessel tonnage has arrived so irregularly that at times some of the piers have been decidedly rushed but at other times there is little or no tonnage alongside the docks. Considering the existing war conditions the number of vessels calling for bunker coal is holding up well.

Prices are generally at the circular with perhaps some cuts being made by shippers who have coal on demurrage. There are indications that some change will be made shortly in the price for bunker coals to be supplied during 1915, but it is impossible to predict what it will be. In the majority of cases payment for bunker coal was made by draft payable in London but the war and money conditions make this impracticable.

Authoritative announcement of destination of vessels is no longer made, but the following have cleared, presumably for the ports noted:

Vessel	Destination	Vessel	Destination
Celia	Iquique	Wascana	Pernambuco and other Brazilian ports
Mar Corusco	Porto Ferrajo, Elba	Sark	La Plata
Highbury	Italian port	Stromboli	Italian ports
Magda	Media Luna, Cuba	Peta	Cienfuegos

OCEAN FREIGHTS

Vessels continue scarce with rates high and hardly quotable.

Freight market conditions are practically the same as a week ago—a strong demand for steamers and a scarcity of available boats; under these circumstances it is rather difficult to quote probable freight rates with any degree of certainty. The following is the approximate market though we can then no doubt give you closer quotations:

To	Rate	To	Rate	To	Rate
Havana	$1.75@2.00	Kingston	$1.85@2.00	Tampico	$2.25*
Cardenas††	1.90@2.10	Curacao	1.75*	Rio	4.80@6.00
Cienfuegos	2.00@2.25	Santiago	2.10@2.25	Buenos Ayres**	4.80@5.76
Port of Spain	2.25@2.50	Guantanamo	2.10@2.25	Mediterranean	4.80@5.76
St. Lucia	2.25@2.50	Demerara	3.00*		
St. Thomas	1.80@2.00	Bermuda	2.00@2.25		
Barbados	2.25@2.50	Vera Cruz	2.25*		

*About. †Small boats to Kingston $2.10@2.25. **Or La Plata. ††Or Sagua.
W. W. Battie & Co.'s Coal Trade Freight Report.

COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Aurania	Italian	Philadelphia	Mediterranean	2180	
Kronprins Olav	Norwegian	Philadelphia	Havana	2509	
Laura C. Anderson		South Amboy	Jacksonville	766	$0.90
Florence M. Panley		Philadelphia	Portland	927	
Estelle Krieger		Norfolk	Puerto Cabello	1047	2.50
Modiva	Norwegian	Philadelphia	Sagua	778	
Malcolm Baxter, Jr.		Philadelphia	Boston	1479	0.60
May V. Neville		Norfolk	Texas City	1043	1.05
John B. Manning		Norfolk	Boston	955	
Trento	Italian	Virginia	West Coast Italy	2089	4.80
Daisy Farlin		New York	Macoris	285	

Note—Steamers are indicated by **bold face** type, all others being schooners.

OHIO VALLEY

PITTSBURGH

Trade suffering severely from cessation of Lake shipments, but otherwise showing slight signs of improvement. Operations at between 35 and 40% of capacity. Slack stiffening, other descriptions being cut as much as formerly, with $1.15 asked on mine-run for prompt shipment.

The coal trade is naturally suffering severely from the cessation of Lake shipments, but this is the normal experience at this time of the year, and operators are not trying to force the market except in a few instances, when prompt coal is sold at particularly low prices. In other respects the situation

shows some slight signs of improvement. Several large operators report a little increase in requirements under contracts with manufacturers, particularly in the iron and steel trade. The manufacturers have no stocks and seem to be increasing their operations slightly. Domestic demand increased somewhat last week, but a further and much larger increase is expected. The retail dealers have been buying strictly from hand to mouth, and the advent of really cold weather, after an exceptionally temperate fall, should result instantly in considerably larger demand upon the mines.

With the restriction due to the cessation of Lake shipments, operations have been further reduced in the Pitsburgh district in the past fortnight, and are now at not over 40% at the outside, though they probably average well above 30%. While little increase is expected for the near future, a rate of 50% may possibly be reached by the end of the month.

There are no contract prices being quoted, as there is no contract demand. For prompt lots most sellers are holding rather firmly, but there are cut prices enough to cover most of the demand. Slack has continued to firm up, and is now quotable at 70@80c., though by this time of the year it is usually up to the regular winter level. The leading interest in the district adheres to its quotation of 90c., and would probably buy slack if low prices were quoted. We quote the market approximately as follows, noting that except in the case of slack the prices are frequently shaded: Slack, 70@80c.; nut and slack, $1; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35.

BUFFALO

An increased activity in bituminous, especially slack. General improvement anticipated. Canada doing better. Lake trade closing. Anthracite strong.

Bituminous—There is a better feeling in the trade, though the demand has not improved as yet. Some shippers are finding better conditions and there is a general disposition to hold firmer and to ask a little more for slack. There are not so many records of slack selling at sacrifice prices and it is generally believed that it will advance before long. An adverse feature of the slack situation is that screenings are dull, selling at about $2, which brings them in competition with slack.

There is a small stir in the Canadian trade, due to the starting up of factories on orders for war munitions from England. In fact orders from Europe are becoming general everywhere and factories are also beginning to make goods formerly imported. All indications now point to a gradual return to normal conditions, though it may be some time before the effects are felt in the coal trade. The current market is certainly in better condition than it has been of late, not much coal being on car service and fewer reports of very low prices being heard.

The closing of the Lake trade affects the bituminous market in a general way. Other markets are compelled to absorb the great volume going out by Lake, but this is usually discounted to a certain extent. Sometimes this is even overdone to such an extent that with the regular increase of consumption at this time of the year, the supply runs short.

Prices are a little stronger, especially for slack, quotations remaining at $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Allegheny Valley coal sells at 25c. below Pittsburgh.

Anthracite—There is a good movement of all sizes of anthracite except egg, which has to be forced by refusing orders for stove or chestnut unless some egg is included. But it is believed that it will all be taken up as the late cold snap has improved the retail trade and the rail-line movement has all along been good. Lake shippers are holding on yet and are willing to pay extra insurance on a few cargoes. Shipments for the week were 146,500 tons, nearly all of it going to the heads of Lakes Superior and Michigan. As a rule the shippers are well supplied at that end of the Lakes.

TOLEDO

Lake movement practically at an end. Many vessels have gone into winter quarters at Toledo. Weather conditions affect market.

While the volume of coal passing through Toledo has been heavier than usual, business has been no comparison to what was expected. The official navigation season on the Lakes ended last Monday at midnight. Underwriters have announced that there will be no extension of insurance this year although this has not been the case in former seasons; so few vessels are out that the possible loss of even one steamer would wipe out any profit that might be made. Three vessels only are in sight for loading at the Toledo docks. Twenty-three Lake freighters are now in winter quarters here and 17 are being stored in the Bay View park harbor.

COLUMBUS

Some improvement is noted as a result of the more favorable weather and the bettering in general trade conditions. Production slightly increased and prices steadier.

While the freezing weather of a week ago was only of a few days' duration, it stimulated trade to a certain extent. Dealers placed orders for immediate delivery while buying on the part of consumers was more lively and a better tone was noted on all sides.

Steam business is still slow and prices rather weak due to the fact that West Virginia coal is being sold under the Ohio circular. Railroads are taking only a minimum amount of fuel though some show a disposition to stock up for the winter season.

Domestic trade is the strongest point in the market. Rural dealers are buying more freely since farmers are now taking time to haul their coal supply. Householders are also buying more freely. The new retail prices of Nov. 1 have been generally well maintained although there is no likelihood of another advance soon. Retailers' stocks are lower than for some time.

Production in Ohio has increased slightly under the beneficial effect of lower temperatures. The Hocking Valley produced about 60% of normal during the week. Crooksville and Cambridge also outputted a like percentage while the Jackson field is credited with 50%. In the Pomeroy Bend district, production is almost normal.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.55	$1.65	.....
Inch and a quarter	1.50	1.55	$1.40
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.40	0.45	0.40
Coarse slack	0.30	0.35	0.30

CINCINNATI

Milder weather has cut down the domestic demand, but the steam business is improving. Prices steady.

The weather has again turned abnormally mild and domestic business has dropped off accordingly. But the previous cold spell showed both consumers and retailers the danger of short stocks, and while the movement of prepared sizes is now below what it was ten days ago, it is much better than before that time. Operators are no longer hampered by an inability to move domestic coal and screenings and steam coal are also in good demand; the steam demand is steadily improving, with every indication of reaching a high point by Jan. 1. During this month many large consumers are expected to make arrangements for their 1915 fuel supply, and business should experience a beneficial effect from this. Prices are steady, the cheaper grades being especially strong.

CLEVELAND

Warm weather and the reconsigning of Lake coal left over on the docks have made the spot market weak. Some demurrage coal noted. Slack stiffening up.

Receipts of coal have not been any heavier, but the warm weather has had a depressing effect upon the buyers. Coal on track has gone on car service and fine coal was sold at from 5 to 15c. below shipment prices. Hocking and Goshen nut and slack went as bonus, $1.55 on track here, while Youghiogheny, Panhandle, Fairmount and other high-grade steam coals touched $1.60 to $1.65. A considerable amount of fine coal has gone on car service and it seems now as if there would be little chance of the market cleaning up this week.

The domestic trade is not absorbing all the coal sent here. Pocahontas lump was offered at $3.45 to $3.50 and mine-run was shaded 5 to 10c. from shipment quotations. There has been some No. 8 from West Virginia consigned here; it is exclusively three-quarter and is being offered at almost any price. Three-quarter coal left over after the last ships were loaded Monday was sold at low prices and reconsigned to Western trade.

A further weakening factor is the excessive production of three-quarter coal to get slack. The closing of the Lake trade is causing slack to advance and is the reason for operators trying to substitute mine-run coal for fine coal. Slack will advance to the mine-run price before another week.

Quotations for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.60	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.60	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1¼ in.	.....	$2.40	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$1.95@2.00	$1.95@2.00
Mine run	2.60	2.25	1.95	1.85@1 90	1.90
Slack	2.40	1.75@1.80	1.65@1.70	1.75@1.80	1.75

COKE

CONNELLSVILLE

Heavy inquiry for furnace coke for 1915 delivery, owing to recent sales of pig-iron and expiration of existing contracts. One contract closed on sliding scale and others being negotiated on this basis. No immediate prospect of increased consumption or production.

The contract furnace coke market has suddenly taken on an aspect of great activity. Inquiries for contracts for delivery during part, or all of next year, received in the past ten days are easily larger than the total of inquiry for several months preceding, and at least one contract has actually been closed.

The suddenly increased inquiry is generally attributed to the greater activity in the pig-iron market. The Buffalo furnaces have lately made a drive and by naming very close prices have sold a quarter of a million tons or more of pig-iron, while other districts have increased their sales somewhat. It is everywhere recognized that the uncertainties of the future are such that no producer can afford to risk selling his finished product without at once covering the raw material involved.

A contract was closed a few days ago for 10,000 to 12,000 tons of furnace coke monthly during the first half of 1915, on a sliding scale, the price to be adjusted monthly according to the ruling price of pig-iron, and it is understood the minimum price stipulated for coke in the contract is but little under $1.75. The inquiries number eight or ten, involving 80,000 to 90,000 tons of coke a month. Most of this is for the first half of next year, no inquiry being for the first quarter only, while one or two are for the whole year and one inquiry involves coke for two years. The trend is stronger than usual towards the making of sliding scale contracts.

The demand for prompt furnace coke increased somewhat last week, owing probably to the holiday, and $1.60 was obtained with less difficulty than usual. Foundry coke remains very quiet.

The activity in the coke market is attributable entirely to the desire of furnacemen to cover for next year, their present contracts expiring in almost all cases with this month. There is no immediate prospect of increased consumption or production. The market stands quotable approximately as follows: Prompt furnace, $1.60; contract furnace, $1.75; prompt foundry, $2@2.25; contract foundry (nominal) $2.35@2.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 21, at 200,804 tons, a decrease of 5510 tons, and shipments at 200,022 tons, a decrease of 10,365 tons.

BUFFALO

Some improvement in inquiries, but no stir yet.

Here and there a coke shipper reports that he has a few more consumers asking for prices, but the improvement is not of much account and may not go any further for the present. Prices remain on the basis of $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

ST. LOUIS

The market is quiet on foundry coke, with little demand. In the past week there have been a few inquiries for the coming 12 months, on selected 72-hr.; quotations were $2.50 at the ovens. This coke takes a $2.80 rate to St. Louis.

A very limited tonnage of byproduct is moving in, whereas in former years the local domestic coke was principally byproduct. This year it has been supplanted by coke from the local gas house, which retails at $5.75, and is sold to the dealer at $4 f.o.b. his tracks.

CHICAGO

There is a little better inquiry for furnace and foundry coke, but purchasers are seemingly indisposed to give orders at the prices quoted, which are as follows: Byproduct, $4.95; Connellsville, $4.75@4.90; Wise County 72-hr. (select), $4.75; gas coke, $4.25; furnace coke, $4.40@4.65.

THE STEEL INDUSTRY

The buying movement in pig-iron, which started with large contracts at Buffalo, as reported last week, has extended to other districts. Cleveland, Pittsburgh, Cincinnati, Chicago and St. Louis in particular have participated. At the same time there are signs in the finished steel trade pointing to considerable activity in December, making that the best month in the final quarter, in point of tonnage.—"The Iron Age."

SOUTHERN

BIRMINGHAM

Coal market remains quiet, though past few days have brought out more inquiries for lump.

The coal market in this district remains about stationary. There is little demand for either steam or lump coal, though the past few days, has brought cooler weather which has helped the retail dealers to some extent. However, it will take at least two weeks of cold weather to reduce the stocks sufficiently to effect the operators. Steam fuel is in a little better shape than lump coal. The demand is practically nothing, except on the regular contracts. Some of the mines are closed down entirely, while others are running from two to three days per week. No decided improvement is looked for until the first of the year.

LOUISVILLE

Prices considerably off the season's basis. Much coal on demurrage.

Continued unseasonable weather has caused a slack demand, though there are occasional reports of some increased activity in certain sections. Prolonged cold weather will be necessary to stimulate business to any extent.

Steam coals are dull; there is much fuel on demurrage in practically all of the centers to which the Kentucky operators ship. The cheaper grades are a drug on the market and many operators with poor selling facilities are continuing to give their coal away. It is reported that one Louisville operator sold a full car of eastern Kentucky nut and slack, at the mines, for $4.65, or at the rate of 10c. a ton. Prices are running considerably less than normal, from 25 or even 60c. below what is ordinarily the case at this season. Western Kentucky lump is offered at $1, nut and slack at about 55 to 65c. Eastern Kentucky, highest grade block ranges from $1.60 to $1.75, run-of-mine, $1.25 to $1.35, with nut and slack from 60@75c. down, according to grade and character. All prices f.o.b. mines.

MIDDLE WESTERN

CHICAGO

Situation more hopeful with some improvement noted. Continued strength in screenings. Anthracite trade improved. Pocahontas weak. Indiana and Illinois coals firmly held.

The colder weather of last week gave a better tone to the market with brighter prospects for the future. The temperature is again higher, but wholesalers and jobbers report a continuance of inquiries and a number of rush orders are being filled. It is evident that the consumers have been backward in stocking fuel this year. Very little consignment coal is left on tracks drawing demurrage. There is a widespread feeling that the balance of the winter is going to see steady absorption of the normal production of the mines.

Operators who have not attempted to force the market seem to be fairly well satisfied. Some companies are now working full time, but others have not developed a sufficient amount of business to justify such a course. During the last ten days, yard stocks have been materially reduced, and orders are now for immediate shipment.

The improvement in screenings continues. Many factories and industrial plants have either resumed operations or increased their working forces. Steam coal prices have advanced from 10c. to 15c. per ton, and show a further tendency to harden.

The anthracite demand has been urgent, and prices firm. Chestnut is short, egg in over-supply, and stove normal.

Shipments of egg and nut from Franklin County are holding up well, with most mines on practically full running schedules. Screenings are strong and in short supply, which is unusual in view of the heavy movement of lump.

Indiana operators are disposing of their lump coal locally and little reaches the Chicago market. Shipments on contracts are heavy. Indiana screenings are strong.

Smokeless has shown some improvement; lump and egg are short and prices slightly stronger.

The accumulations of Hocking coals have been cleaned up and shipments increased.

Carterville mines are working full time, leading all other Illinois districts in this respect; the demand is satisfactory and no low prices are quoted.

Demand is strong in the Springfield district; circular prices are strictly adhered to and screenings are buoyant:

Prevailing quotations are as follows:

	Franklin Co.	Springfield	Harrisburg	Sullivan	Clinton
Lump	$1.65@2.00	$1.60	$1.50@1.75	.....	$1.65@1.75
4-in. lump	.....	.....	.....	$1.60@1.75	.....
Steam lump	.....	.....	.....	.....	1.15@1.20
2½-in. lump	.....	.....	.....	1.50	.....
1¼-in. lump	.....	.....	.....	1.20@1.35	.....
Mine-run	.....	.....	1.20@1.30	.....	1.10
Egg	1.50@1.75	.....	1.50@1.75	.....	.....
6x3-in. egg	.....	1.50	.....	.....	.....
Nut	.....	1.35	1.40@1.75	.....	.....
No. 1 nut	1.50@1.75	.....	.....	.....	.....
Screenings	0.65@0.75	0.60@0.70	0.55@0.75	0.60@0.75	0.60@0.75

Hocking Valley 1¼-in. lump, $1.40@1.60; mine-run, $1.25.

New River and Pocahontas lump and egg, $2.25; mine-run, $1.25@1.40.

Somerset Smokeless lump and egg, $2@2.25; mine-run, $1.25@1.40.

Carterville lump, $1.60@1.75; 6x3-in. egg, $1.60@1.75; No. 1 washed egg, $1.60@1.75; No. 2 washed egg, $1.50@1.60.

Green County 5-in. lump, $1.50@1.65; 3-in. lump, $1.30@1.40; 3-in. egg, $1.30; mine-run, $1.10.

INDIANAPOLIS

Mild weather has resulted in a limited demand for domestic lump. Some improvements in slack. Mines on better running time. Slow growth in industrial demand.

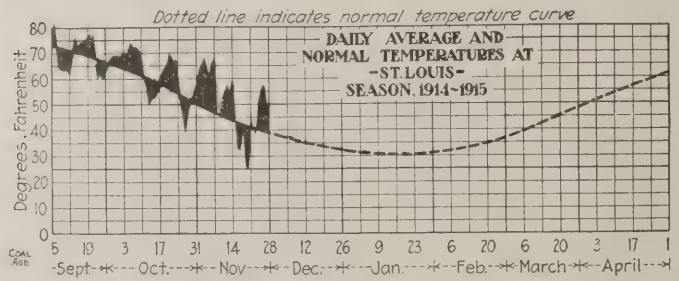
The mines seem to be making better time. The cold snap of last week cleaned up the surplus slack and left the mines in position to increase operations. The price in the open market is 50 to 60c., which, at some mines is an advance of 10c. The railroad demand is still below normal for the season. A slightly improved industrial situation has something to do with the better movement of screenings; a slow improvement is expected in this direction.

A campaign has been started to eliminate the various grades of slack and return to one size of screenings. The agitation has been brought about largely by the experience of operators this year in having to find a market for the smaller sizes at the lowest prices in the history of the Indiana coal industry.

ST. LOUIS

Prices stiffening and a better tone is evident. December outlook fair. Collections the worst in years.

A slight change for the better, as regards high-grade coal, is noted in the local market. With practically no demand at all for domestic coal, there has been a stiffening up of prices on the lump size, while egg seems to hold its own. Raw and washed nut are unchanged and there is nothing to indicate an advance, except on the smaller sizes of washed coal for steam purposes; these are likely to increase with screenings which figure quite prominently in the market now.



On a contract for screenings from the Carterville field, from now until Apr. 1, several operators bid 80c. The stiffening up of the market is due to several mines in the Williamson and Franklin County field having decided to curtail their output. In the Standard field coal continues to sell below the cost of production.

Anthracite coal is heavy, with no demand, and smokeless the same. The retailers all report business slow but steady. Collections both retail and wholesale are the worst in years.

The prevailing wholesale prices are:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.25	$1.05@1.10	$1.20
3-in. lump	.....	....	1.40	....	.....
6-in. lump	$1.35@1.60	....	1.50	1.25@1.35	1.40
Lump and egg	1.85@2.15	$2.25	.....	....	1.35
No. 1 nut	1.25@1.40	....	.....	0.75	.....
Screenings	0.50@0.55	....	0.80@0.85	0.25@0.30	0.20
Mine-run	1.05@1.10	....	.....	0.75@0.80	.....
No. 1 washed nut	1.50@1.60	2.00	1.60	....	.....
No. 2 washed nut	1.30@1.40	....	1.45	....	.....
No. 3 washed nut	1.10@1.15	....	.....	....	.....
No. 4 washed nut	1.00@1.10	....	.....	....	.....
No. 5 washed nut	0.25@0.30	....	.....	....	.....

PORTLAND

Buying in a hand-to-mouth fashion. Volume of business so far only about 40% normal.

While there was a small spurt for a few days during the cool weather, orders are falling off again. Consumers are apparently buying from hand to mouth, and will continue to do so for the winter. This will probably mean that the first real cold spell will find the dealers snowed under with urgent orders that they will find difficulty in filling promptly. Importations of coal are light at present as a result, and dealers have large stocks on hand.

PRODUCTION AND TRANSPORTATION STATISTICS

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during August, September and October of this year and last year:

	August		September		October	
	1914	1913	1914	1913	1914	1913
Coal	2,769,453	3,295,123	2,878,963	3,001,733	2,662,377	3,250,220
Coke	242,283	391,999	237,661	387,704	208,866	388,337
Total	3,011,736	3,687,122	3,116,624	3,389,437	2,871,243	3,638,557

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during October and the past four months of the current year in short tons:

	July	August	Sept.	October
Pocahontas Field	1,314,478	1,277,621	1,390,531	1,021,699
Tug River District	263,240	293,179	295,332	270,651
Thacker District	288,643	286,572	295,776	264,528
Kenova District	100,600	105,724	110,158	112,455
Clinch Valley District	140,751	134,408	158,393	84,530
Other N. & W., Territory	2,735	4,211	4,781	4,860
Total N. & W. Fields	2,110,447	2,101,715	2,254,971	1,758,723
Williamson & Pond Creek R.R.	90,819	91,813	85,053	70,338
All other railroads	301,796	257,280	169,892	168,778
Grand total	2,503,062	2,450,808	2,509,916	1,997,839

FOREIGN MARKETS

GREAT BRITAIN

Exports—British exports for October and the first ten months of the past three years were as follows:

	October			Ten Months		
To	1912	1913	1914	1912	1913	1914
Russia	520,800	756,112	19,107	3,628,685	5,218,772	3,086,032
Sweden	500,925	503,863	525,357	3,339,161	3,779,014	3,580,692
Norway	209,015	200,079	197,813	1,755,010	1,888,628	2,104,903
Denmark	274,656	281,369	313,873	2,235,248	2,494,585	2,581,185
Germany	876,134	835,839	.....	6,915,448	7,619,413	5,256,765
Netherlands	226,419	167,299	108,851	1,575,330	1,712,193	1,565,953
Belgium	188,661	181,591	82,148	1,249,483	1,728,225	1,166,549
France	985,570	1,077,519	1,006,066	8,173,434	10,644,929	10,046,810
Portugal[1]	138,330	94,748	65,434	1,000,329	1,124,872	988,620
Spain and Canaries	374,674	328,971	200,768	2,767,978	3,074,153	2,659,286
Italy	1,027,991	910,513	705,346	7,481,586	8,060,538	7,262,616
Austria-Hungary	62,264	103,433	.....	613,316	899,840	564,362
Greece	42,311	84,033	20,632	498,227	591,284	510,380
Roumania	21,192	47,864	.....	185,500	197,381	218,218
Turkey	32,351	61,728	12,069	342,377	246,682	429,506
Egypt[2]	232,621	229,100	167,770	2,382,127	2,488,330	2,361,658
Algeria	120,766	108,422	31,896	829,169	1,060,663	812,523
Portuguese W. Africa	32,358	10,908	4,166	254,355	200,990	157,452
Chile	13,373	35,310	10,382	492,090	492,951	370,773
Brazil	167,173	147,943	71,596	1,290,323	1,593,692	1,038,214
Uruguay	96,312	33,612	46,143	719,298	601,754	526,665
Argentine Republic	424,219	297,148	173,068	2,694,002	3,022,451	2,535,790
Channel Is	19,141	14,726	12,317	147,509	136,559	139,540
Gibraltar	24,635	25,311	15,116	275,668	280,102	254,322
Malta	59,791	42,068	13,193	328,295	548,429	324,234
Aden and dependencies	15,714	20,881	16,967	164,992	148,559	135,817
British India	17,288	14,216	12,523	112,889	140,048	139,784
Ceylon	10,881	23,764	16,834	194,042	198,122	239,871
Other countries	84,213	101,103	95,122	904,320	1,064,102	1,002,326
Coke	122,298	150,955	150,879	803,011	989,010	975,204
Briquettes	136,376	169,500	56,005	1,252,007	1,711,865	1,487,943
Total	7,058,442	7,059,928	4,151,381	54,605,209	63,958,136	54,523,993
Bunker	1,818,431	1,888,794	1,455,447	15,020,522	17,434,411	16,037,409

[1] Includes Azores and Madeira [2] Including Anglo-Egyptian Sudan.

Nov. 23—Business is still suffering owing to scarcity of tonnage. Stocks of large coals are excessive and buyers in a position to take immediate delivery can obtain concessions in quoted prices. Quotations are approximately as follows:

Best Welsh steam	$4 80@5.28	Best Monmouthshires	$3.96@4.08
Best seconds	4.32@4.56	Seconds	3.84@3.96
Seconds	4 14@4.26	Best Cardiff smalls	2.04@2.16
Best dry coals	4.56@4 80	Cargo smalls	1.20@1.68

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash payment.

Freights—The position remains the same. Chartering orders numerous but tonnage scarce. Rates are approximately as follows:

Gibraltar	$2.64	Venice, Ancona	$4.80	Singapore	$4.32
Malta	2.88	Alexandria	4.08	Las Palmas	2.64
Marseille	3.66	Port Said	4.08	St. Vincent	2.76
Algiers	4.14	Aden	4.08	Rio Janeiro	3.84
Genoa, Savona	3.48	Colombo	4.20	Monte Video	3.36
Naples	3.48	Sabang	4.08	Buenos Ayres	3.60

Note—These indications are for Bristol Channel loading. Rates from the East Coast of England are considerably higher.

SPANISH IMPORTS

The Spanish imports of coal for the nine months to Oct. 1, of the current year, were 2,018,943 tons, as compared with 2,029,846 tons for the same period in 1913. Coke imports for the same periods were, respectively, 294,460 tons, in 1914, and 273,160 tons in 1913.

GERMANY

Considerable demand in the North to replace British coal. Heavy movement from Upper Silesia to Austria-Hungary. Belgium mines resuming operation.

Northwestern Bohemia—Although the output has been good, it is still far from normal, the car supply being about 50%. In household sizes there has been a marked falling off in the supply.

Saxony—Deliveries have shown a distinct improvement. The demand for soft coal is particularly urgent from the North, especially Hamburg, in consequence of the loss of the usual English supplies. Moreover, some industries, busy with military products, are buying heavily.

Upper Silesia—Coal shipments from this district to Austria-Hungary average 700 cars daily, of which 200 are for Vienna. The operators have promised to increase this to 1000 cars daily, if the requisite cars are furnished the Upper Rhine. The demand for steam sizes keeps brisk.

Belgium—The mines have been opened at Charleroi; about 60% of the regular force is employed.

Essen—The Syndicate has been ordered to increase the coal output to 60%, coke 27½%. The Syndicate agreement will expire Dec. 31, 1915, but negotiations have been pending for some time for the renewal of the agreement until 1921. The war stopped the negotiations and a temporary agreement is now under consideration to restrict all independent sales until 1915. As there is no disposition to dissolve the syndicate and as all wish to avoid industrial conflicts, a general acquiescence is looked for.

Coal Contracts Pending

Contract No. 14—Panama, C. Z.—In the list of bids quoted on this contract in last week's issue, the price of the West Virginia Coal Co. for 150,000 tons should have been $2.83 instead of $2.38, as noted. Delivery at Newport News and Seawalls points.

Contract No. 17—New York—Bids received on this contract (see "Coal Age" issue of Nov. 21), for furnishing the Department of Public Charities with coal, were as follows:

MANHATTAN (anthracite)—1800 tons egg, Pattison & Bowns, $5.37; 900 tons stove, Gavin Rowe, $5.70; 7000 tons buckwheat No. 1, Pattison & Bowns, $2.79; 800 tons pea (L. H.), Meyer-Denker-Sinram Co., $4.85; 30 tons egg coal (B. T. C.), Meyer-Denker-Sinram Co., $7.40.

MANHATTAN (bituminous)—10,000 tons, Geo. D. Harris & Co., $2.87; 400 tons gas coal, John W. Peale, $3.45.

BROOKLYN (anthracite)—7000 tons pea, Bacon Coal Co., $4.62; 700 tons stove, Bacon Coal Co., $6.81.

RICHMOND (anthracite)—400 tons egg, Gavin Rowe, $6.17; 250 tons stove, John E. Donovan, $6.43; 6000 tons buckwheat No. 1, Joseph Johnson's Sons, $3.38.

Address, Contract Clerk, Department of Public Charities, Room 1034, Municipal Building, Borough of Manhattan.

Contract No. 20—New York—Bids will be received by the Board of Trustees, Bellevue Hospital, until 3 p.m., Dec. 4, for furnishing and delivering 300 gross tons buckwheat coal No. 1. The security required will be 30% of the total amount of the bid and a deposit of 1½% shall accompany each bid. The time for completion of this contract shall not be later than Dec. 31. Blank forms and further information can be obtained on application to the auditor, 400 East 29th St., Borough of Manhattan.

Contract No. 21—Cleveland, Ohio—Sealed proposals for furnishing and delivering 2000 tons of Pittsburgh nut coal, 100 tons of the best grade soft lump coal and 50 tons of the best grade Lackawanna egg coal will be received by the County Commissioner until 10 a.m., Dec. 12, each bid to be accompanied by samples of not less than 25 lb. A certified check for $500 must accompany each bid. Address E. G. Krause, Clerk of the Board of County Commissioners, Cuyahoga County, Cleveland, Ohio.

Contract No. 22—Philadelphia—Sealed proposals for furnishing anthracite coal of various sizes to the different departments of the city will be received until Dec. 16. Deliveries are to be made as per specifications. Address, Director of Supplies, Room 312, City Hall, Philadelphia, Penn.

Contract No. 23—Boston, Mass.—Proposals will be received until noon, Dec. 4, for furnishing the Boston & Maine R.R. with 25,000 gross tons of low volatile coal for power house use. Mine-run coal is required, and it should be low in sulphur and have a heat value of approximately 14,000 to 15,000 B.t.u. Shipments will be in cargo lots, evenly distributed throughout the year, beginning Jan. 1, 1915, alongside Mystic Wharf, Boston, Mass. Address, Benjamin S. Hinckley, Purchasing Agent, North Station, Boston, Mass.

Contract No. 24—U. S. Navy—Only a comparatively few bids were received in reply to the recent request for tenders for coaling naval vessels at 82 different ports, the following being the complete list, all quotations f.o.b.:

BAKER, WHITELEY COAL CO. (Baltimore)—Bergen, $8.41; Gravesend, $6.67; Mauretius, $12.62.

CHESAPEAKE & OHIO COAL AGENCY CO. (Boston)—Gravesend, $6.61.

BERWIND WHITE COAL MINING CO. (New York)—Curacao, $5.40 (trimmed); Havana, $5.80; Manzanillo, $12.50 (trimmed); Naples, $6.48.

CASTNER, CURRAN & BULLITT (Philadelphia)—Curacao, $5.28 (trimmed alongside wharf).

W. R. GRACE & CO. (New York)—Callao, $13.70; Valparaiso, $17.49.

PAPARAO COAL MINING CO. (Wellington, N. Z.)— Auckland, N. Z., $6; Wellington, N. Z., $5.40.

PORTO RICO COAL CO. (New York)—San Juan, $6.20.

VICTORIA COAL MINING CO. (New York)—Bergen, $8.34; Mauretius, $12.48.

WITTENBERG COAL CO. (New York)—Bergen, $8.34; Mauretius, $12.48.

WILLARD BROS. (New York)—Amsterdam or Rotterdam, $4.56; Bermuda, $9.24.

Address, Paymaster General, U. S. N., Navy Department, Washington, D. C.

CONTRACTS LET

Contract No. 13—New York—This contract, previous notices of which, including most of the bids of various companies, appeared in this column, has been awarded as follows: Smith, Lineaweaver & Co., 14,000 tons No. 1 buckwheat at $3.19; John W. Peale & Co., 3700 tons No. 1 buckwheat at $3.67, and 15,000 semi-bituminous run-of-mine at $3.35; Joseph Johnson's Sons, 4000 tons No. 1 buckwheat at $3.30; Pattison & Bowns, 3800 tons No. 3 buckwheat at $1.97. Address William Williams, Commissioner, Department of Water Supply, Gas and Electricity, Room 2351, Municipal Building, Borough of Manhattan, City of New York.

Contract No. 16—New York Harbor—The bid of Hite & Rafetto has now been definitely accepted on this contract, which provides for furnishing and trimming approximately 17,000 tons of bituminous coal to be used by the United States dredges in New York Harbor. This bid was $3.43 per ton for Bird Quemahoning coal with a guaranteed heat value of 14,400 B.t.u. Maj. G. J. Dent, Corps of Engineers, Army Building, New York.

Contract No. 18—Brooklyn—The bids on this contract, which provides for furnishing 560,000 lb. of anthracite pea coal to the 26th Ward Disposal Works, at the foot of Hendrix St., Brooklyn, were as follows on a basis of 1000 lb., delivered: Bacon Coal Co., $2.24; Miners' Coal Co., $2.50; Wood's Sons & Co., $2.73. For previous notice on this contract see "Coal Age," issue of Nov. 21. Address, Bureau of Public Buildings and Offices, Borough of Brooklyn, Room 1003, No. 50 Court St.

Financial Department

Pond Creek Coal Co.

(*Continued from p. 656*)

New Stock—To preserve our working capital, 6333 shares of common stock were issued and offered to common stockholders at $50 per share.

Net Current Assets—These increased $54,759, to $1,445,897.

Additions to Property Account—Such additions in 1913 include the completion of the dock at Duluth, the addition of boilers and automobile stokers to the power plant at Holden; two fan houses, a sub-station, two 15-ton and six 6-ton electric locomotives, 200 steel mine cars, etc.

Legislation—In W. Va. a workmen's compensation Act took effect Oct. 1, 1913, and a state workman's compensation fund was established, to which it seemed proper that the company should become a contributor.

Outlook—Conditions for a favorable year's business appear encouraging.

CONSOLIDATED EARNINGS STATEMENT YEARS ENDING DEC. 31

	193	1912		1913	1912
Net earnings	$800,448	$811,048	*Add*—Int. on bank deposits, etc.	$5,663	$18,694
Res. for extinguishment and depreciation	106,047	95,357	Total net profits	$629,672	$677,132
			Pref'd dividends	$298,754	$298,659
Net profits	$694,401	$715,691	Common dividend	530,943	401,280
Admin. & gen. exp.	70,392	57,253			
	$624,009	$658,438	Balance, deficit	$200,025	$22,807

CONSOLIDATED BALANCE SHEET DEC. 31 (INCL. SUBSID'S)

Assets—	1913 $	1912 $	Liabilities—	1913 $	1912 $
Property account	5,094,241	5,001,858	Stock (not par—see below)	*4,493,974	4,487,016
Bond redemp. fund	3,150	3,150	Cap.stk.of U.S.C. & Oil Co. not held	15,325	15,950
Cash	731,787	802,156	Def.pay'ts on prop.	100,125	121,640
Accounts receiv'nle	426,504	446,218	Current liabilities	†150,274	185,730
Coal in transit and storage	299,421	164,793	Div. paid in Jan.	74,691	74,680
Materials & sup'ls.	299,421	164,793	Prem. on shares of common stock	692,651	292,334
Unexp. insur., prepaid taxes, etc.	32,771	22,383	Deprec., &c., funds	510,385	455,062
			Undiv. surp. of sub cos. applicable to stocks not owned.	1,653	3,557
			Surplus	848,796	1,048,829
Total	6,797,874	6,675,789	Total	6,797,874	6,675,789

*Includes 49.796$^{7}/_{13}$ shares preferred and 99.592$^{14}/_{18}$ shares common issued for cash, par value $12,299; total, $4,493,974.

†Current liabilities include bonds called for payment, unredeemed, $3150; accounts payable, $83,429; accrued payrolls, $24,700; drafts in transit, $12,419; accrued taxes, $26,575.

Note—For last previous annual report of this company see, "Coal Age," Vol. 3, p. 980.

Elk Horn Fuel Co.

An official statement of this company to the first of the current year says:

Organization—Property—Incorporated in West Virginia, Feb. 3, 1913, and its assets consist principally of coal lands; in addition to these, it owns $4,371,500 par value of stock of the Consolidation Coal Co. The Elkhorn Fuel Co. is not and does not contemplate being a coal-operating company. Its coal land holdings are all located in the eastern part of Kentucky, except some 15,000 acres in Randolph and Upshur Counties of West Virginia.

These lands can be more or less arbitrarily designated as follows (in acres): Mineral fuel, 4500; Beaver Creek, 124,883; Licking River, 47,481; Johns Creek, 21,658; Knott County, 6613; Kentucky River, 45,800; Rich Mountain (W. Va.), 14,600; total, 265,535; Beaver lands under option, 50,000; total owned and under option, 315,535.

The mineral fuel lands are located within what is considered as the best development of the Elkhorn seam of coal and which is now operated by the Elk Horn Mining Corporation. The Beaver Creek lands include the larger part of what is known as the Elk Horn coking coal region. It has been fully prospected and in part developed and operated by the Elk Horn Mining Corporation. These lands contain several seams of coal, principal among which is the Elk Horn seam, which has shown such superior qualities and uniformity in the Consolidation Coal Co. property which adjoins these lands to the south.

The Licking River lands are located principally in Magoffin County, Ky., on the headquarters of Licking River, and we believe to a large extent contain noncoking coal applicable as steam and domestic coals. The Johns Creek lands are located in Pike County, Ky., principally on the waters of Johns Creek; these coals are noncoking in character, but of excellent quality, and should be readily sold as domestic and steam coal in the West.

The Knott County lands practically adjoin the Beaver Creek lands on the south and contain the Elk Horn seam of coal of equal quality to that of the Beaver Creek lands. The Kentucky River lands are scattered over a wide area on the waters of Kentucky River. They are well within the coal-bearing area, but have not been sufficiently prospected for an estimate of quantity or quality of coal; none of them carries the Elk Horn seam of coal in known workable thickness, but several seams higher in the series show promise of good coal areas.

The Rich Mountain lands in West Virginia contain two coal seams of the so called New River series that have been fairly prospected and operated to some extent. The seams are thin, but contain an excellent quality of coal, particularly adapted for smithing purposes.

The Beaver Creek lands, under option, are a western extension of the Beaver Creek lands owned, and limits the Elk Horn coking coal region on the north and west. These lands contain workable coal seams, but it is probable that those of the northern part of the field are not of a coking type. Our option on the 50,000 acres does not expire until Apr. 30, 1918, and if advantage is taken of the option it will be purchased free of all taxes and other expenses that might be incurred in the meantime.

Leases—The Elk Horn Fuel Co. has leased to the Elk Horn Mining Corporation 24,500 acres of land, 20,000 acres of which are in the Beaver Creek lands and 4500 acres on Boone Fork of Kentucky River. The latter company is rapidly equipping itself to a capacity of 3,000,000 tons of coal per year, 2,000,000 tons of which are tributary to the Chesapeake & Ohio Ry. and 1,000,000 tons to the Louisville & Nashville R.R. This lease, with others which the Elk Horn Fuel Co. has, will cause in a few years over 3,000,000 tons of coal to be mined yearly from its property, giving the company a revenue of over $300,000 annually. Many applications for leases have been received, but conditions and railroad facilities have not warranted the closing of additional leases.

Lumber—The Elk Horn Fuel Co. has, together with its fee lands and mineral rights, a large area of timber lands, and now has operating seven saw mills having a total daily capacity of 150,000 ft.

Gas and Oil—The probabilities are strong that both oil and gas will be found in these lands; about 80% of the oil and gas rights are owned by the company.

CONDENSED GENERAL BALANCE SHEET DEC. 31, 1913 (TOTAL EACH SIDE, $31,278,560).

Assets:		Liabilities:	
Real est. & coal lands	$23,482,104	Capital stock, common	$19,000,000
*Stocks of other co's	7,298,390	Capital stock, preferred	7,000,000
Advances to subsid. co's	35,312	1st M. notes	3,970,000
Deferred debit items	20,083	Unpaid vouchers	80,896
Cash	81,814	Pay-rolls	12,294
Demand loans	335,081	Accrued interest on notes	33,083
Supplies, etc	18,590	Accounts payable	2,506
Miscellaneous	7,186	Surplus	1,179,780

* Include 43,715 shares Consolidation Coal Co., 12,000 shares Mineral Fuel Co., 7,879 shares Beaver Creek Consol. Coal Co., 1,800 shares Tennis Coal Co., 500 shares York Coal & Coke Co.

An issue of $200,000 first mortgage, 6% bonds was made by the Hocking Coal Co., the bonds dated July 1, 1912, and due July 1, 1932. They are unconditionally guaranteed by the Minneapolis & St. Louis R.R. The entire capital stock of the coal company was purchased by the railroad company about five years ago; the consideration was $550,000, and $350,000 have since been expended in improvements and extensions. The property embraces 4500 acres of coal land, including two modern shafts and 317 dwelling houses, store building, etc., all located in Monroe County, Iowa.

COAL AGE

Vol. 6 NEW YORK, DECEMBER 12, 1914 No. 24

A New Idea in Welfare Work

HERE'S *a suggestion that might be adopted by many coal companies owning a large acreage of vacant land. Perhaps it will pay you to carefully consider the plan.*

Several years ago, the president and the general manager of a big coal-mining and manufacturing concern went quail hunting. The company owned immense tracts of land, from which most of the big timber had been cut. On this land there were large open stretches of ground where the quail abounded.

At the time this incident occurred the plants of the company were either shut down entirely or were operating on a considerably reduced schedule, and as a consequence there was a dearth of life's necessities in many of the company homes adjoining the various works.

The small towns and the big city in the center of the mining-industrial district referred to were what is known as "paper-bag communities," the people buying practically every necessity of life from small stores. When business was at high tide, this plan worked all right, but when the mines were running half time, or were idle, there was nothing for the employees to fall back upon and existence grew precarious for some.

The shooting was good, but in spite of the sport, the minds of both officials were full of the burden of doing the best they could to afford work for their men to tide them through the dull period. It was desirable to keep the force intact, for there were many skilled employees whose services were valuable and whose welfare was important to the concern. The hunt which took them over a large area of company land was ended and the two men returned to their work.

The next morning the president called for the general manager and said:

"I believe we can help our men to get ready for the next dull season. We have overlooked one of our biggest assets—our vacant land. I'm going to let our miners use the land to help them make a living."

Briefly, he instructed the general manager to take certain sections of land adjoining several of the plants and subdivide same in one to five-acre tracts, move houses from the company camps to this land, construct small barns, chicken houses, etc. The rental of homes on these small tracts was fixed at the same figure as that for homes in the company towns.

The result was that employees who desired to live where they could till an acre or two of ground, have a cow, raise chickens, hogs, etc., and yet be close to their work, were invited to move into these homes; the only provision being that unless they made use of the land they would lose their places with the company. A department was created to follow up this work and aid the employees in getting the most out of their gardens and small farms.

Good times returned as they always do, and this was the real test of the plan for it was questionable if men would learn the value of getting all they could out of the land while work and wages were good at the mines. A few failed as was expected, but there were always others ready to take their places.

Again the pendulum swung and five years later another period of depression came. Now was the time for the scheme to demonstrate its value. The president and the general manager did not go hunting, but instead they visited the dozens of homes which had been created on the small tracts adjoining the works. Notice what they found:

It was winter time, but skilled men who were out of work were living comfortably at home. There were small smokehouses full of meat, winter gardens, milk and butter in plenty, potatoes for the winter, chickens by the score, in fact enough of the necessities of life to keep families in plenty until work should be resumed.

The general manager turned to the president and said: "It works all right—how much money can I have to extend it?" The president smiled and answered: "All you need—This is real **Welfare Work.**"

Using a Mining Machine in the Roslyn District

By James E. Ash*

SYNOPSIS—The coal measure pitched so heavily that the machine was unable to climb the steeper grades. Difficulty was also experienced in unloading. Both of these obstacles were overcome, however, by the use of the two simple devices here described.

The property of the Roslyn Cascade Coal Co., William Mackay, general manager, is located near Ronald, Kittitas County, Wash. It is 99 miles by way of the Northern Pacific R.R., from Seattle, and comprises about 570 acres. The present output is 450 tons per shift of eight hours, but this may be increased to 1000 tons should occasion demand. No washing is required, and the coal is loaded direct into railroad cars, the average value at the mine being $2.50 per short ton. The principal markets lie in eastern Washington and the Puget Sound cities.

Although several workable coal measures exist in this property, only one, the Roslyn bed, is being worked at the present time. This ranges from 4 ft. 2 in. to 4 ft. 6 in. in thickness, and dips at an angle of from 8 to 19 deg.

In this measure two mines have been developed, known as No. 1 and No. 2. A mining machine is employed in No. 1, while the system of mining previous to the adoption of the machine is carried on at mine No. 2. Both developments are worked by the room-and-pillar system. At No. 2 mine single rooms are driven from the entry on the pitch, while at No. 1 where there is less cover, the double room system is employed. Cap and refuse rock is gobbed in the room. The double rooms are 41 ft. wide with 8-ft. necks for a distance of 25 ft. Crosscuts are driven on 60-ft. centers and staggered, while the gob is carried roof high in each double room. Rooms are driven on an average of 66-ft. centers, a 25-ft. pillar being left between the double rooms.

The machine employed by this company is a Sullivan, short-wall CE-7 type, and is the only one in use in the State of Washington. Another is, however, to be installed in the near future. It was at first anticipated that the machine could be employed on the pitch, but on trial it was found that it was only capable of traveling on a grade of from 8 to 10 per cent., and was consequently useless on the steep inclinations encountered.

An attempt was made to assist the machine up the room by hitching a car weighing 3000 lb. onto the opposite side as a drag. The machine, however, under its own power and with the help of the drag, could not satisfactorily overcome the 14 per cent. grades encountered. Furthermore, it could only be unloaded with difficulty from its truck, since due to the pitch, the cutter bar with its teeth would catch in the bottom when the machine was being unloaded, causing considerable annoyance and loss of time. It was at once perceived, therefore, that unless some improvement could be made, the machine could not be used. The makers were, of course, notified, but after careful investigation, were unable at the time to suggest a means of overcoming the difficulty.

As the result, however, of the persistent efforts of Mr. Mackay, improvements have been embodied which satisfactorily adapt the machine to this pitch. It now travels to the faces of the rooms as easily as it before traveled on the entry, and no difficulty is encountered when working on even a 24 per cent. grade without assistance of any kind.

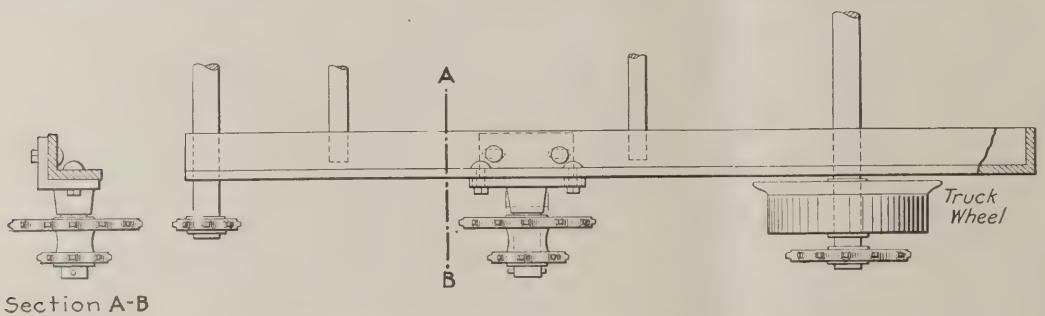


Fig. 1. Showing the Intermediate Gearing

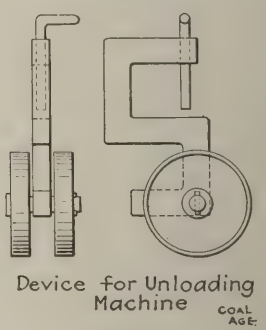


Fig. 2.

Fig. 1 shows the intermediate gearing which was employed to overcome the difficulty of moving on pitches. As may be seen in the drawing, the cast-steel intermediate bracket is, for purposes of adjustment, provided with slotted bolt holes. These slots, which are made for 5/8-in. bolts, are approximately 2 in. long, which is sufficient to give ample adjustment for the chains. The entire arrangement is so simple, and the object sought and attained so obvious, that it scarcely needs any description whatsoever.

To facilitate unloading from the truck, the device shown in Fig. 2 was built. This consists of a piece of 2-in. wrought iron bent into the form of the letter S, which fits onto the end of the cutter bar and is held in place by a pin, which passes down through the frame. A 1-in. hole was drilled in this iron at the lower bend, into which was forged an axle which carries two wheels, one upon either side. These are 2 in. wide and 8 in. in diameter, each being held in place by a 3/8-in. linch pin. This set of rollers is easily put on or taken off the

*Roslyn Cascade Coal Co., Roslyn, Wash.

machine, and greatly lessens the time that was originally spent in unloading.

Since the installation of the machine, the following prices have been paid for contract work. Machine runner, 5¾c. per long ton for room cutting, and 6¾c. for entries; helper, 4¾c. for room cutting, and 5¾c. for entries. Loaders are paid 55c. per long ton for room work, 60c. for room necks and entries, and $1.10 per yard for brushing.

The machine puts in a 6-ft. undercut across the face of a room in from 30 to 40 min., and by its use the percentage of lump coal has been greatly increased. This always finds a ready market at from $3 to $4 per short ton, f.o.b. the mine. Where formerly about 40 per cent. of the output was lump coal, it is now aproximately 70 per cent.

As stated above, only one machine is in use at the present time as its employment was largely an experiment in this field. This has met with such success, however, that more will be installed shortly, as a better grade of coal is now being obtained for the same cost of mining.

The Electric-Air Coal Mine

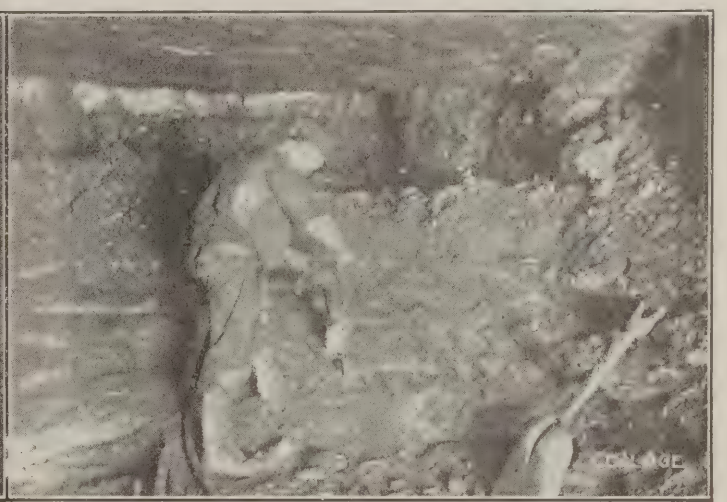
By Charles C. Phelps*

SYNOPSIS—In those mines where electricity is already installed and it becomes desirable to operate punchers or other air-driven machines at the face, portable electrically operated compressors present many advantages over a large central compressing station.

Reviewing the history of coal mining from the time when mechanical methods of mining began to supersede hand work, we find that for a long time, machinery operated by compressed air practically monopolized the field. In recent years, however, with electrical energy at hand in many mines for such purposes as lighting, ventilation, pumping, haulage and hoisting, it is only natural that the attempt should have been made to design coal-cutting machinery to be driven by the same power.



A Radialaxe Cutter Working in a Clay Band



Gangway Driving with a Jackhamer Drill

Comparing electrically and pneumatically operated coal-cutting machinery, considerations of safety are on the side of the pneumatic machines. Electrical feeder wires leading to a cutting machine are an ever-present source of danger to the workmen, especially in view of the darkness and cramped positions in which the miners often have to work.

The danger of igniting mine gases is probably greatest near the freshly opened faces for two reasons: First, because of the insufficient ventilation often found in such locations, and, second, due to the fact that the opening cuts frequently liberate pockets of gas. Pneumatic machines tend to eliminate the hazard from gas at the face by the added ventilation furnished by the exhaust air.

It is a well known fact that no type of machinery excels air-operated coal-mining machines in ruggedness of design and general reliability. The nature of the pneumatic action insures a cushioned blow which protects the machine to a large extent against injury. The pneumatic mechanism is simpler than the electrical and consequently is better suited for rough and ready use in coal mines where operating conditions are never too favorable.

In order to utilize and secure the advantages of air power in mines already electrically equipped, additional air lines and compressors have to be provided. At present those mines which are using electrical mining machinery have found it profitable or expedient to do without the inherent advantages of pneumatic methods in order to secure those other advantages which can be obtained from the electrical power.

This procedure is a compromise rather than a solution.

A Practical Solution for the Electric Mine

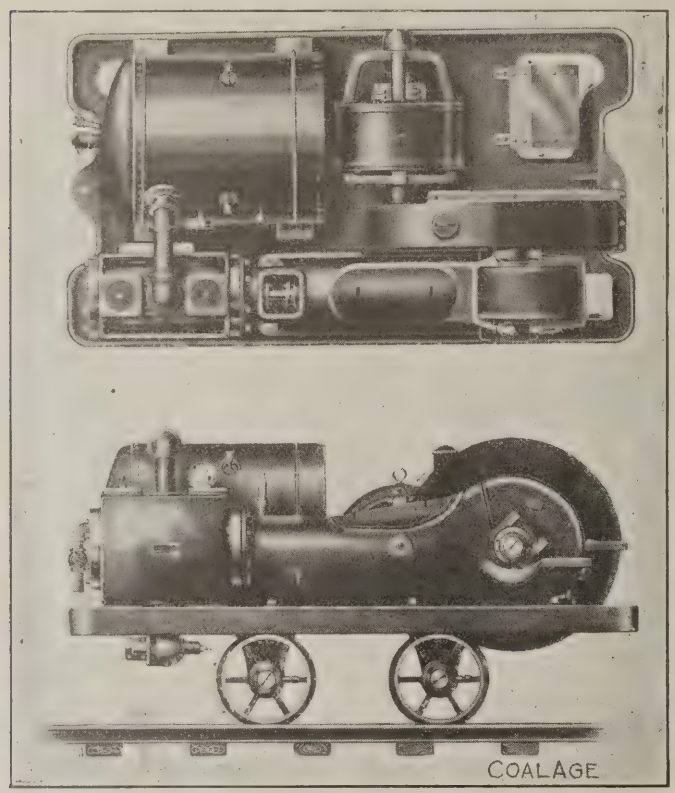
The logical course to pursue in the electrically equipped coal mine is to find a means of deriving the benefits of compressed-air machinery while at the same time utilizing all of the advantages of the electrical system of distribution. This end is best attained by installing electrically

*Ingersoll-Rand Co., 11 Broadway, New York City.

operated air compressors in convenient places in various parts of the mine. What is a convenient location today will become an inconvenient one in a week or a month, as the mining progresses from room to room. Consequently in an ideal system of power conversion for a coal mine, these local air plants should be portable units.

As a result of these conditions, which are peculiar to the electrified coal mine, operators have been calling for a practical electrically operated portable compressor plant. This demand has been met, and in Fig. 1 is illustrated an efficient compressor of this type, introduced by the Ingersoll-Rand Co.

The truck is built for any gage of track and can be run into any entry that will accommodate a mine car. The



Top and Side Views of Ingersoll-Rand Portable Electrically Driven Air Compressor

compressor may be placed in any convenient location in one of the main entries and connected to the cutting machines in one or more rooms by means of suitable hose.

These portable outfits are designed in every way to meet mine conditions. They are built for either direct or alternating current, and for any of the voltages commonly employed in coal mines. The compressor is suitable for pressures of from 50 to 100 lb., as desired.

The herringbone-gear drive is completely inclosed and runs in a bath of oil. The compressor proper is also of inclosed construction, and has a hopper type of water jacket, which is open to the atmosphere at the top. This type of jacket requires refilling but once a day, which is an advantage in a coal mine, where clean water is usually scarce and where the best attention is not to be expected. The latter idea was kept in mind in adopting the various features of design.

The lubrication is automatic. An inlet unloader maintains a constant air pressure in the receiver, which is mounted on the truck beside the compressor. The valves are of the new Ingersoll-Rogler type, which is a complete departure from previous compressor practice. These valves combine lightness, toughness, small spring tension and large free area, from which follow a high efficiency, great durability and remarkable quietness of operation.

An additional element of economy with the portable type of compressor is found in the fact that the air is used in its heated condition, obtaining all the advantages of a reheater without actually employing this device. Of course, the full benefit of this heat is obtained only when using short air-feed lines, as the chilling of the air in passing through a long pipe is rapid.

The Economy of the Equipment

One of the first questions that the mine operator will ask is: "Are these portable outfits economical?"

Taking the case of a coal mine already equipped with electricity and desiring to operate a given number of



A Coal Puncher at Work in an Illinois Mine

pneumatic coal-mining machines, and comparing the two methods of air supply; i.e., from a motor-driven central air plant on the surface and from a number of small portable air compressors underground, the actual power consumption would undoubtedly be but little greater with the latter system, provided it were properly planned, assuming that both systems employed modern and efficient equipment.

The reasons for this are apparent. Although the motor and compressor efficiencies of the central plant would be higher than the combined efficiency of several small units, it must be borne in mind that the recent improvements embodied in the latter have given them a very fair efficiency. This difference in efficiency is largely compensated by the smaller leakage losses, lower pressure drops and reduced heat dissipation in transmitting the air over the shorter distances to the cutting machines.

It must be emphasized that the above discussion applies only to mines already equipped with electrical power. Of course, these portable equipments would not be advocated for use in a mine not electrified, for it would undoubtedly be much more economical to compress the air in a steam-driven compressor, using slack coal as fuel, and pipe it throughout the mine rather than to con-

struct an electrical plant exclusively for driving such portable units.

Other advantages of the portable type of air compressor for the electrified mine are the facility with which the machine may be moved about from place to place in minimum of time, permitting air to be supplied to any room where needed without delay. Moreover, these equipments may be purchased only as needed, there being no necessity for maintaining a capacity in excess of the actual needs of the operation.

Now comes the question of the work capacity of these portable outfits. The following table gives the essential details concerning the various sizes of portable mine compressors already in use, as well as an approximate idea of the number of pneumatic coal-mining machines of different types that they will operate. The power cost will, as a matter of fact, figure out more favorably in actual practice in view of the fact that the service will always be intermittent rather than continuous.

PRINCIPAL DIMENSIONS OF PORTABLE MINE CAR ELECTRICALLY DRIVEN COMPRESSORS

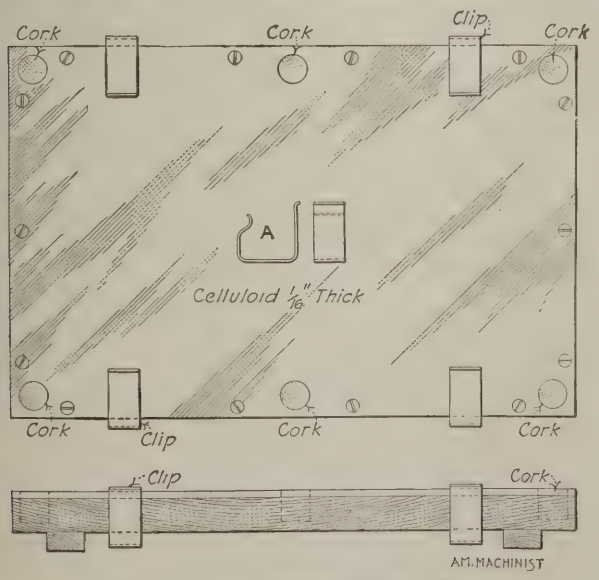
Size of Cylinder, In.			Piston Displacement, Cu.Ft.	Air Pressure, Lb. per	Brake	Dimensions		Height over Rails (Width 10-In.
Dia.	Stroke	R.p.M.	per Min.	Sq.In.	Horsepower	Length	Width	Wheels)
7	6	300	78	90–100	12–12.5	7′	4′ 0″	3′ 2″
8	6	300	102	50–60	12–13	7′	4′ 0″	3′ 2″
9	8	250	145	90–100	23–24	8′ 3″	4′ 8″	3′ 10″
10	8	250	179	50–60	22.5–24.5	8′ 3″	4′ 8″	3′ 10″
12	10	235	304	90–100	51–53	9′ 4″	5′ 8″	4′ 4″
14	10	235	415	50–60	52–56	9′ 4″	5′ 8″	4′ 4″

An approximate idea of the capacity of these plants may be gained from the fact that the larger sizes can operate 3 coal punchers or 1 "radialaxe" machine, 6 to 8 jackhamers or from 8 to 12 "crown" coal picks.

The medium sizes will take care of one coal puncher, 2 to 4 jackhamers and 3 to 6 "crown" coal picks. The smaller sizes will furnish air to 1 or 2 jackhamers or 2 or 3 "crown" coal picks.

Avoiding Tack and Compass Holes on Drawings

On small drawing boards the following kink has proved of value, says William C. Betz, in *American Machinist* for Nov. 5. A sheet of celluloid about $\frac{1}{16}$ in. thick is fastened to the board with small flat-head screws, the drawing paper being held by means of the steel spring clips shown at *A* in the illustration.



CELLULOID DRAWING-BOARD COVER

If thumb tacks are to be used, six holes ½ in. in diameter are drilled through the celluloid into the board, but not through the latter, and are then plugged with corks which are renewed when full of holes. The principal advantage of the celluloid surface lies in its resistance to piercing with the compass and bow pen points. This is of special advantage when thin drawing and tracing papers are used, as it does away with unsightly center holes. The cork inserts for thumb tacks localize the area of the tack holes, which will be appreciated by draftsmen. The spring-clip method speaks for itself.

A Cheap and Efficient Harness of New Design

The accompanying illustration shows a mine mule equipped with a harness invented and patented by Ralph Toward, of Russelton, Penn. Aside from the collar and hames, from 15 to 18 ft. of chain, depending, of course,



THE NEW MULE HARNESS

upon the size of mule for which the harness is made, two pieces of leather, approximately 8x12 in., about 3 ft. of rubber hose, together with the necessary snaps for fastening the various parts together, and a few copper rivets are all that is required to complete this harness.

It will be readily perceived from the foreging that compared with the ordinary harness, this one is decidedly cheaper as well as being more durable. The inventor figures that the actual first cost of the equipment will be about one-half that of the ordinary harness now employed.

Furthermore, it will be readily appreciated that, due to the extreme simplicity of the construction, this harness is not liable to gall or injure the mule, and with proper care should last almost indefinitely.

The inventor, who has had long experience in driving and handling mine mules, would be glad to submit prices for this harness either singly or in large quantities. He is also desirous of disposing of his patent.

Shotfiring in Coal Mines by Electric Circuit from the Surface

By George S. Rice* and H. H. Clark†

SYNOPSIS—The current in shotfiring from the surface should be thrown on only once, for fear that the gas liberated and the dust raised by the first shot may become ignited and explode. A gap of several feet should be left in the shotfiring line when not in use, so that there may be no risk of ignition by lightning. A potential of 250 volts is recommended for shotfiring. The installation of the circuit costs from one to three thousand dollars.

When miners in the interior coal fields of the United States began the practice of blasting the coal without undercutting, or what is known as "shooting off the solid," many explosions resulted, some of them of great extent and violence, and attended with much loss of life. One of the means adopted for preventing these fatalities was to employ shotfirers to discharge the shots when all the other employees had gone out of the mine at the end of the day's shift. This system still prevails in most of the Central and Southwestern mines.

System Originated in Utah

Following the disaster at the Winter Quarters mine, Utah, May 1, 1900, in which 200 lives were lost, a system of firing shots electrically from outside and when the men were out of the mine was adopted at the operation of the Utah Fuel Co.[1] This system has also been used in France in certain mines that are subject to instantaneous outbursts of carbon dioxide. These outbursts generally occurred at shotfiring time, the blasts releasing the gas held in crevices under high pressure.

The system was also adopted at a number of other mines in Utah, at the Cokedale mine, Colorado, at the Dawson mines, New Mexico, and in some mines of the Tennessee Coal, Iron & R.R. Co., in the Birmingham, Ala., district; and more recently in certain mines in Iowa and Kansas.

At first there was much trouble from misfires, and in a few instances from the premature firing of the shots, while men were in the mine, through the shotfiring lines becoming crossed with power lines. Fortunately, however, no loss of life resulted from such premature firing within our knowledge, and latterly this danger has been reduced to a minimum by certain measures of precaution. The proportion of misfires, or failures of individual shots to fire, has also been reduced to a small number through better installation and arrangements of the shotfiring circuits, so that the system has proven satisfactory, and has stood the test of a number of years' experience. The methods and regulations employed in one mine are described in part in *Bulletin No. 10* of the Bureau of Mines.

The need of the adoption of the system, under the conditions which prevail where coal is shot off the solid by black powder or dynamite, has recently been brought to the front by the large number of shotfirers who have been killed, particularly in the Southwestern mines.

Loss of Life Most Frequent in Indiana, Kansas and Oklahoma

In some districts where there are restrictions on the quantity of black powder that may be used, and where a careful inspection is made of the holes before the shots are charged, there has been reasonable freedom from accidents; that is, only occasionally has there been an explosion, with the loss of a shotfirer or two. This has been the situation in coal-mining states like Illinois and Iowa, but in Indiana, where larger charges of explosives are permitted by law, explosions resulting in the deaths of shotfirers have been more frequent.

In Kansas and Oklahoma, however, it is admitted on all sides that the methods of shot preparation have been extremely reckless, so that explosions have been frequent. This has been due to the use of long drill holes, 6, 8 and even 10 ft. or more in depth, drilled straight into the solid, and sometimes loaded with both dynamite and black powder, such shots being used at the face of entries to crack and pulverize the coal in order that it may be easy to make a shearing. So many shotfirers in this Southwestern district have been killed and with such regularity, that at some mines they have to be paid $10 per day for a shift of only 2 or 3 hr., and this price is none too high, as the risk is tremendous. One mine, for example, had three shotfirers killed in as many explosions in one year and another two in a single month.

Regulations on Lands of Civilized Tribes

Many of these explosions, particularly in the pitching beds of McAlester, Okla., which are often dusty and gaseous, are violent, resulting sometimes in wrecking the whole mine. As most of the mines in Oklahoma are on lands of the Civilized Tribes, who are the wards of the nation, the supervision of the leases is under the charge of the Indian Bureau, the U. S. Bureau of Mines acting in an advisory capacity; both bureaus are in the Department of the Interior.

In order to lessen the loss of life in the Indian lands from the use, or misuse, of explosives, and to lessen the number of mine fires and explosions caused by the use of black powder and dynamite, the Secretary of the Interior issued an order, effective Aug. 1, 1914, afterward suspended to Jan. 1, 1915, as follows:

> On and after Aug. 1, 1914, except as hereinbefore provided, only such explosives as shall have passed the tests of the (U. S.) Bureau of Mines, and have been designated as "permissible explosives," shall be used in any coal or asphalt mine on the segregated coal and asphalt lands belonging to the Choctaw and Chickasaw nations in Oklahoma.
>
> Permissible explosives shall be fired by detonators of a strength not less than No. 6 or otherwise as may be approved by the Bureau of Mines, and shall be used in quantities and under conditions approved by said bureau.
>
> Other kinds of explosives than "permissible explosives" may be used in mines in which the holes are loaded and the shots fired by special shotfirers using an electric system

*Chief mining engineer, Bureau of Mines, Pittsburgh, Penn.
†Chief electrical engineer, Bureau of Mines, Pittsburgh, Penn.

1"Electrical Shot Firing in Coal Mines," "Engineering and Mining Journal," Vol. 88, No. 5, p. 243 (Jan. 30, 1909).

Note—Paper read before the American Institute of Mining Engineers in the Electricity and Mining Topics Section on Oct. 10, 1914, Pittsburgh, Penn.

from without the mine. The right is reserved to revoke this exception of the use of "permissible explosives" if it shall be found that explosions of gas and dust are caused thereby, resulting in loss of life or of coal through mine explosions or mine fires.

During the months of June and July, 1914, and subsequently as may prove desirable, the Bureau of Mines will supply on application, free of charge, the services of an expert to aid in demonstrating the best methods of using permissible explosives.

Shotfiring from Surface to Be Introduced into Indian Mines

At a number of mines on Indian lands where the seam worked is flat, the operators are preparing to introduce undercutting machines and use permissible explosives, which are efficient where the coal is undercut, but which, with exceptions, cannot be used effectively in shooting off the solid, since they are quicker acting than black powder and their charge limit is 1½ lb. In hard or tough coal this is insufficient to throw out material unless it has been undercut.

In pitching beds, under systems of mining now employed, there are difficulties in introducing the types of mining machines which are most popular. While it is probable that machines of equal efficiency may be developed which will be more suited to the conditions, and also that changes in the system of mining may be made which will permit some of the present semilongwall or shortwall machines to be used, there are difficulties in agreeing upon labor scales to cover such new work, and therefore some of the operators on the Indian lands, to conform to the Department's order, have indicated their intention of introducing electric systems of shotfiring from outside the mine. It is on account of the prospective wider adoption of this system that it seems desirable to have the matter of specifications for the installation of the shotfiring system and the regulations governing it brought before the American Institute of Mining Engineers with a view to a discussion as to what such specifications and regulations should be, and with a view to making the system as efficient and safe as possible.

Electrical Shotfiring Systems

Electrical shotfiring from the outside of a developed coal mine differs in general from similar shotfiring from within a mine only in the number of shots fired at one time, and the greater distance to the shots from the point of firing. There are, however, several differences in the details of the equipment and its arrangement. Outside firing, as compared to inside, requires larger firing generators, larger conductors for distributing the current, better insulation on the conductors, and better insulators to support them.

Since the main circuit of the outside firing system is permanent, extends over a large area and is exposed to various untoward influences and possible mishandling by many people, various switches and safety devices must be used in connection with the system. It is also essential that there be provided effective means for insuring that no one is in the mine when the shots are fired from the outside.

Factors Contributing to the Success of the System

In order to insure safe and successful operation, an outside system must be installed with careful attention to the following points: 1. Freedom from accidental connection with its source of power. 2. Freedom from stray currents from other sources of electricity. 3. Freedom from connection to the earth. 4. Freedom from short-circuits between the two sides of the shotfiring line.

Freedom from accidental connection to its source of power requires that several switches located at different points should be connected in series with the line, and that these should be closed in predetermined order, and only by the man authorized to perform this duty.

Freedom from stray currents requires that only properly insulated conductors be used for the shotfiring circuits, and that such circuits be properly installed and protected from roof falls and where crossing or passing near other electric circuits.

Freedom from ground connections is desirable because such connections allow the firing current to be diminished by leakage, and at the same time provide a path by which stray currents may reach the firing circuits.

Freedom from short-circuits on the firing line or from even moderate leakage between the two sides of the firing circuit is essential to the proper distribution of current to the detonators or fuses.

Tentative Specification for an Outside Electrical Shotfiring System

A tentative general specification for the various parts of a shotfiring system follows. It should be changed whenever the wisdom of such modification is made manifest as a result of enlarged experience.

1. *Generator*—The generator should be a direct-current, 250-volt compound-wound machine having a momentary capacity of about 30 kw.; 250 volts is recommended because this voltage will distribute the necessary current throughout the mine without necessitating the use of prohibitively large conductors and it is better than 550 volts because it will produce less strain upon the insulation of the line. However, 550-volt current has been successfully used, and if there is a source of power of this voltage already installed in the mine power plant, it may be used with some saving in size of shotfiring conductors.

(2) *Distributing Circuit*—The size of the conductors used should be sufficient to pass at least 1.25 amp. through each room or heading circuit immediately upon closing the firing switch. This current will insure that three or four electric igniters or detonators (if perfect) will explode, even if they vary in resistance 25 per cent. above and below the average. With less current than 1.25 amp., the Bureau of Mines has found by experiment that detonators 25 per cent. high in resistance will explode and open the circuit before detonators 25 per cent. low in resistance can become ignited.

(3) The conductors should be insulated with rubber if installed in damp places, but if used where it is dry, may be insulated with triple-braid weatherproof insulation. However, as the humidity in coal mines is generally high, it is advisable to use rubber-covered wires.

(4) The conductors should be supported upon glass or porcelain insulators placed so near together that the wires do not touch anything. It is better not to install the circuits in the same entries with other electric wires, especially trolley lines, but preferably in a parallel entry, and when they have to cross other electric circuits, the shotfiring wires should be completely protected from contact with other circuits both under normal conditions and under those that might arise from roof falls and other

contingencies. When a trolley line must be crossed, the shotfiring lines should be protected by special timbering, or placed in a channel cut in the roof, if the roof is low.

Provision for Extension in Rooms

(5) The wires that are used for connection between the room switch and the detonators will have to extend for a certain distance beyond the last insulator in order to allow for extensions without making frequent splices. These unsupported ends should be coiled up and hung on the post that supports the last insulator. From that post the wires will, of course, have to extend without support toward the face, but care should be taken that they do not make contact with the floor if it is wet.

The ends of the wires should be scraped clean of insulation and the connection with the detonator leads made by cleaning the ends of the leads and twisting them tightly about the ends of the permanent room wires. The detonators in a room should be connected in series, but the room and entry circuits should be connected in parallel.

(6) *Switches*—There should be a double-pole single-throw switch at the entrance to each room or heading of entry. This switch should be mounted securely on a post with the hinges of the switch at the bottom. The room wires should be connected to the hinge or lower terminals of the switch and the power wires to the upper terminals.

(7) There should be at the mouth of each entry a double-pole, single-throw, 50-amp. switch, mounted in the same manner as the room switch.

(8) At the foot of the shaft, slope, or borehole where the shotfiring circuits enter the mine, there should be provided two plugs with flexible lines not less than 5 ft. long to protect further the main circuit of the shotfiring system until all men in the mine have gone out. Provisions should be made for locking the plugs out of circuit.

One Throw of the Switch All that Is Permitted

(9) There should be located in the shotfirer's cabin, in a locked box, a switch that shall be thrown only by the authorized shotfirer after all the men are out of the mine and after all other switches have been thrown in. This switch should be so designed that when it has been thrown once, it cannot be thrown again until the shotfirer operates a *locked* dog, tooth, cam latch, or other restraining device. The authorized shotfirer shall be the only person having a key to this lock.

(10) There should be located in the power house a switch in a locked box, used for connecting the shotfiring circuit to the generator or power line. This switch shall be thrown in only by the shotfirer before closing the shotfiring switch, but not until all the men are out of the mine.

Explanation of Specifications

Specifications (1) to (5) are self-explanatory, but it may be advisable to make some further explanation of the paragraphs relating to switches and cutouts.

(6) With reference to the requirement of a switch at the mouth of each room or heading of entry, electrically it is of course not necessary to have such a switch, but to promote safety it is of the utmost importance. The miner in connecting up the shotfiring wires with the detonator or electric-igniter leads at the end of his shift when he is about to go out of the mine, would, if there was any stray current through grounding on a power line in the entry, be exposed to the risk of premature firing.

It much lessens the danger if there is a switch at the mouth of his room attached to a post in plain sight of the inspector or mine official going along the entry; and so placed that the miner is somewhat protected when the switch is thrown. The miner throws this switch in when he goes out of the mouth of his room or heading, after connecting up the shotfiring wires. The room and heading circuits are in parallel so that if, by any inadvertence, the miner fails to throw in the switch, it does not cut out the other working places in the branch entry off which the rooms are turned.

As an additional precaution to prevent premature firing, switches are placed at the mouth of each branch entry, such branch switches being placed in a locked box, the key of which is in possession of the official in charge of the branch or district. This reduces the area affected by possible stray currents until these switches are thrown.

Protection against Lightning

(8) The purpose of putting in the circuit a gap 5 ft. long, as specified above, at the foot of the shaft, slope or borehole where the shotfiring circuits enter the mine, is primarily to prevent the possibility of a discharge by lightning, which may strike the outer circuit entering the mine, and would jump an ordinary switch opening. This actually happened in a certain mine, evidently after the men had left their working places, so that no accident resulted. This plan of using flexible lines 5 ft. long was then adopted at this mine.

(9) The specifications of the switch in the shotfirer's cabin and in the power house are self-evident. However, the reason for arranging the switch so that it may not be accidentally closed a second time needs explanation. There is always a possibility of an electric flash at the working face on reëstablishing the current in case there is grounding of the lines when the shots are fired. Dust and inflammable gas may have been liberated when the shots resulted from the first switch closing and the electric flashes resulting from the second closure of the switch may ignite the dust and gases with violent explosive effect.

Checking-In-and-Out System

An important part of an electric shotfiring system from outside the mine, is the method of keeping track of the employees on entering the workings, to insure that the shotfiring is not done until all of them have come out. At many mines, irrespective of the system of shotfiring, the checking-in-and-out system is used. Where such a plan is employed, the check board should be kept in the shotfirer's cabin or adjacent to it.

One excellent method is to have the check board arranged so that every employee and visitor entering the mine may have a number; when the employee is working at the face his number will most conveniently be the same number as used for the checks which he places on the mine cars he has loaded. These are generally of iron; the man checks should be made of brass or other metal to distinguish them from the car checks. When no one is in the mine, all the man checks should be on the board, so that at a glance it can be observed whether or not any are missing, which would mean one of two things, either that the man was in the mine, or had come out of the mine and gone home without leaving his check.

There should be a penalty for failing to hang the check on the hook.

The shotfirer's cabin should be so located that the men in coming out of the mine are compelled, by means of fences, or by direction of officials stationed at the mouth of the mine, to pass the cabin. As a man enters he is handed the brass check, and if it is a gaseous mine he may be given his safety lamp at the same time. When he comes out of the mine he surrenders his check. When the shotfiring time comes the shotfirer examines the board, then if there is any check missing a search is made for the man. A book or list should be accessible for quick reference, showing where each underground employee ordinarily works, if he has a regular station, which is the case with 90 per cent. of the employees.

Checking System Works Well

The checking system, therefore, serves two purposes: One for the protection of the men from shotfiring, and the other in case of an accident, such as a fall of roof upon a man working in an isolated place. When he does not appear at the end of the shift he will be sought for. As suitable penalties are imposed on those who are careless either in not coming out of the mine at the proper time or in not giving up their checks when they do come out, it seldom happens, at mines where this or similar systems are used, that men fail to give up their checks promptly.

When the shotfirer has been informed by the underground officials that all the underground main switches have been closed, that the 5-ft. gap in the circuit where it enters the mine underground has been bridged by the flexible connections and is sure that all the men are out, he proceeds to the power house, unlocks the switch box and closes the switch that connects the generator to the shotfiring lines; he then returns to the shotfiring cabin, opens the box containing the shotfiring switch and operates that but once. The reason for the mechanical locking of the switch in an open position after throwing has already been explained.

Inspection Needed after Shotfiring

In mines that use black powder or dynamite for shooting off the solid, fires are frequently started by the explosive, particularly if the mine makes a little inflammable gas at the face. It is, therefore, essential after shotfiring that an inspection be made by a fireboss or other official as rapidly as the state of ventilation permits, both to extinguish incipient fires and to find out whether any of the shots have missed. If some shots have failed, it will be necessary to reconnect the shots in the room after first having opened all the switches of those branch entries where the shots have not failed. Then after reconnecting the switches leading to these shots, the balance being kept open, the officials come out of the mine and again try to fire them. In the event of a second failure it will probably be necessary to examine and test the shotfiring lines for grounds or other defects; and if none are found, to withdraw the explosive charges by the most approved means, and recharge, using fresh detonators or igniters.

Manifestly the success in handling such details will depend upon the efficiency of the mine organization; but as already stated, the percentage of failures in mines where the system has been tried for years is small.

Reason for Series Connections in Rooms

The object of having all the shots, which may be as many as three or four in a single room or heading, connected in series, is twofold:

(1) To prevent the amount of current falling below that which is necessary to discharge the detonators or igniters.

(2) To insure that either all the shots in the room or heading be discharged, or none at all. This is because in shooting off the solid where a number of shots are likely to be prepared, especially if there are three or four, the success of some of these shots is dependent upon the success of the others; in other words, they are "dependent shots." In firing shot by shot, the order in which they go off can be assured; but while this undoubtedly is the best system, the next best method is that of having them all go off at once.

It is true, it is possible to use delayed detonators or igniters. In this type, pieces of fuse of varying length are inserted, the electric current firing the fuse, and the latter in turn igniting the explosive; thus by regulating the length of fuse the shots may be exploded in the order desired. However, the complications of this in the hands of the less experienced or less intelligent miners make it somewhat dubious whether there is any material gain over firing simultaneously.

Electric Shotfiring from Outside by Districts or Branch Entries

A number of ingenious systems have been tried by which shots in a mine may be fired from outside, sectionally. That is, first one pair of entries, then another pair, and so on, the theory being that this has a less severe effect upon the mine. However, experience has indicated that the effect of discharging shots throughout the mine at one time is not any more severe than when the shots are fired by sections. In fact, at a large mine it is impossible to tell at the mouth when the shots have been fired, so unimportant is the air wave arising from their simultaneous ignition.

It would seem that the local pressures set up by the shots in the different rooms and entries neutralize one another so that there is no general concussion wave started. Further, there does not appear to be any more serious difficulty with the roof than results from the ordinary shotfiring, shot by shot.

With either method falls of rock will occur, and ventilation doors and stoppings will be blown down.

The expense of a new installation, apart from the generator, is from $1000, in a mine of moderate size, to about $3000 in a large mine.

The members of the Mining Institute of Scotland have been discussing John Gibson's paper on "Mining Economies." He pointed out that in 50 years, the standard of life in the mining village has advanced very little. Wages have doubled, the consequence being that in the household where thrift is not practiced, there is no incentive to regular working. Three days per week at the pit keeps the wolf from the door and maintains the customary standard of life. Large numbers of the mining population reside in houses of a class similar to those in which their fathers lived. If better and dearer housing were obtained, the standard of food, clothing, education and everything else would automatically rise. The present-day miner occupies his time more in amusements, to the neglect of his work. All of which goes to say that Mr. Gibson has not a very high opinion of the Scottish miner as a class.

Coaling Steamers from Barges and Fuel Lighters

By Chas. H. Hughes*

SYNOPSIS—An interesting summary of the modern practice in coaling steamers in which a general description of the more popular types of lighters is given. The problems encountered embody many novel features.

The coaling of a steamer, when the fuel is delivered alongside in barges or fuel lighters, is a most important problem; not only do the port requirements vary, but it is also essential to get the coal into the bunkers as quickly and as cheaply as possible. For it is evident that the ship owner does not wish his steamer unnecessarily detained, while from the coal companies' standpoint the fuel must be put on board at a minimum cost.

In some parts of the world labor is extremely cheap, and instead of using mechanical means, men and even women carry the coal in baskets from barges moored alongside and empty them into the scuttles on the deck or into barrows which are emptied into the bunkers. But in the majority of instances, labor is high and it is preferable to use mechanical methods. There are at present a variety of methods of coaling a steamer from barges and fuel lighters, and there is outlined below a number of types that have proved satisfactory. In every instance the one selected largely depended on local conditions.

Coaling from Barges with Cranes

This method is shown in the photo, Fig. 1, taken at New Orleans, La. Here the coal is transported in a barge from which it is taken out by a clam-shell bucket swung at the end of a crane, the one shown having been built by the Ohio Locomotive Crane Co., of Bucyrus, O. The crane is mounted on a separate barge on which there is also a tower. The coal is discharged by the bucket into a hopper and then elevated by a bucket conveyor or skip



Fig. 1. View Showing a Lighter Coaling a Steamer with a Crane. Fig. 2. A Fuel Lighter Receiving Coal through Bucket Conveyors from the Erie Coal Co.'s Docks, Cleveland, Ohio. Fig. 4. Self-Propelled Coal Lighter Designed by John H. Bernhard. Fig. 5. An End View of Bernhard's Coal Lighter, Showing the Loading Trunk and Return Flight of the Conveyor

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hoist to another hopper on the tower. From this latter it is discharged through chutes leading directly to the scuttles on the deck through which the coal falls to the bunkers below.

There are many variations to this method, depending on the type of steamer, the location of the bunkers and whether they are accessible from the deck or from ports on

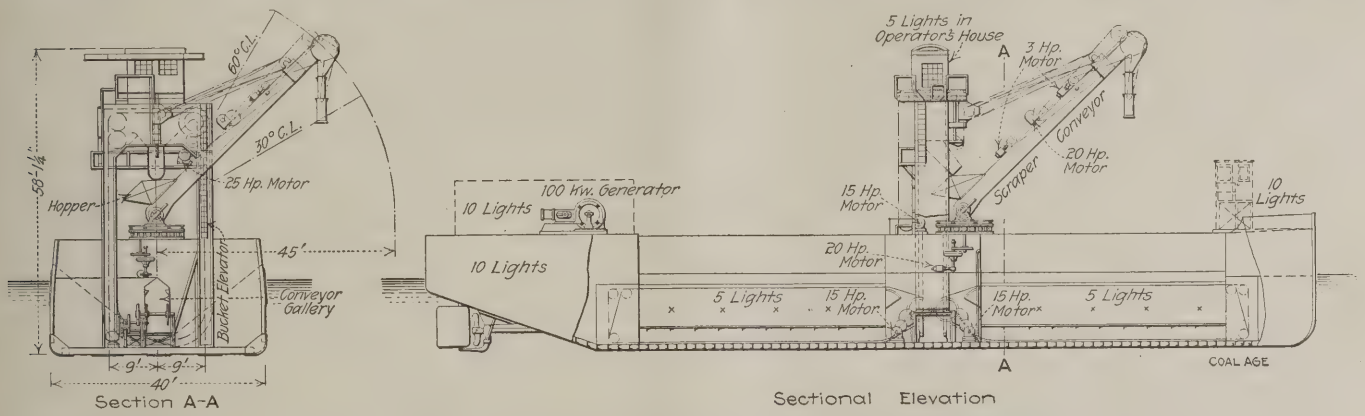


FIG. 3. SIDE AND END ELEVATIONS OF LIGHTER, SHOWN IN FIG. 2

the side. In the former case, the chutes can be used as just described, or they can be made to discharge into a hopper having chutes leading to the coal scuttles; the hopper being portable, can be moved along the deck. When the ports are on the side, a special side hopper is fastened to the ship from which the coal is discharged into barrows and wheeled away.

As ships vary in size and height above the water, it is necessary that all coaling devices must be designed so as to be adaptable to a wide range of vessels, the maximum conditions being assumed. In Fig. 1, the upper hopper on the tower can be raised and lowered and the chute leading from the hopper can be made to take different angles, for it is obvious that a change in angles is necessary when coaling a bunker on the starboard and port sides.

The speed of coaling with a machine of this type largely depends on the skill of the operator. But it is safe to say that under ordinary conditions, 100 tons of coal per hour can be easily handled with a 1½- to 2-yd. bucket at a hoisting speed of 180 ft. per min. With an intermittent system of this kind, there is time between the successive discharges of the clam-shell bucket for the men to trim the coal in the bunkers, while with a continuous system the conveyors have to be stopped occasionally till the accumulated coal has been trimmed. The cost of a crane as shown, exclusive of the barge, varies with the size and capacity, but will be between $4000 and $6000.

The barge is of the box type strongly built with square ends. Before mounting the crane with its equipment and the tower, stability calculations should be made so that when the boom is swung at its greatest radius and with the bucket well filled, there will be no danger of the barge turning over.

FUELING LIGHTERS

Another method of coaling is shown in Figs. 2 and 3, the latter being a drawing of the lighter shown in the photograph. By having the machinery aft, and the coaling apparatus amidships with the pockets on each side, no very marked change of trim takes place between the light and loaded condition, for it is practically immaterial whether the coal is taken from the forward or after pockets first.

This lighter was designed and built by the C. O. Bartlett & Snow Co., of Cleveland, O., for use on the Great Lakes. It is self propelled and is divided into rows of pockets, each holding about 50 tons. In the bottom and between the pockets is a passageway about 8 ft. high by 4 ft. wide, in which is the conveyor for taking the coal from the pockets to a bucket elevator at the center; this latter travels up one leg of the supporting member of the center structure and down the other, discharging into a hopper that in turn empties into another bucket conveyor from which the coal is spouted into a ship's bunkers.

This last conveyor is pivoted and is supported by a circular roller track, so it can be swung through an angle of 180 deg. and the one shown herewith has a radius of 45

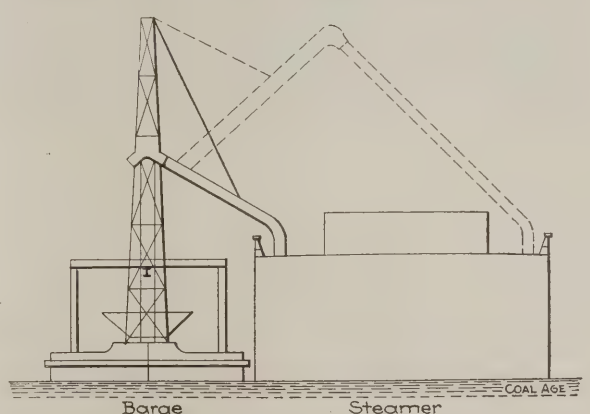


FIG. 6. SELF-PROPELLED FUEL LIGHTER

ft. At the end is a telescopic chute which can be extended if desired, thus increasing the working radius. As the conveyor can be raised and lowered and also swung through a horizontal angle of 180 deg., a wide range of action is obtained; the lighter can thus coal steamers of a variety of sizes, and under all conditions, whether they are light and high out of the water or low with their cargo on board.

The machinery is located aft; it consists of a Scotch boiler supplying steam to a vertical engine that is used for propelling purposes, and to the engine driving the dynamo that generates electricity for lighting and power purposes. The entire system of conveyors, including the pivoted one, is operated by electric motors, all of which

are controlled by a man in the center tower. With this arrangement the number of men required is kept at a minimum and the operating cost is low.

The lighter is 166 ft. overall and 41-ft. 9-in. beam. It can carry 1000 tons of coal and has a capacity of 400 tons an hour. The hull is of steel but could be built of wood if desired. The pockets are shown in dotted lines in the cross-section, and are given such an angle that the coal readily falls to the center and onto the conveyor when the doors are opened.

In Fig. 4, is shown a self-propelled fuel lighter, designed by John H. Bernhard, of New Orleans, La., where the coal is handled by bucket conveyors and scrapers. The hull, which is of steel, is divided into ten hoppers, with gates at the bottom through which coal passes to two conveyors, one running from the bow aft to the tower amid-



Fig. 7. De Mayo Coaling System

ships and the other forward from the after bins. These conveyors discharge the coal onto other conveyors located in the tower, which elevates it to a height of 43 ft. The coal is then dumped into a trunk in which there is a scraper conveyor that can raise it against any vertical angle or can retard its flow when the trunk is depressed. By referring to Fig. 5, the return flight will be noted directly over the trunk.

The trunk can be raised and lowered through a variety of angles, the maximum height being about 63 ft. At a height of 43 ft. it extends about 30 ft. from the side of the lighter, thus making it possible to coal bunkers in a steamer on the far side from the lighter.

The lighter in Fig. 4 is 240 ft. long, 32-ft. beam and on a draft of 7 ft. can carry 1000 tons of coal. It is propelled by three 80-hp. gasoline engines giving a speed when loaded of about 8½ miles an hour. All the conveyors are driven by electric motors, the current being furnished by disconnecting one of the 80-hp. engines from its propeller shaft and connecting it to a dynamo. The conveyors are all controlled from a platform on the center structure.

Another type of fueling lighter that is also self propelled is shown in Fig. 6. The machinery is located aft, while practically the whole of the rest of the lighter is used for carrying coal. Over the bin is a steel rail on which runs a trolley having suspended a clam-shell bucket. The bucket picks up the coal, carries it forward and discharges it into a hopper, from which it is fed to a skip hoist or a bucket conveyor; this last empties the coal into a hopper on the tower, from which it is led by a chute to any of the scuttles on the deck. Should the steamer that is being coaled be exceptionally high out of water, a conveyor is placed in the position indicated by the dotted lines, which could easily reach the scuttles on the far side of the steamer.

The mechanical equipment consists of a Scotch boiler supplying steam to a turbo-generator set and to a compound vertical marine engine, the latter being used only for propulsion, being of sufficient size to give a speed of 8 to 9 knots when loaded. The turbo-generator furnishes electricity to the motors for operating the clam-shell bucket and also to the hoist or conveyor in the tower. The barge shown is 160 ft. long on the water line, 33-ft. beam and carries about 1000 tons of coal.

Coaling by Portable Elevators

A novel method of coaling, which has been developed by the De Mayo Coaling Co., of New York City, is by means of portable elevators, as shown in Fig. 7. This type is particularly adapted for coaling steamers with side ports, although it can be used with various modifications for coaling through scuttles on the deck.

The elevator or unloader consists of steel-plate buckets and steel spacer plates connected by cold-steel hinge pins. No chain is used, the buckets and plates forming an endless steel belt. The end drums are entirely open and are made of cast-steel disks connected by heavy steel rods. By having the drums open no material can become wedged between the rods and the buckets. The endless steel belt is driven by an electric motor at the head or top of the unloader.

The elevator is suspended from a boom on the side of the ship, see Fig. 7, and by its own weight digs into the coal, which is raised by the buckets and discharged through chutes into hoppers on the ship's side. Two elevators can be readily placed over an ordinary barge, each digging and discharging from 75 to 100 tons of coal per hour. By swinging the booms they can be moved to any part of the barge and the coal taken out with a minimum amount of trimming.

As to the speed at which a steamer can be bunkered, this largely depends on the number of coaling ports, for an elevator can be placed at every one; in some instances six or more elevators could be working at the same time. This method lends itself to rapid coaling, as for example the steamer "Imperator" of the Hamburg-American Line was loaded with 8200 tons of coal in 19 hours.

In some cases, owing either to the construction of the steamer or that she is exceptionally light and high out of the water, the coal has to be discharged through scuttles on the deck. To avoid making the elevator unnecessarily long and hard to handle, the standard length of 39 ft. 6 in. is adhered to, the elevator discharging through chutes into a hopper from which the coal is raised by another elevator that chutes it directly to the deck scuttle. Instead of suspending the elevators from booms on the ship's sides, the coal barges have masts with booms from which the elevators are hung.

Gasoline Locomotives in Relation to the Health of Miners

By O. P. Hood*

SYNOPSIS—The author points out the danger of running a locomotive at the same speed as the air current. He also urges the use of restarting devices, so that the engine need not be run with the clutch thrown off. He believes the gasoline locomotive has a wide field of usefulness, if the limiting conditions are properly kept in mind.

None of the methods now in use for the transportation of materials underground is entirely free from more or less serious objection. The great flexibility, ease of control and economy of operation of electric tramming are accompanied by the serious menace of a trolley-wire distributing system.

As the gasoline locomotive has even greater flexibility of application and requires no similar dangerous distributing system, it might be considered a safety device which would make possible the elimination of the dangerous trolley system were it not possessed of other objectionable qualities peculiar to itself. It is found that the exhaust gases from the engine may be injurious to the health of those breathing the air in which the locomotive has been operating.

While electric shock may kill the individual who makes contact with uninsulated parts, the gasoline engine may be detrimental to the health of all those who have to work within the atmosphere vitiated by exhaust gases. The degree of pollution measures the magnitude of the menace. This may be negligible at times, but with careless operation it becomes serious. The exhaust gases from an engine are composed of nitrogen, a little free oxygen, hydrocarbons, hydrogen, carbon monoxide, and carbon dioxide, the last two being considered dangerous.

Carbon Dioxide Not Made in Objectionable Quantities

The presence of carbon dioxide as a product of combustion of the gasoline was recognized as an objection from the beginning of the use of these machines, but attention was called to the fact that the amount produced was relatively small as compared to that from other sources of this gas. Carbon dioxide, except in relatively large percentages, produces no effect such as results from reducing the oxygen content of the air that is breathed.

The presence of carbon monoxide in the exhaust gases in injurious quantities was less apparent, but it appears from what is now known that this is the limiting factor in the use of these locomotives if they are not to be injurious to health. The presence of carbon monoxide in the air in relatively small quantities has been shown to have a marked effect upon the blood, producing sickness and, if inhaled in sufficient quantity, resulting in death. A discussion of the effects of these gases is to be found in *Technical Paper No. 62, U. S. Bureau of Mines,* written by G. A. Burrell, F. M. Seibert and I. W. Robertson.

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Note—Article read before the American Institute of Mining Engineers, Electricity and Miscellaneous Mining Topics Section, Oct. 10, 1914, at Hotel Schenley, Pittsburgh, Penn.

The Carbon-Monoxide Toxicity Limit

It is difficult to get those most conversant with the effects of carbon monoxide to assign a definite limit to the amount which may be in the air without detriment to health. There does not exist a sharply defined line on one side of which is to be found safety, with danger on the other side. It has been shown that the physiological effects vary with different people, and with the state of health and degree of activity required of the individual, so that a condition which may be considered safe may prove to be unsafe under conditions of harder work and unfavorable physical state.

After careful inquiry, the best that can be stated at this time is that, without injury to health, no more than 0.1 per cent. of carbon monoxide can be breathed except for short periods and at infrequent intervals. It is probable that one-half of this percentage could be allowed for a considerable period of time without noticeable effect.

The percentage of carbon monoxide in the mine air depends upon the amount made by the engine and on the quantity of air with which it is mixed. It is necessary to provide ventilation for the worst possible combination of gases which such engines can make under unskillful handling. The gasoline locomotive should therefore be considered as a carbon-monoxide producer, and the maximum quantity of this gas which any engine is capable of making should be ascertained.

Important to Figure on Maximum Output of Monoxide

It is not sufficient to consider the average amount produced as distributed over the whole time of running such a machine. The total quantity of gasoline burned in any one day may have produced but a small quantity of carbon monoxide, but if this has been confined to a relatively short period during bad carburetor adjustment, and in some poorly ventilated space, the momentary percentage may be very high and the consequences may be fatal. It is evident that to be entirely safe the ventilation must be sufficient to keep the percentage of carbon monoxide below the assigned limit when the engine is producing the maximum quantity possible.

If this maximum quantity is provided by proper ventilation, the chance of injury to health can be considered quite remote. Certain peculiarities of gasoline engines make the percentage of carbon monoxide generated vary between rather wide limits, but the maximum is fairly constant. No other constituent of the exhaust gases varies so much or so rapidly with slight changes of adjustment as does the carbon monoxide.

Makes Most Monoxide When Doing Most Work

Extended experiments have been made by the Bureau of Mines to determine under what conditions of running such locomotives give a maximum quantity of carbon monoxide. This maximum quantity is found when the engine is running at full load and full speed, and when burning the greatest quantity of gasoline which will

maintain these conditions. Any further enriching of the mixture results in weaker explosions, misfires, a reduction in speed of the locomotive, and thus a reduced total quantity of gases.

The weight of gasoline used per stroke may vary nearly 100 per cent. without varying the speed or power. As the mixture is enriched the combustion is less complete, reducing the efficiency, but affecting the power but little until the upper limit of explosibility is approached, when the power falls rapidly. Under these conditions a maximum quantity of carbon monoxide equivalent to 5¾ per cent. of the piston displacement may be generated and delivered into the surrounding air.

A Slow-Going Locomotive May Have Bad Carburation but Volume of Gas Is Reduced by Reason of Low Piston Speed

When the engine is throttled down to a slow speed and with a light load it is possible to produce exhaust gases containing a greater percentage of carbon monoxide but the total quantity is less because of the slow speed of the engine. It can, therefore, be stated that the maximum amount of carbon monoxide that can be generated with a gasoline locomotive is a function of its piston displacement.

SIZES OF LOCOMOTIVES IN COMMON USE, QUANTITY OF GASES THEY MAY GENERATE AND AIR NEEDED FOR NECESSARY DILUTION

Engine Cylinder Size, In.	No. Cylinders	Speed Rev. per Min.	Piston Displacement* (Cu. Ft. per Min.)	Maximum Probable Amount of Noxious Gases (Cu.Ft. per Min. at 60° F. and 30 in. Barometer) Produced with Efficient Carburation CO	Efficient Carburation CO_2	Inefficient Carburation CO	Inefficient Carburation CO_2	Air in Cu.Ft. per Min. to Dilute Exhaust Gases to 1 Part CO per 1000 Parts of Air† Carburation Efficient	Carburation Inefficient
4.75x5.25	4	800	172	2.61	6.80	9.91	3.65	2,610	9,910
5x5	4	600	136	2.06	5.37	7.84	2.88	2,060	7,840
5x5	4	800	182	2.76	7.18	10.48	3.86	2,760	10,480
5x6	4	800	218	3.30	8.60	12.56	4.62	3,300	12,560
5.5x5	4	600	165	2.50	6.51	9.50	3.50	2,500	9,500
6x6	4	700	275	4.17	10.86	15.85	5.82	4,170	15,850
6x7	4	500	229	3.47	9.04	13.19	4.85	3,470	13,190
6.5x7	4	500	269	4.07	10.63	15.50	5.70	4,070	15,500
6.5x8	4	650	399	6.04	15.76	23.00	8.46	6,040	23,000
7x7	4	500	312	4.73	12.33	17.97	6.62	4,730	17,970
7x7	6	500	468	7.08	18.49	26.97	9.92	7,080	26,970
8x7	4	500	407	6.16	16.08	23.45	8.62	6,160	23,450
8x7	6	500	610	9.24	24.10	35.14	12.93	9,240	35,140

* Area piston in square feet × stroke in feet × number of cylinders × revolutions per minute.

† Maximum amount of carbon monoxide which can be breathed for short and infrequent intervals without injurious effects.

The sizes of locomotives in common use are given in the accompanying table, together with the maximum quantity of injurious gases which they may generate.

The size of a locomotive that may with safety be introduced into a mine depends upon the amount of air that can be mixed with the exhaust gases in the most unfavorable portion of the run of the locomotive. For each cubic foot of carbon monoxide which can possibly be generated in the engine there should be available 2000 cu.ft. of air to mix with the exhaust gases if the resultant atmosphere is for continued breathing, while for short and infrequent intervals the proportion may rise to one part in one thousand.

Relative Velocity More Important Than Actual

The air with which the exhaust gases are mixed is the air passing by the locomotive. If the speed of the air current and that of the locomotive are the same, there would be a concentration of exhaust gases immediately surrounding the engine, which would soon reach the danger limit, and the engine runner, if no one else, would be exposed to this excessive percentage. Again, the air may be stationary, and if the locomotive passes through it at such a rate as to distribute the exhaust gases into the required quantity of air, the dilution may be below the danger limit.

It becomes necessary, therefore, to investigate the relative velocity of the locomotive and the air current, together with the cross-section of the latter, in order to determine whether a sufficient quantity of air is passed to insure a proper dilution. The mixing due to the movement of the cars and the diffusion of the gases is expected to distribute the gases through the air. An investigation of this kind will frequently disclose some portion of the run of the locomotive where the air and the locomotive are traveling together and the dilution is insufficient, forming the basis for just complaint. By a change in the speed of the locomotive, or more careful running, perhaps with lighter loads, these difficulties can frequently be overcome.

Need for Restarting Device

It is evident from the foregoing that it is a dangerous practice to allow locomotives to stand idle for any length of time in locations where there is not ample movement of air. The introduction of a self-starter on locomotives which are compelled frequently to wait for cars would be a great aid. The engines on these locomotives are usually difficult to start, and to stop the engine whenever the locomotive is compelled to wait for a few minutes would not be practicable unless some easy means of restarting was provided, but this practice would greatly reduce the chance of air pollution.

The requirement that not less than 1000 cu.ft. of air shall pass the locomotive for each cubic foot of carbon monoxide which the engine can possibly generate will limit the size of the locomotive in many cases. Sizes will have to be chosen smaller than are now in use. It may also confine the use of these engines to main entries where there is ample ventilating current.

Need for Better Carburetors and More Skillful Men

The maximum quantity of noxious gases for which provision is here made should not actually be realized with improved carburetor construction and skillful manipulation. The percentage of carbon monoxide in the exhaust gases under the worst conditions is about 13½ per cent., while under normal running conditions the amount seldom exceeds 6 per cent. It is this great variation in the possible amount of carbon monoxide due to unskillful operation that makes the experience of different users of these machines vary through the wide limits noted.

Use of Table Where More Efficient Carburation Is Secured

If a locomotive is installed in a place where the quantity of air is not sufficient to dilute the maximum quantity of carbon monoxide properly, analyses of the exhaust gases should be made to determine just what percentage is actually produced with the carburetor in use and the methods employed in running these machines. The ventilating current may then be regulated to conform to the actual amount of carbon monoxide as found. It is proposed that this be done by a method somewhat as follows:

Suppose, upon analysis, that the actual amount of carbon monoxide is found to be not over 4 per cent. We will

allow a factor of safety of 2, that is, we will assume that this percentage might on occasion amount to 8 per cent. Since the maximum percentage possible is about 13½ per cent., the ventilating current required can be estimated to be that given in the table when reduced in the proportion of 8 to 13½.

If a careful study is made of the amount of air available for dilution throughout the run of a locomotive, and the quantities are kept within the limits that are here proposed, a wide field of usefulness for these locomotives remains, where it is believed there would be no injurious effects upon health.

The Electric Rock Drill in Coal Mines

A part of the net profits that should be derived from coal mining is often absorbed in expensive "dead" or unproductive work. The excavation of rock in various forms is an absolute necessity in many properties, representing a large percentage of the total cost per ton of output. Many thin but excellent beds of coal have not been worked, on account of the excessive cost of this operation.

The wide area of the workings of the average coal mine prohibits the use of rock-drilling equipment such as is used in metal mining. Were air drills used, the distance from compressor or power plant, the amount of piping required with its attendant losses due to leakage and friction, the investment in heavy compressor plants and high power costs for the comparatively few drills necessary are all factors conducive to prohibitive operating costs, and as a result it is not surprising to find many large properties still adhering to the primitive methods of hand drilling.



The Drill May Be Easily Handled and Moved

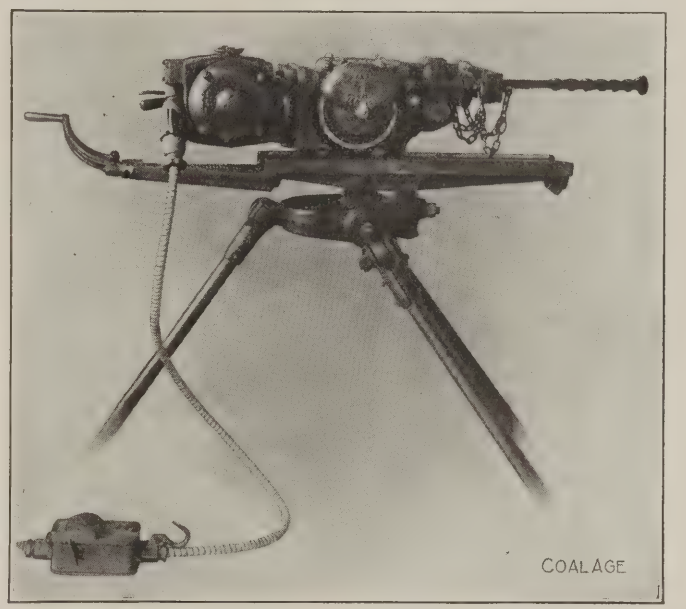
The almost universal use of electricity in coal-mining operations permits of the introduction of the electric rock drill without an additional investment for the production and distribution of power, thus eliminating a dual power installation of electricity and compressed air.

Coal operators have been quick to appreciate the advantages of an electrically driven rock drill that is instantly available in any part of the property and may be operated direct from any underground circuit from which the mine locomotives, cutters or other mining machines obtain their power.

The Fort Wayne Electric Works of the General Electric Co., at Madison, Wis., after many years of exhaustive testing, are now extensively marketing an electrically driven rock drill that has reduced the cost of rock excavation to the minimum and is naturally of great interest to coal operators.

This drill is of the percussive hammer type. A simple and effective motor-driven striking mechanism delivers 1700 blows per minute to a slowly revolving bit. The machine with motor complete is mounted on the familiar rock-drill tripod or mining column.

The drill mechanism possesses many novel features. The striking apparatus consists of a heavy flywheel or "helve" carrying two cylinders, in each of which a solid steel hammer floats freely. As the helve revolves, the hammers are thrown outward into the striking position by centrifugal force and at each revolution deliver a blow upon the projecting tappet or drill-steel cap which transmits the energy received to the drill bit.



The Drill on Its Tripod

After delivering its blow, the hammer rebounds into the chamber or cylinder where it is completely cushioned upon the air which it traps. During the period of recoil (the helve continuing to revolve), the hammer passes the drill-steel cap and is again thrown into striking position during the remaining portion of the complete revolution of the helve.

The "shank" of the drill steel is loosely held in the revolving sleeve or chuck, which is designed to hold the bit in position to receive the hammer blow. It is retained in the chuck by means of spring-steel buffer-plates, and the entire mechanism is inclosed in a steel casing.

The drill is fitted throughout with special shock-absorbing roller bearings, and the motor with high-duty ball bearings. As all bearings are packed in grease, they require oiling but once every 30 days. The hammers, however, are supplied with oil from a reservoir, which must have attention daily.

The revolving helve or striking mechanism is flexibly connected to the motor by means of a special endless belt which permits of a wide variation of speed without the use of electric rheostats or controlling devices, the motor be-

ing stopped and started by means of a special inclosed switch.

Ample means are provided to protect both motor and drill mechanism from overload and stresses in case the rotation of the drill steel suddenly ceases, due to the bit encountering extraordinary resistance.

The cuttings from the drill bit are continuously removed from the hole by a special auger-drill steel, which is provided with veins or ribs similar to those upon the well known spiral conveyor, the center core of the steel being of ample section to transmit the hammer blows throughout its length.

Holes may be drilled at any angle from horizontal to 45° below without the use of water. For holes from 45° to vertical, water is poured into the hole in sufficient quantity to form the cuttings into a thick mud, which is readily elevated by the spiral conveyor.

One and one-half to 2½ hp. is required for the operation of this drill, including losses in transmission from the generator to the machine. A large number of these drills are in successful use in the coal-mining regions of Pennsylvania, West Virginia and Kentucky.

Extracts from a Superintendent's Diary

If ability to choose suggestive words is a criterion of literary ability, the citizens who originated some of the nicknames around our camp are certainly overlooking promises of immortality by wielding the pick instead of the pen.

These nicknames are not confined to humans alone, but include also mine mules, family horses and at least two cows, as well as several inanimate objects such as the commissary, the superintendent's office, and the camp's boarding house.

The suitableness of most of the nicknames is apparent to even a stranger, but a few of them require, for proper appreciation, some knowledge of local gossip.

The history of some of these names is very interesting. Some have been handed down from father to son, some were improvised on the spur of a moment, while still others are the fruits of deliberate planning in search of revenge. Then there is quite as much variation in the attitude of the christened ones toward their rechristening. As a matter of fact, a man's attitude toward his nickname has little effect on its popularity and there's no instance on record of a man outliving a nickname, irrespective of his efforts and inclinations.

The thing that set me to thinking about nicknames is a little incident that started yesterday and was concluded today.

One of the most popular men in our camp is a young fellow who clerks in one of the commissaries. He plays in our band, has a good singing voice, likes all the young ladies without favoring any particular one, and makes himself agreeable to every man, woman and child with whom he comes in contact.

He has been with us off and on for about five years.

Occasionally, he tires of the humdrum existence that our camp affords and wanders off to try his luck in one of the near-by cities, but in a few months he always returns and finds his position still open, quite as a matter of course.

Just as he was boarding a train that carried him away, the first time he decided to try his luck in new fields, one of the youngsters at the station reminded him that "a rolling stone gathers no moss." Before he had time to reply another kid came to his assistance by singing out "no, but it gathers a lot of polish." By this time the train was moving and there was only time for a parting shot. It was furnished by a bairn whose father is an amateur geologist and talks geology at home; "Goodby Slickensides," yelled out this youth, and "Slickensides" became the young man's name from that time forth.

Last week he again left us and as usual he insisted that he would never return.

Yesterday I happened to be in the city and encountered him in one of the large retail stores acting as floorwalker. "Hello Slickensides," was the greeting I gave him. "Well I'll be blowed," was what he gave me in return, "Haven't been called that for a week, guess I'll have to go back, it's too darned formal in here."

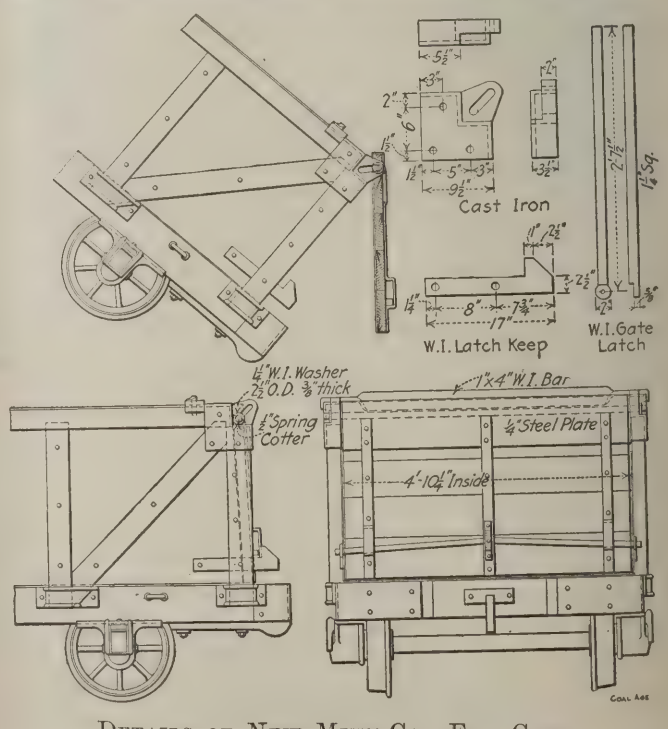
Sure enough, today he returned and was reinstated in his old position.

He came by my office and confessed that he always got along all right while away from us, until some of his old acquaintances came along and called him "Slickensides," then he couldn't resist the longing to get back to his old haunts where people understood him.

From this time forward nicknames will be more than witticisms to me, and because of my discovery, any youth possessing rare ability to improvise names that will stick, can have a job around my office.

An Automatic Mine-Car End Gate

An automatically operated gate for mine cars has been patented by C. W. Stickler, of Lansford, Penn., which should become popular for the simple reason that it has no parts to get out of order, no levers to operate, will not bump open on level track, dumps easily and surely, and latches itself automatically. The attach-



Details of New Mine-Car End Gate

ment can be placed upon any mine car now in use at but a small cost.

A mine car equipped with this automatic device has been in use more than three months, making frequent trips from mine to tipple, and has never failed to dump or latch itself.

It is an economical device in that it does away with the services of the men now required to set and operate the car latches between the shaft and the headhouse.

As may be seen from the accompanying drawing, the attachments consist of a casting fitted to the top of the car at the gate end and the ordinary car latch, shortened, so as not to extend beyond the body of the car.

The casting, as the detail shows, has a slot for the gate bar to slide in. This slot, for 5/8 of the thickness of the gate bar, has a pitch of 60 deg. to form a pocket for the bar, so that the gate cannot be bumped open on level track. From that point it pitches at 45 deg. to a height sufficient to lift the latch from the keep.

As the car runs onto the dump the center of pressure of the contents shifts from the bottom of the car to the gate, while the momentum causes great pressure to be exerted thereon. Meanwhile, the car is tilting downward and the 45 deg. slot is assuming a horizontal position which permits the bar to slide, lifting the latch out of the keep and releasing the contents of the car.

As the car returns to the horizontal, the bar slides down the slot into the pocket and the gate slams shut, dropping the latch into the keep and automatically locking the gate.

A tie is placed across the top of the car near the gate casting to prevent the sides from spreading and binding the gate bar.

It should also be noted that the gate extends above the bar so that the car can be loaded level full.

The Labor Situation

SYNOPSIS—The Industrial Relations Commission meets in Denver, Colo., and is expected to raise much bitter recrimination. The state authorities are providing for miners on strike in eastern Ohio. Compensation for accidents is sought by Pennsylvania miners. Arkansas is quiet. An extensive strike stops mining in Kansas.

The Federal Industrial Relations Commission commenced to hold a long session in Denver, Colo., on Dec. 1. Coal-mining managers and operators, miners and officers of the unions will be called to give testimony at hearings which will be open to the public. The citizens of Colorado have become weary of investigations which do not arrive at results and seem only to pave the way for succeeding investigations and more postponements of settlement with a continuance of friction between the principals in the issue.

However, the hope that investigations will cease to probe the Colorado wound with distressing results, seems destined to be disappointed. Now it is the Rockefeller Foundation which is going to make an investigation, according to John D. Rockefeller, Jr.

Removal of U. S. Troops

Governor E. M. Ammons desires that Federal troops be removed from the state and that Colorado be permitted to resume government in the strike zones. His time of office is about to expire; his successor is a man of the opposite political party. These men are working harmoniously in this strike policy and it is expected that the reins of government will change hands so smoothly that the only effect immediately noticeable will be a general feeling that there is a more capable driver.

Investigations Stir Up Strife

On Nov. 24, both governors united in sending telegrams to President Wilson and to Chairman Frank P. Walsh, of the Industrial Relations Commission, objecting to the pending investigation. These telegrams were duplicates and stated that there have been more than a score of investigations; that it is doubtful whether any new information is obtainable; that the presence of the commission in the state at the time of changing administration would embarrass the governors in their program and might endanger the present peace in the state. Reply came by wire the following day from Mr. Walsh to the effect that the hearing could not be postponed but that the commission invited the coöperation of the two governors.

Arms and Ammunition Will Be Forbidden under Militia as under Army Rule

Governor Ammons has issued a proclamation, at the request of Col. Lockett commanding the federal troops, renewing the prohibition of liquor in the strike zones of the state until Jan. 1, 1915. Should the President accede to Ammons' request for the removal of troops, the governor will issue a much more stringent proclamation that will forbid, in the strike areas, the purchase and possession, not only of liquor, but also of firearms and ammunition.

We commented at length editorially in our last issue on the new committee of conciliation. The operators see no need for any such mediatory body. They declare that they have trouble, not in obtaining men but in securing orders for such coal as is mined by the men they have.

The Eastern Ohio Strike

In Ohio, the state authorities are trying to protect the miners from the effects of their sturdy resistance to the extremely reasonable offer of the operators. It is questionable whether state funds should be used to aid men to continue on strike for what is equivalent to an increase in wages when wages and salaries elsewhere are either being reduced or at best continue unchanged. However, so far, little action has been taken to which serious objection could be raised.

Governor Cox and other state officials have asked the federal government to donate the old uniforms of the Ohio National Guard to the miners. Usually old uniforms are destroyed under orders from Washington but there is still much wear in them and it is figured that much good would be done by distributing them among the needy miners. Dyers, of Columbus have offered to dye them free of charge.

There has been no movement toward reconvening the wage-scale joint committees in eastern Ohio or Coshocton. Generally speaking everything is quiet in the two idle districts.

A number of miners who are stockholders in the West Wheeling Coal Co. near St. Clairsville have opened the mine and are producing several cars daily.

Mines in Eastern Ohio Ask for Increased Wage

The conference of the scale committee of operators and miners held at Cleveland last week, adjourned Dec. 4 sine die, without arriving at the settlement of the wage scale. It developed after the conference was called that the miners' representatives were not empowered to make any concessions from the proposition of 47c. for run-of-mine machine-mined coal, and the operators would not agree to any such a figure. It was generally believed by operators that when the conference was called that the miners would have something to offer in the way of a compromise. But their hopes were soon dispelled and the threadbare proposition of 47c. was again put forth. It is believed that officials of the International organization, who attended the conference, had a part in keeping the miners' members of the scale committee from offering a compromise.

According to one of the scale committee the operators attended the meeting with open minds. They were prepared to accept any reasonable proposition either on the mine-run or screen basis. But they were not disposed to accept any scale higher than last year or higher than the Pittsburgh scale, which is 44.61c. But they were not wedded to either the mine-run or any other form of computing weights.

Word now comes from Cleveland to the effect that some of the operators in the eastern Ohio district will try to open

their mines on the open-shop basis. The Lorain Coal & Dock Co., of Columbus, which has operations in that field, has not yet decided that question. The officials of the company are watching the trend of affairs, ready to take advantage of conditions.

In a circular letter sent out by the state executive committee of Illinois, miners of that state are urged to loan $100,000 to the Ohio organization to help to pay strike benefits in eastern Ohio and Coshocton. Strike benefits amounting to $49 to each mine employee have been paid in the last eight months.

Criticism of Coal Screen Commission

State Auditor Donahey has criticized the Coal Screen Commission, which made an investigation prior to the passage of the mine-run law on its charges. An appropriation of $5000 to pay the expenses of the commission was made by the legislature. John M. Roan drew $1324; Morris Albaugh, $1277; and W. B. Bowman, $1266, as members of the commission. They accepted fees at the rate of $10 per day and expenses. M. B. Hammond, Phil M. Crow and J. C. Davies refused to accept compensation. A balance of $46 remained in the fund and that was given to a clerk in the office of the mining department.

J. M. Roan, chief inspector of Ohio, was called to the J. L. Poston mines near Athens to decide a disputed point as to the duties of safety foreman. He ruled that the safety foreman should act as a patrolman to visit all workings and decide on questions of safety.

J. M. Roan, mine inspector, has changed his system of working the deputy inspectors attached to his office. He is changing them from one mining district to another in order to provide for a check, one against the other as to the faithfulness of their services.

Mine-Run Law Did Not Help the Politicians.

That the espousal of the Mine-Run Law by Governor Cox proved to be a source of weakness to him among the miners, rather than of strength, at the late election in which he was defeated, seems very evident from an analysis of the miner vote, as made by a prominent Columbus operator. Cox did not carry a single coal-producing county in the state. The vote this year, which was much heavier than that of two years ago, resulted in both the leading candidates showing gains, but in all coal counties the Cox gain was the smallest. The most significant vote was that of Hocking County, in which the Mine-Run Law has had the fullest demonstration. Here Cox actually lost 14 votes, while his opponent gained 1398. In Perry, another Hocking Valley county, the Cox gain was only 48, as compared with a gain for his rival of 2472. The Governor's nearest approach to breaking even was in Guernsey County, where the mine-run law has worked out more favorably than elsewhere, because of the small per cent. of slack which results from mining. His gain in Guernsey was 1163, compared with a gain of 1239 for the other candidate. In Belmont, the chief coal-producing county of eastern Ohio, with a large foreign population, and where the scale fight is still on, Cox's gain was 1000 less than that of his opponent. The whole adds to the proof that the miners are generally dissatisfied with the mine-run plan and would be glad to be back on the old screen basis.

Miners Trying To Bring Pennsylvania To Take Correct View of Compensation for Accidents

The miners are urging that accident compensation laws like those in other states be introduced into Pennsylvania. Many operators have advocated such action at public meetings and some have even voluntarily provided for the payment of benefits to those who are injured or to their beneficiaries if they are killed. The executive boards of subdistricts 1, 7 and 9 met at Clifford's Hall in Wilkes-Barre, on Nov. 27, to advocate a law like that in force in the state of Ohio.

The union has turned over a fund to erect a monument to the 14 victims in the Lattimer mine disaster to subdistrict No. 7, Lehigh, which will push the project to a conclusion.

The Editor

Written Expressly for COAL AGE *By* MICHAEL BERNARD

THE EDITOR is not a chap
Whose life is something of a snap,
And if by any chance there are
Some folks that see in him a czar
Who issues edicts from his throne
And bends all wishes to his own,
Let them at once revise the plan—
The editor is but a man.

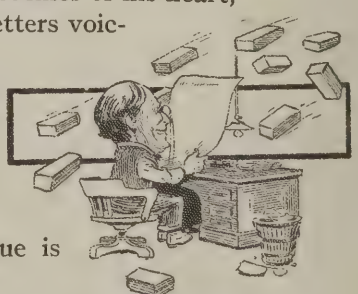


HE'S *Forced to Wade Through Reams of Verse.*

He hasn't such a cinch to choose
The articles he ought to use
To keep his journal up to snuff
On every phase of mining stuff.
He has to winnow heaps of prose,
Some good, some rotten, heaven knows!
And sift the flour from the bran—
But yet, he's not a superman.

He's forced to wade through reams of verse
Like this—or probably no worse;
He makes amends for each mistake
And takes the blame fo every break;
He answers questioning and quiz
On every mining theme there is.
Then show him pity, if you can,
Because he's just a mortal man.

It makes his pulses thrill and start
And warms the cockles of his heart,
If, mixed with letters voicing kicks
And hurling metaphoric bricks,
He finds a note in one of them,
"Your latest issue is a gem."
Ah, that's the kind he likes to scan;
For, after all, he's just a man.



MIXED *with Letters Voicing Kicks.*

Editorials

Foolish "Muckie" McDonald

A brief description of what a man, by the name of "Muckie" McDonald, did in his innocence at Butte, Mont., will convince our readers that this same "Muckie" used very poor judgment. His crowning fault was that he believed that "what was sauce for the goose was sauce for the gander." He had a notion that he had just as much right to be violent as some of the heroes of whose actions he had read. He now knows there are distinctions of time, place and person which men of spirit must observe if they would also be men of reputation.

Muckie had heard how they "did things" in Colorado, how they kidnapped nonunion men and hid them in caves and he thought that he could successfully turn the same trick in Montana with union men. The county attorney, J. J. McCaffery, admitted practically that Montana did not object to kidnapping so long as union men were not interfered with.

He took care to point out in his plea that the men "were not deported from Butte because they were scabs." The jury might well think with some people in power that such a deportation was justifiable. He went on to explain that they were men entitled to their liberties, gentlemen of the privileged sort, not scum whose rights no one is bound to respect: "They were old-time union men. This was merely a squabble among union men. The law in even the meanest principality in Europe says a man is entitled to his personal liberty. I ask you to demonstrate the existence of that law in this country by your verdict."

You can see by the first part of that plea that the lawyer did not trust the jury. He had to appeal to its union principles, because in America it seems to be almost recognized that the personal liberty of a "scab" is not guaranteed, but that fact had not yet burned into the heart of "Muckie" McDonald. He only knew that union men had made an easy living off their dupes in Butte and that while wages for carpenters and all manner of mechanics soared, miners' wages in that camp failed to show any such tendency.

When Martin Glachin went to give in his time at the window, two men grabbed hold of him and put him in the midst of a ring of some six or seven hundred men. Several others were there already and some were pushed in afterward; there were 33 in all. He, with the rest, was marched down town and they were exhibited to the crowd as "Amalgamated stool-pigeons."

But your "Muckie" was no fierce violator of the laws, for when someone picked up a lagging, "Muckie" and his right-hand man Bradley protested loudly, crying, "None of this rough stuff here." The crowd took its captives out to a cabbage patch for trial, this deluded McDonald foolishly leading the way, and sat them down on the sand and tried them, finding them guilty of being Federation men. Someone wanted to hang them, but the pacific McDonald flared up with "Cut that rope business out." The convicted, all but Glachin, were ready to join the new union, and a bright thought occurred to "Muckie." If he could only get these men to join the new organization, it would appease their tormentors, and so he asked the crowd for such a judgment, but they were not so disposed.

Martin Glachin had "a bum foot" and the considerate Muckie helped him up after the trial. Then the men were marched to the brewery, Martin requesting Bradley to let him escape. Bradley was afraid to do this, so Martin states, because the crowd threatened violence. "Muckie," with his usual generosity, wanted to raise money to feed the captives, but that attempt to succor them met with no favor, the crowd in response to the suggestion yelling: "Put rollers under them."

The men were urged by the angry crowd to leave Butte, being warned that if they returned "they would be taken out on the flat, feet first," but the genial McDonald, amid angry comments, shook hands with Glachin and told him to come back as soon as he was ready to join the new union.

And now as leaders, or rather than as restrainers of their evil followers, McDonald receives three years and Bradley five years in the penitentiary. Had they only realized the difference between a union man and a scab, their paths might have led to privileged conferences in the White House, large audiences in Carnegie Hall and much honor in public, such as Mother Jones and others have enjoyed. Instead, their ways end in Deer Lodge Penitentiary and dishonor, consorting with horse thieves and like men of violence.

"Muckie" may think we are lecturing him at too great length, but we have one more piece of advice to give him before we finish. Let him remember the next time when he wants to violate the sacred law of private contract, that he should have the U. S. military forces back of him to make his practices safe. Let us hope that when one Woodrow Wilson, the historian, extends his short story of the United States to take in his own time, he will call "Muckie" gently to task for greatly daring, from so humble a point of vantage as that of a private citizen, to abrogate the law on which our country is founded. Meanwhile, let us rejoice that a man so good of heart, though wrong of head, has gone to the penitentiary. Sorely at times do such frowning walls need the presence of such tender-hearted men.

Savings in Fuel Costs

R. Holliday, president of the Association of Mining Electrical Engineers in Great Britain, in a recent address dealt with the use of electrical power in collieries, looking at the problem from the point of view of justification on economic grounds. He says that opinions may differ as regards its safety, but nowadays the reliability of an electrical plant is scarcely ever questioned.

Many accidents attributed to the use of electricity are due rather to the use of defective or unsuitable apparatus. As regards economy, he points to the increasing attention now paid to savings in the cost of fuel

used for power purposes which can be effected by the use of byproducts. When low-pressure steam turbines are driven from the exhaust steam of winding engines, the saving in steam consumption due to condensing alone can be taken as 25 per cent., and by utilizing the steam for power generation, 45 per cent. may be saved, or more than enough to pay for the extra capital involved in the turbines.

Enormous gains are also possible in the power transmission efficiency compared with steam pipes. Capital cost and maintenance expenses are lower for the electrical plant, and the electric motor is justified on the score of efficiency.

There is no question but that in any existing electrical plant, a reduction of 40 per cent. in the boilers may be made by the utilization of the exhaust steam. Such a saving is sufficient not only to pay interest and depreciation on the plant scrapped, but to provide interest and depreciation on the entire electrical installation, and still leave the operating company a profit.

Large Corporations and Safety

The machinery of big corporations has repeatedly and most successfully been put in operation to reduce accidents. In fact, the large companies have a great advantage over their small competitors in the humane work of saving life and most conscientiously have they availed themselves of it. All of them now have men specializing in safety and these men take care that their department of mercy is not overlooked by the men whose bent is technical or commercial. Their continual reports to headquarters raise the questions: "It pays but is it safe? It is a clever solution of a problem but is it injurious to the employee?"

We have shown, in a previous issue, how the H. C. Frick Coke Co. is one of the leaders in Pennsylvania in safety despite the fact that if the expert were asked to choose the most dangerous point for operation in that state he would select the region in which that company operates. The U. S. Coal & Coke Co. and the Bunsen Coal Co. have made notable reductions in the number of accidents and so have most of the large anthracite companies. A similar convincing proof can be secured from the Colorado inspection report regarding the Colorado Fuel & Iron Co. and it shows that this corporation, regardless of the calumnious criticism of people who are absent in residence, irresponsive in spirit and lacking in knowledge, is really doing its duty like other large financial concerns.

ACCIDENTS IN MINES OF COLORADO FUEL AND IRON CO. AND IN BALANCE OF STATE

Year 1911	Production	Number Fatal Accidents	Number Injuries	Fatal Accidents per 1000 Employed	Tons Mined per Fatal Accident	Tons Mined per Injury
The Colorado Fuel & Iron Co.	3,285,431	19	46	3.51	172,917	71,422
Balance of state	6,912,164	72	310	8.09	96,002	22,297
Year 1912						
The Colorado Fuel & Iron Co.	3,516,103	17	64	3.40	206,830	54,939
Balance of state	7,500,845	81	262	9.05	92,604	28,629
Year 1913						
The Colorado Fuel & Iron Co.	3,017,288	18*	86	3.73	167,602	34,850
Balance of state	6,251,651	90	268	11.19	69,462	23,327

* Excluding two washery accidents.

The fatal accidents in the United States in 1911, 1912 and 1913 averaged 3.58 per 1000 employed, according to the estimates of the U. S. Bureau of Mines, excluding for lack of data final figures for Kentucky in December, 1913. The Colorado Fuel & Iron Co., in those same years, had a rate of 3.54 per 1000 employed, according to the table.

That Colorado with its inherent dangers and inexperienced men has a large company, with over 5000 men employed, which beats the United States average in safety will be a surprise to most people.

Service Not Sacrifice

We had hoped when we wrote the editorial entitled, "Small Potatoes," which appeared in our issue of Oct. 17, that we had made our position so plain that further comment was unnecessary. We might have said more but we begrudged the editorial space which is all too limited for the comment which should be made. But, evidently, we have not made our point clear to Geo. N. Lantz, whose remarks were published in our discussion department of Nov. 28.

We tried to point out that a man could not get more for his labor than his employer would receive for his product, that if his product was inferior, his wage must decrease unless the employer accepted decreased profits, and that if the corporation for which he worked was already operating without profit, no such recourse was open and wages must inevitably be reduced.

As we read over the matter we wonder that we gave so much room to such needless platitudes, but still Mr. Lantz is not satisfied, so we must again affirm and defend our axiomatic statement. We will rewrite it thus: Employees are paid not for sacrifices but for service.

Trentino, the street-cleaner, sacrifices more than Caruso, the tenor, when the former sweeps in the rain and snow for the whole livelong day, and when the latter only spends a couple of hours singing at the opera. But the public values the service of Caruso, the tenor, above that of Trentino. The basis of payment is the delivery of something needed or desired and not the sacrifice expended in its production. This is especially true when the bulk of any one product like coal is gotten at less sacrifice by some producers than others or, when gotten, is of unequal quality and value.

We are surprised that Mr. Lantz says that the problem is not one of product but of wages, after the importance of product as a determinant of labor compensation was so clearly shown in our editorial. More surprised are we, seeing that Mr. Lantz lives in the very heart of the eastern Ohio trouble where the effect of product on wages is so clearly evident. If they do not bear the required relation, the employer refuses to engage the workman and that is what has happened in eastern Ohio.

Mr. Lantz says conservation and welfare work pay. One cannot see how the first can be profitable with the scale purposely schemed to make correct methods of mining expensive. Welfare work is probably not without its financial compensation but the return to capital is slow and dubious at best.

It is hard for the operator who has been compelled to run his mines at a loss or with a minimum profit and who is asked to increase the loss or see the profit wiped out to be told that he must look to recoup his losses by paying bonuses for conservational mining and by borrowing money to erect clubhouses. All this from the men who are urging higher and still higher wages.

Truly such men believe the operator's treasury a ver-

itable widow's cruse, from which the oil, though never replenished, never ran dry. We are afraid that unlike the widow and the prophet the two protagonists of the miners will find and indeed have already found that the cruse can be readily depleted if the draft on it is too heavy.

However, we are fully aware that a more artificial society might ultimately make the degree of sacrifice the determinant of compensation. But, before that time comes, there will be an end of private ownership. Then those whose work is unproductive will be compelled by law to transfer their toil to more profitable tasks, or to places where conditions are more favorable.

Mines where the coal is thin, sandwiched with impurity, sulphurous or uncertain, will not be worked and men will be moved where the captain of industry decides. A captain, indeed, he will be, for as in war, so then in peace, the regulation of a man's efforts will depend not so much on actual success in any one place as on the presumption of success by those who direct and control industry in the interest of the public.

But that is another economic period. Meantime, wages must be paid out of earnings, and the price of the product determines the wage rather than the labor of production.

Advice to American Coal Exporters Concerning the Fuel Requirements of Peru

Duncan Hood, special COAL AGE representative, traveling through the South American Republics, has appointed a number of agents to act for COAL AGE and its friends, in the large commercial and industrial centers of the different countries. In Lima, Peru, F. T. Lee, an American engineer, has been engaged as our representative. He writes us the following interesting letter relative to the coal situation in Peru:

"Yesterday, on behalf of COAL AGE, I interviewed Señor Gio Batto Isola, the leading coal dealer of Lima. He was much interested in my talk concerning the possibilities of using American coal in Peru and appeared anxious to get in communication with American exporters.

"From my conversation with Señor Isola, and several other fuel dealers, I find that coal for domestic use in Lima must be of firm structure and good weathering qualities, as the climate of Peru is unusually dry. The servant class and poorer people, in their ignorance, use only lump coal; all fine coals and dust are thrown away because it is believed they will not burn. They have probably been led to this conclusion because of the crude and inefficient stoves that are employed—there being hardly any iron cooking ranges, the majority of the kitchens being fitted with poorly designed brick stoves, or with open iron stoves similar to braziers.

"Señor Isola told me that the coal which had proved the best for this market, owing to its 'lack of fines' and low-ash content, was an Australian brand known as 'Aberdare.' Another satisfactory coal is also from Australia and is known as 'Burwood.' This latter coal, however, has a higher ash content than the 'Aberdare.' I was shown large stocks of the latter fuel and judged it to be similar to good Hocking Valley or West Virginia lump.

"The firm of W. R. Grace & Co. has started bringing coal to Peru in its own steamers from New York, via the Panama Canal, and a pile of this coal was shown me by Señor Isola, who stated that he would suffer a considerable loss on the lot he had purchased, owing to the large percentage of slack. It appeared to me that this coal was an ordinary grade of mine-run steam coal. It is evident that the Grace Co. simply used this coal to round out their cargoes and did not make any attempt to study the market; on the other hand, loading in the first coal that could be procured. Naturally, all the Lima dealers with whom I talked were disappointed with the 'sample' of American coal, and all cry 'show me.'

"I, therefore, inclose a copy of the Australian advertising circular, giving analyses of the above mentioned coal. These fuels c.i.f. Callao have cost the Peruvians $9.50 for the 'Aberdare' brand and $8.76 for the 'Burwood' coal. The unloading charges were correctly stated in a recent article in COAL AGE. These latter costs, of course, are assumed by the purchaser, so that no account need be taken of them by the exporter.

"The usual mode of payment is as follows: Once the coal is unloaded by the dock company and the weights certified by them, payment is made to the bank here in Lima with a draft at 90 days sight for the amount shown by the dock company's weights. This, in turn, on becoming due, is paid with a 90-day sight draft on London, payable in English gold, which shows the long credits obtaining here—these include time of voyage and discharge, besides the six months allowed for the maturing of the two drafts. I see no reason why the payment should not be made with a New York draft instead of one on London.

"Señor Isola stated that they were willing to pay more for screened coal, which could be used without any loss, and he was kind enough to advise me of the following conditions relative to the importation of bituminous coal in Peru, which conditions are worth repeating for the information of American exporters:

"1. The quality of coal best liked is the brand known as 'Aberdare,' which is imported from Australia and preferred because of its easy burning qualities and cleanliness, there being very little ash.

"2. After the 'Aberdare' brand, the 'Burwood' coal is favored because it has the qualities of the former, but has a higher ash content.

"3. The conditions that coal for domestic use should have are: It should be compact, without fines, easy burning and low-ash content. We prefer to pay 50c. more for a screened coal which does not carry dirt and fines.

"4. The buying here is done c.i.f. Callao, payment being according to the weights given by the dock company, with drafts at 90 days, which are in turn paid in drafts at 90 days sight on London and in English currency.

"5. If you can send us samples of coal which have the above conditions, we are ready to examine them, and, after a practical test and the opinion of our customers, are ready to enter into important negotiations, as stated above, providing the results have been favorable.

"6. The actual price of Australian coal comprising the above qualities is $9.50 for the 'Aberdare' and $8.76 for the 'Burwood' brand. Any higher price could not be considered inasmuch as the prices just indicated are those quoted by the principal importing houses of Lima for this week, from which we have just purchased 1000 tons."

Sociological Department

Wilkes-Barre District Mining School

SPECIAL CORRESPONDENCE

The fifth year of the Wilkes-Barre District Mining School, which is conducted jointly by the Wilkes-Barre Young Men's Christian Association and by the Wilkes-Barre District Mining Institute, opened for registration on Oct. 6, the first class night being Oct. 16. Classes will be held two evenings each week until Apr. 16, 1915.

The course of study includes practically every subject having any bearing on the mining of coal, and has the endorsement of leading mining officials; it is systematically arranged, so that it is possible for students to complete the entire course. This year preparatory instruction has been arranged for those who possess little education, and the subjects taught will be Reading, Writing, Spelling and Arithmetic, with special relation to mining subjects.



A Class in the Wilkes-Barre District Mining School

The regular course is designed to be covered in three years. In the first year the subjects included are Arithmetic up to and including Mensuration; Mine Gases, their occurrence, properties, behavior and detection; Mine Ventilation, the general principles of ventilation, and the production and control of air currents; Mine Law, its application and practical reference, with special attention paid to composition work; and lectures on organization, management and mine safety.

In the second year, the subjects are Arithmetic, including Mensuration, Involution and Evolution, Ratio and Proportion; Mine Surveying, its general principles, compass surveying and instruments; Mine Ventilation, the production and control of air currents, and practical considerations in elementary regulating and splitting; Mine Law and Lectures.

In the third year, the men are taught Mathematics, including Trigonometry and Logarithms; Mine Surveying, including compass surveying and instruments, general principles of mapping, linear and angular measurements, and calculations; Mine Ventilation, control of air currents, advanced study on regulating and splitting, and ventilators; Electricity and Magnetism, fundamental principles, electrical units, and application to mining; Mechanics, matter, motion and velocity, force, pulleys and gears, friction, centrifugal force, work and energy, strength of materials; Air Compression, general principles, styles of compressors, transmission and application; Mine Law and Lectures.

In addition to the night classes, a day class is held on the same days as the night classes, from 1:30 to 3:30 p.m. This is for the men who work at nights, either all the time, or every other week. Because many men work nights on alternate weeks, the work in this class is largely individual, and covers all the first and most of the second year work. If enough men enroll for this day class, it is planned to form two grades and employ an additional teacher.

The fees for this course are $8 per year. To those students who complete the entire course and pass a satisfactory examination the fees paid are refunded. This plan is made possible by reason of the interest taken in the school by the officials of the coal companies operating in and about Wilkes-Barre. At the annual banquet of the Wilkes-Barre District Mining Institute last spring, 14 graduates of the school were presented with diplomas and with checks for the amount of tuition paid by them. This was the first class to complete the course. The books are furnished by the school, and remain their property, a small fee being charged for their use.

The teachers for the school have, without exception, been chosen because of special fitness to teach the subjects assigned to them. Charles Enzian, mining engineer of the U. S. Bureau of Mines, continues as supervising principal, a position which he has occupied since the establishment of the school. C. A. Garner, mining engineer with the Lehigh Valley Coal Co., a former instructor in the School of Mines, Pennsylvania State College, is senior teacher, and is in charge of the classes in Surveying, Mine Law, and general subjects. Frank Nicholson, electrical engineer with the Lehigh & Wilkes-Barre Coal Co., formerly with the Westinghouse Mfg. Co., and the Vulcan Iron Works, teaches Arithmetic, Mechanics, Air Compression, Electricity and Magnetism.

Robert Johnson, mine foreman with the Lehigh Valley Coal Co., at Henry Colliery, and William D. Thomas, mine foreman with the Kingston Coal Co., teach Arithmetic, Mine Law, Mine Gases, and Ventilation. Edward P. Davis, assistant mine foreman with the Lackawanna Coal Co., a graduate of the school, is teaching the day class for the second year. John L. Picton, mine foreman with the Plymouth Coal Co., also a graduate of the school, is in charge of the preparatory class.

There are classes in many other subjects beside mining taught in the night schools conducted in the same building by the Y. M. C. A. Sometimes mining students find it to their advantage to supplement the regular course in mining by taking subjects other than those in the regular mining course. Especial emphasis is placed upon the classes in English for men who do not speak that language. Two classes are offered in the Y. M. C. A. Building, for the accommodation of young men of foreign birth, who wish to learn to speak, read and write the English language.

Too much emphasis cannot be placed upon the importance of all English-speaking mining men coöperating in securing students for these classes in English. The lives of those who work with the foreigner are often endangered because of the failure of the foreigner to understand the instructions given him. As a matter of self-preservation, if for no other reason, every English-speaking man should try to get these men interested in studying the English language.

The officers and directors of the Wilkes-Barre District Mining Institute, who are responsible for the Mining School, are: Thomas H. Williams, president; H. G. Davis, first vice-president; Jas. J. McCarthy, second vice-president; F. M. Devendorf, secretary and treasurer; Thomas R. Evans, A. L. Williams, Charles Enzian, Benj. D. Amos, Gilbert Jones, W. G. Thomas, P. H. Devers, M. J. Flaherty, Thos. H. Price, Thomas Martin, Thos. J. Williams, Samuel R. Morgan, R. P. Thomas, S. William Edwards, J. S. Hammonds, E. J. Newbaker, Lewis J. Davies, Thomas Thomas, and John H. Haertter. F. M. Devendorf, the secretary-treasurer of the institute, is also general secretary of the Wilkes-Barre Young Men's Christian Association.

Legal Department

Coal and the War Tax Bill

By A. L. H. Street*

An examination of the War Tax Bill, which became a law Oct. 22, through the President's approval, discloses that it affects the coal trade as follows:

Under Section 3, which became effective Nov. 1, 1914, an anuual tax of $20 is imposed upon "commercial brokers." "Every person, firm or company whose business it is as a broker to negotiate sales or purchases of goods, wares, produce or merchandise, or to negotiate freights and other business for the owners of vessels, or for the shippers or consignors or consignees of freight carried by *vessels*, shall be regarded as a commercial broker under this Act." The same section imposes an annual tax of $20 on "commission merchants." "Every person, firm or company whose business it is to receive into his or its possession any goods, wares or merchandise to sell the same on commission shall be regarded as a commission merchant." But after paying a tax as a commercial broker, one is not taxable as a commission merchant.

Stamp taxes are levied as follows: "Bonds, debentures or certificates of indebtedness issued on and after the first of December, 1914, by an association, company or corporation, on each $100 of face value or fraction thereof, 5c., and on each original issue, whether on organization or reorganization, of certificates of stock by any such association, company or corporation, on each $100 of face value or fraction thereof, 5c., and on all sales, or agreements to sell, or memoranda of sales or deliveries or transfers of shares or certificates of stock in any association, company or corporation, whether made upon or shown by the books of the association, company or corporation, or by any assignment in blank, or by any delivery, or by any paper or agreement or memorandum or other evidence of transfer or sale, whether entitling the holder in any manner to the benefit of such stock, or to secure the future payment of money or for the future transfer of any stock, on each $100 of face value, or fraction thereof, 2 cents."

This provision does not apply, however, to stock pledged for loans nor to agreements evidencing such pledges. When stock transfers are shown only on corporate books, the stamp must be placed on the books; and where they are evidenced by certificates, it must be placed thereon. When a certificate is assigned in blank, the seller must give the buyer a bill or memorandum of sale, to which the stamp must be affixed, showing the date thereof, the name of the seller, the amount of the sale, and the matter or thing to which it refers. Failure to comply with these requirements subjects the offender to a fine not exceeding $1000, or imprisonment not more than six months, or both such fine and imprisonment.

Every sale or agreement to sell any "products or merchandise *at any exchange, or board of trade, or other similar place.*" must be evidenced by a bill of sale or agreement, to which must be attached stamps equal to 1c. for every $100, and fractional part thereof in excess of $100. The bill or agreement must show its date, the seller's name, the price, and the matter or thing to which it refers. Violations are punishable as above mentioned. But this provision does not apply "in case of products or merchandise actually delivered at the time of sale or while in vessel, boat or car, and actually in the course of transportation * * * provided such bill, memorandum, agreement or other evidence of such sale, or agreement of sale, or agreement to sell shall be accompanied by bills of lading or vouchers showing that the said products are actually in course of transportation."

Notes, and renewal notes are subject to a tax of 2c. for the first $100, and 2c. for each additional $100 or fraction thereof.

Carriers must issue bills of lading, receipts or manifests for each shipment, where the freight charge exceeds 5c., and attach thereto a 1c. stamp. Violation of this requirement is punishable by a fine of $50.

Telegraph and telephone companies must collect from the sender of each message where the charge is 15c. or more, 1c. additional which must be accounted for to the Government. This applies to telephone conversations, as well as telegrams, but only one charge can be made for a single message although it may pass over more than one line.

Conveyances of land, not including mortgages, "when the consideration or the value of the interest or property conveyed, exclusive of the value of any lien or encumbrance thereon, exceeds $100 and does not exceed $500, 50c.; and for each additional $500 or fractional part thereof in excess of $500, 50c." A deed to coal in place, but not a coal lease, would seem to fall within this provision. In any event, when the amount payable to an owner of land for the privilege of removing underlying coal is left to be determined by future development, it must be that no tax can be levied, since the law does not afford a basis for the computation thereof.

A 10c. tax is levied on each proxy to vote at any election of corporate officers. Powers of attorney in general are subject to a 25c. tax, as are all commercial protests.

Separate provisions are made by the Act for punishment of the offenses of issuing papers not properly stamped (fine not exceeding $100); forgery or counterfeiting of stamps, etc.; evading the requirements concerning notes ($200 fine); failing to cancel stamps affixed by writing or stamping initials and date (fine not exceeding $500, or imprisonment for not more than six months, or both).

Administration of the provisions of the law is placed under the control of the Treasury Department.

The last section of the law provides that the act shall cease to apply after Dec. 31, 1915, except for the purpose of enforcing payment of taxes theretofore accruing; and that stamps remaining unused shall be redeemed.

*Attorney at law, St. Paul, Minn.

Discussion By Readers

Mining Laws, Legislation and Mine Regulation

The discussion that is being brought out on this subject is most interesting and we urge that all our readers submit their views. Eventually we hope to print a résumé of the opinions expressed and then send such summary to lawmakers in all coal states. Legislation that affects an industry, affects every individual engaged in that industry; the problem, therefore, is of vital importance to each and all of us.—EDITOR.

Letter No. 8—It is a fact to be regretted that our state mining laws are, in many cases, the product of legislative bodies composed largely of men unacquainted with mines and mining conditions. It requires no argument to convince even the most skeptical that such men cannot be expected to enact laws that will prove effective or stand the practical test. One has but to glance at the mining laws of most states to be impressed with the fact that they could be made more plain, so that their meaning would be better understood by the men who must obey them. The need of constant revision of these laws is at once evident to any man familiar with mining requirements. We may ask the question, Do we go to work in the right way when drafting these mining laws, by allowing men unfamiliar with the conditions that exist in coal mines to have a leading voice in formulating such laws? I am glad to see that this subject is to be thoroughly discussed in COAL AGE, and I hope that all classes of mining men, particularly mine inspectors, will do their part to improve the present condition in this regard.

It is important to recognize the fact, at the start, that, in many important instances, no two mine inspectors will interpret the law alike, unless they get together and compare notes and get each other's viewpoints beforehand.

I want to draw attention to one point with which I have been impressed recently. Picking up the paper, under date of Nov. 20, I read that suit has been instituted against a certain mine foreman who is held responsible by the mine inspector of the district for the death of a miner who was killed by a fall of rock in his working place. It is claimed by the mine foreman that he directed the man an hour before the accident occurred to set props under the roof, as it appeared to be unsafe. Having done this, he proceeded to inspect other working places, and was so engaged when news reached him of the accident. It is claimed, on the other hand, that the foreman or assistant foreman should have remained in this place until the timber was set and he was sure that the place was safe for work.

We may ask, Does the law require a foreman or his assistant to stay in one place until he knows that his orders have been completely carried out? This is not an isolated case, but a common occurrence. One frequently reads in the daily papers that mine foreman so and so, or a superintendent, or company is held responsible for the death of one or more of their miners. It may be that a similar accident has previously been passed without any criminal action being taken by those whose duty it is to enforce the state laws. This may be attributed to the fact that it is difficult in most of these cases to reach an interpretation of the law that would be satisfactory to all concerned. For this reason, the inspector selects a single case, which he intends to bring before the court for the purpose of having the meaning of the law interpreted thereby.

Under these conditions, it is quite possible, in the event that the court's ruling should sustain the inspector, that such a judgment might impose an unjust burden on a particular case. This fact alone, however, emphasizes the need of such a revision of the mining laws as is required to make their meaning clear and unmistakable.

In closing, I would refer, briefly, to another point that has frequently arisen. This is in regard to the requirement of many mining laws that a borehole shall be kept in advance of the headings driven in virgin territory, for the purpose of testing the ground for the possible presence of gas or water, particularly where clay veins or faults are of frequent occurrence. In many cases, this law has worked an unjust burden on the operator by unnecessarily increasing the cost of production per ton of coal mined. In many mining localities, in the same state, the necessity does not exist for the driving of such advance boreholes. Other similar cases could be mentioned where the law imposes an unnecessary burden on coal operators.

MINING ENGINEER.

Uniontown, Penn.

Letter No. 9—The suggested discussion of present existing mining laws and the need of more intelligent mine legislation and more effective mine regulations, as made in COAL AGE, Oct. 31, p. 698, is timely and of the utmost importance to the industry and to miners and operators alike, since these are so mutually dependent that what affects one necessarily affects the other.

I am glad to say that Alabama has a fairly good set of mining laws. In some instances, however, there is room for improvement. For instance, the reading of the Alabama law, in respect to the examination of gaseous mines by the fireboss before workmen are allowed to enter the mine presents such a wide margin as to practically defeat the evident intention of the lawmakers, which is to secure the greatest safety both to life and property. The weak point of the law in this regard is its failure to specify any time limit in which the inspection of the mine must be made. The statutes simply require that such inspection of the working places be made "every morning," which may be any time after midnight.

Because the mining law does not specify a particular time limit, other than "every morning," many firebosses in this state are required by the company whom they serve to commence this inspection as early as 12 p.m. (mid-

night). In some cases, they are required to commence before midnight, in order that they may cover the large amount of territory assigned to them. It is surprising that large coal companies, having extensive operations that involve the expenditure of large sums of money, should take advantage of the law's weakness, in this respect, and be willing to run the great risk of a heavy loss of life and destruction of the property, which this manner of inspection entails.

All mining men having a practical knowledge of conditions underground know that no fireboss, however competent, can conscientiously guarantee the safety of working places he has examined from four to five hours previous to the workmen entering the mine. In this interval, there has been ample time for a heavy fall of roof to occur, which might derange the ventilation and cause a dangerous accumulation of gas that would prove a veritable death trap not only to the miner working in that place, but, possibly, to everyone in the mine. It is clearly evident that the law should be more specific and require that every part of all gaseous mines be inspected not more than three hours previous to the time set for the workmen to enter the mine.

Another important point requiring recognition in state mining laws is that relating to the removal of an accumulation of gas. The law should require that, before any attempt is made to disturb or remove such an accumulation of gas, all men working on the return of that current or air split should be withdrawn. The law should further state that no person, except those actually required to perform the work, should be permitted to enter that section of the mine until the gas has been removed and the places examined and pronounced safe for work. In the reremoval of gas, the law should require that only safety lamps be used and that the antiquated practice of "brushing" out the gas should be prohibited. It should be made compulsory to remove all gas by means of the ventilating current only.

The Alabama mining law empowers the governor to remove any mine inspector with or without cause (Sec. 14). This feature of the law, in my opinion, places the mine inspector at a disadvantage, and, naturally, makes him hesitate at times to enforce requirements that he would otherwise consider essential to the health and safety of the miners. I believe the appointment of mine inspectors should be wholly competitive and that his removal from office could only be effected "for cause."

There are a number of other important points that might be enumerated if space permitted; but I will briefly mention a few of these and leave their discussion to others. Some of these points are as follows: The prohibition of shooting off the solid; the exclusive use of permissible explosives; the adoption of the electric head-lamp at the working face, in gaseous mines; the firing of all shots after the workmen have left the mine and by competent shotfirers; compulsory use of safety chains or catches on all cages and trips used for hoisting or lowering men.

By removing the weak points in state mining laws and enforcing more strictly the necessary mine regulations, we can hope for a great reduction in mine accidents.

EDWIN HUSBAND, Member,
Alabama Mine Examining Board.

Ensley, Ala.

Letter No. 10, to be published next week, is from W. L. Morgan of the Illinois Miners and Mechanics Institute.

Proposed Method of Working to Reduce Expense of Upkeep

Letter No. 2—I was interested in reading the letter of Moses Johnson, COAL AGE, Oct. 31, p. 723, in regard to adopting such a method of working as will reduce to a minimum the expense of keeping the roads open in the mine and in the working places.

In regard to reducing the cost of production, the question of reducing the expense for maintenance is one of the principal things to be considered. It matters not how well a mine is laid out, if the general plan is not adapted to the conditions existing in the strata and if the work is not properly executed, troubles are sure to arise that will greatly increase the expense of maintenance and the cost of production.

Consider, for a moment, the manner of work in some of our uptodate mines, in respect to the care taken to put the main haulage roads and main air courses in good condition, from the start; and observe how this method reduces the cost of upkeep to almost nothing. Steel timbers are used; or, if conditions are unfavorable, concrete walls and brick arches are employed to support the sides and roof. Heavy rails of 70 or 80 lb. per yd. are frequently laid on steel ties, which afford a solid roadbed and reduce the cost of haulage to a minimum. In fact, everything is done to secure the best possible conditions in regard to haulage and ventilation in such mines.

Mr. Johnson may not have made his proposed plan sufficiently clear, but it is certain that "from 6 to 7 years to drive and finish a single pair of butt entries a distance of 1200 ft." is a rate far too slow for economical working. However, he must not rely too much on getting 1000 tons of coal out of four entries, as he states, especially as the seam is only 3.5 ft. in thickness.

The best plan that I have seen adopted in room-and-pillar work, particularly where the roof is bad and the bottom has a tendency to heave, is to drive the butt entries a sufficient distance to provide for, say 30 rooms. Turn no rooms until the entry is finished. Then, drive the rooms on 60-ft. centers and instruct the entrymen to take a cut out of the rib each 30 ft. or at the joint of every 30-ft. rail. When driving the rooms, use one of these cuts for a room-neck and the other for a manhole. If motor haulage is used, not less than 25-lb. rails should be adopted, and these should be laid on a sufficient number of ties to form a solid bed. It is always easier to put down the ties before laying the rails than to put them in afterward. Care should be taken to align the tracks and ballast the roadbed thoroughly, besides bonding the rails and using good fish-plates at each joint, when the road is first made.

Assuming that conditions will permit, a great saving will result in the use of machines for cutting the coal. If compressed air is used, a 2-in. pipe line should be installed, with a tee at each room-neck. This tee should accommodate a 1¼-in. pipe running into each room. When the heading is finished, six rooms should be turned. The rail joints at the mouth of each room will be convenient for laying the frog for the room switch. These six rooms should be driven to the limit. Then, if the conditions will permit, start at once and draw back the pillars as far as is safe. The rooms should be started from the inby end of the heading; and while the pillars in the first six rooms are being drawn back, another set of six rooms should be

turned and driven up to the limit, as before. The same method should be repeated the entire length of the entry. As quickly as the room pillars are drawn back in each set of rooms, the entry stumps should be drawn and the headings closed.

I do not like the idea of turning 24 rooms away together, although this may have to be done with a limited amount of entry available. Such a plan has the objection of a heavy expense for turning rooms at one time, besides the expense of laying switches and the necessary delay because the trackmen can only be in one place, at one time. Furthermore, the narrow work in driving room-necks affords a limited supply of coal, and there is some delay in changing the machines when cutting so many narrow room-necks at one time.

The method I have described is being worked successfully in mines with which I am acquainted; and, with proper care, the same number of men can be worked continuously in the same heading, until the last room is finished and the pillars drawn. I have known a heading to be started and finished in a year, a distance of 1800 ft.; but the work was double-shifted, running night and day. The men worked on day shift for a month and then changed with the night-shift men for the following month. The men on day shift took out all the coal, while the rock was moved and crosscuts driven by the night men. One heading furnished three trips of 50 cars each per day, or 150 cars holding, say 150 tons. This tonnage was the output of from 20 to 24 men, showing an average of about 6 tons of coal, per man, per day, which is about as much coal as can be expected under ordinary conditions of mining.

Two men of average ability can draw back a room pillar in about a month, and the chain and barrier pillars can be drawn about as fast.

In closing, I would say there would be another difficulty experienced in Mr. Johnson's plan when drawing back the pillars. The 24 rooms being started together would probably finish together, with the result that the pillar work would have to be started in each room at the same time. This would make the line of pillar work parallel to the entry when it should always run at an angle with the entry. I believe he would be unable to work more than seven or eight pillars at a time, and the remainder would have to stand for some time before they could be drawn.

I should like to hear the experience or views of other mining men on this very important phase of coal-mine operation.

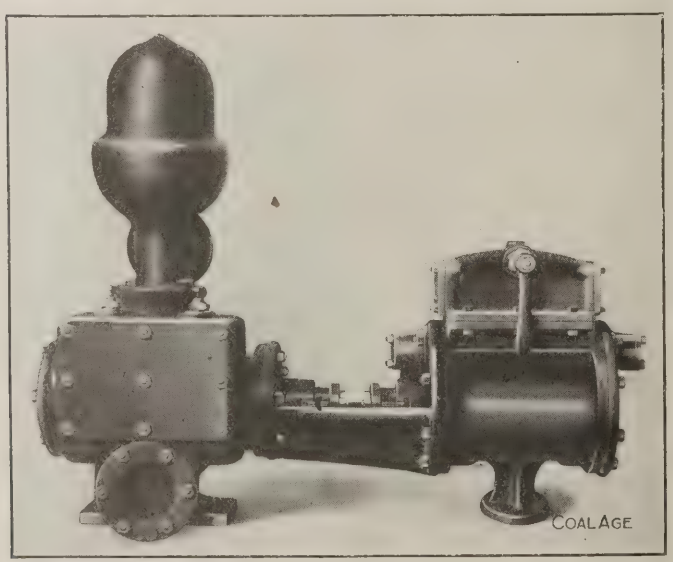
THOMAS HOGARTH, Mine Foreman,
Penn-Mary Coal Co.
Heilwood, Penn.

Study Course in Coal Mining

By J. T. BEARD

The Coal Age Pocket Book

One of the simplest forms of a single direct-acting pump of the piston type is illustrated in the accompanying figure. The cut is a side view, showing the steam cylinder on the right and the water cylinder on the left, the latter being



SIDE VIEW OF CAMERON PUMP. REGULAR PATTERN

partly hidden by the large valve chest, containing the valves which control the flow of water in obedience to each stroke of the piston.

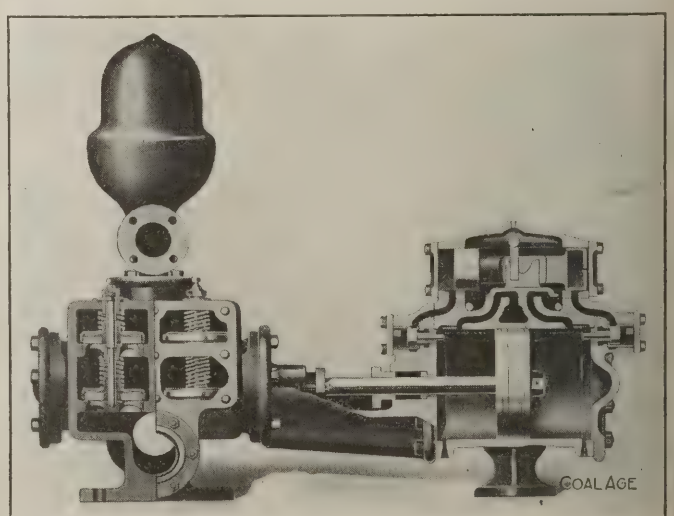
The diameter of the steam cylinder of this particular pump is 12 in. and that of the water cylinder 7 in., the length of its stroke being 13 in., its size is, therefore, expressed thus, 12x7x13 in.

As shown in the figure, the valve chest, in this pump, is placed on the side of the water cylinder, which reduces the suction lift. The valve chest is surmounted by an air chamber that equalizes the action of the pump and maintains a more uniform pressure and flow of water in the discharge pipe, which is here shown behind the chamber, but can be set in any desired position on the pump.

The Coal Age Pocket Book

On this page is shown a complete sectional view of the pump described on the preceding page. The section of the steam cylinder surmounted by its valve chest, on the right of the figure, shows the steam ports, valves and auxiliary plunger common to all direct-acting steam pumps. The hand lever, which is more clearly shown in the side view of this pump, is used when the operator desires to reverse the action of the pump.

On the left of the figure is shown the valve chest of the water cylinder, with the bonnet removed so as to expose to view the valves. The chest, as shown, has two decks, each being bored with a taper to receive the brass valve seats.



SECTIONAL VIEW, CAMERON PUMP, REGULAR PATTERN

The valves are the usual poppet valves employed in pumps of this type, and are held to their seats by springs that are adjustable to give the required action. As here shown, the two valves on each end of the cylinder are mounted on a single valve stem, which can be withdrawn when it is desired to remove the valves.

Inquiries of General Interest

Norwegian Market for Coal

What opportunities are there for the sale of American coal in Norway? Can you also tell me what countries at the present time supply fuel to satisfy the demands of the Norwegian markets?

AMERICAN EXPORTER.

New York City.

Up to the present time very little American coal has been shipped to Norway. The proximity of the Norwegian markets to the British coal fields has practically given Great Britain a monopoly on this trade. However, the recurring strikes of miners in England have at times seriously threatened the coal supply of Norway to the extent that railways and shipping and industrial concerns have been compelled to retrench, and the present war emphasizes the necessity of making arrangements for a future supply from sources outside Europe.

The market for coal in Norway is quite important when it is taken into consideration that its merchant marine stands fourth among the world's nations and that Norway does not produce a single ton of coal. The importations of coal and coke in 1912 were as follows:

Countries	Coal, Metric Tons	Coke, Metric Tons
Belgium	838	12,216
Denmark	10	.....
France	.....	4,355
Germany	70,189	23,098
Great Britain	2,157,968	135,857
Netherlands	14,176	34,681
Spitzbergen	19,860	.....

According to a recent *Consular Report,* Newcastle coal is now quoted $3.71 to $3.77 per metric ton f.o.b. steamers east coast; Welsh coal is quoted at $5.35 per ton.

While the matter of tonnage for the coal trade between Norway and the United States has been the main obstacle, this difficulty is now in a fair way to be overcome, as the Norwegian-American Line has added three large freight steamers to its fleet of chartered vessels to be employed in the freight service between Norway and New York. In addition to these the Norway-Mexico line runs regular freight steamers between Norwegian ports and Atlantic and Gulf ports in the United States.

The docking facilities at Bergen are ample, the discharging capacity at the smallest docks being 100 tons daily per gang by the steamer's winches, and for the larger ones like the gas works (steam group) and the Bergenske Dampskibsselskab (electric elevator), the discharging capacity is 30 and 50 tons, respectively, per hour.

The Norwegian Government recently purchased 5600 tons of coal at Baltimore, which proved a rather expensive transaction; the high freight rate and war insurance made the cargo cost nearly double the price of English coal. Coal and coke are duty free.

The Formation of a Flame Cap

An interesting question has arisen in connection with the work of testing for gas in coal mines. It is as follows:

Why is a cap or aureole formed on the flame of a safety lamp when the air in which the lamp is burning contains less firedamp than is sufficient to render it explosive?

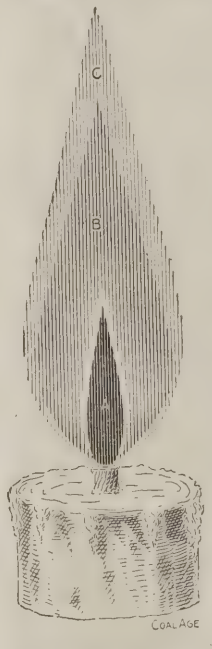
As this question has been variously discussed, and there appears to be much doubt in the minds of some firebosses who, above all others, should have a clear conception of the effect of small percentages of gas on the flame of the lamp, it would be of interest to COAL AGE readers to have this thoroughly explained.

"ANXIOUS."

Fernie, B. C., Can.

It is well known that the oxygen of the air supports the combustion of the flame. The combustion going on in the flame is due to the burning of the carbon set free when the hydrocarbons of the oil, which are being constantly vaporized, are dissociated or broken up by the heat of the flame. It is the incandescent carbon particles that furnish the light or make the flame luminous. The hydrogen, also set free by the dissociation of the hydrocarbons, is likewise burned; but, unlike the combustion of the carbon particles, forms a nonluminous envelope that surrounds the flame of the lamp.

In the combustion of a candle flame burning in pure air, there are thus formed three zones, *A, B* and *C,* as shown in the accompanying figure. The inner zone *A* is a dark zone filled with hydrocarbon vapors. There is no combustion going on in this zone. The zone *B* is the luminous zone filled with the incandescent carbon particles undergoing combustion. Surrounding this zone is the zone *C,* which is a nonluminous envelope formed by the burning of the hydrogen set free from the hydrocarbons of the vaporized oil, in the flame.



SHOWING THE ZONES IN A CANDLE FLAME

It should be perfectly clear that the presence of a combustible gas, such as methane (CH_4), or the carbon monoxide (CO) distilled from coal dust floating in the air surrounding the flame, will at once increase the combustion in the outer nonluminous envelope *C,* by the burning of these gases when present. The outer zone *C,* which is almost imperceptible in a flame burning in pure air, is thus enlarged and becomes distinctly visible when such combustible gases are present.

It is this enlargement of the nonluminous envelope that produces the cap, which increases rapidly with the percentage of gas present in the air. Naturally, the effect is greater at the tip of the flame which reaches upward, aided largely by the upward draft due to its own heat. It is this effect that causes the observed lengthening of the flame in an atmosphere charged with gas.

Examination Questions

Hoisting Engineers' Examination, Held at Albia, Sept. 23 and 24, 1914

(Selected Questions, Continued from Last Week)

Ques.—(a) What should be the tensile strength of a good boiler plate? (b) What should be the tensile strength of rivets used in boiler construction?

Ans.—(a) The tensile strength of a good boiler-plate steel should not be less than 60,000 lb. per sq.in.

(b) The tensile strength of good rivet iron should not be less than 50,000 lb. per sq.in., in boiler construction.

Ques.—How strong are riveted joints, in boilers, as compared to the strength of boiler plates?

Ans.—A committee appointed by the Institute of Mechanical Engineers to investigate the strength of riveted joints, in boiler construction, found that single-riveted lap joints gave an efficiency varying from 54.8 to 60.8 per cent., and double-riveted lap joints, of 3/8-in. boiler plate, an efficiency ranging from 67.1 to 81.2 per cent. For double-riveted butt joints, in double shear, the efficiency of the joint ranged from 61.4 to 71.3, although it is stated that these low efficiencies for butt joints were probably due to the use of soft steel in the rivets.

From the results of these experiments, an average efficiency of 55 per cent. for single-riveted lap joints and 70 per cent. for double-riveted lap joints may be assumed, in estimating the strength of boilers. The efficiency of a riveted joint expresses the ratio of the strength of the joint to the strength of the boiler plate.

Ques.—A boiler is 60 in., in diameter; the plates are 3/8 in., in thickness, and have a tensile strength of 60,000 lb. per sq.in.; the efficiency of the longitudinal seam is 70 per cent.; what is the bursting pressure of the boiler?

Ans.—The bursting pressure of a boiler is found by multiplying twice the thickness of the boiler plate, in inches, by the tensile strength of the steel, in pounds per square inch, and that product by the efficiency of the longitudinal seam or joint, and dividing the final result by the diameter of the boiler shell in inches. Thus, in this case,

$$p = \frac{2\,t f E}{d} = \frac{2 \times \frac{3}{8} \times 60{,}000 \times 0.70}{60} = 525\ lb.\ per\ sq.in.$$

Ques.—In a slide-valve engine, how much is the eccentric placed in advance of the crank?

Ans.—The angle of advance must be equal to the sum of the angles required by the lap of the valve and the desired lead, which must be determined to correspond to these requirements in each case separately.

Ques.—(a) How can we find the length of stroke of any engine without disturbing the cylinders? (b) How is the area of a piston found?

Ans.—(a) The length of stroke of an engine is equal to twice the distance from the center of the shaft to the center of the crankpin, which is found by exact measurement.

(b) The area of a piston is calculated from its diameter, by multiplying the square of the diameter, in inches, by 0.7854. Thus, the area of a piston 10 in. in diameter is $10^2 \times 0.7854 = 78.54$ sq.in.

Ques.—What will be the volume of a pound of steam, at 100 lb. gage pressure?

Ans.—This question can only be answered by reference to steam tables. If, however, the temperature of dry saturated steam, at this pressure, be given, the volume of 1 lb. of the steam can be found approximately by the formula

$$V = \frac{0.37\ T}{0.6235\ p}$$

For example, at sea level, a gage pressure of 100 lb. per sq.in. corresponds to an absolute pressure of 100 + 14.7 = 114.7 lb. per sq.in. Then, taking the temperature of dry saturated steam, at 100 lb. gage as 338 deg. F., and substituting these values in the formula given, the volume of 1 lb. of this steam will be

$$V = \frac{0.37\ (460 + 338)}{0.6235 \times 114.7} = 4.128\ cu.ft.$$

The actual volume of 1 lb. of steam, in this case, as taken from steam tables, is 3.89 cu.ft. The formula given is only approximate, as it assumes that the specific gravity of steam is that of water vapor (0.6235) referred to air of the same temperature and pressure. Owing, however, to the density of steam increasing more rapidly than that of air as the temperature rises, the result obtained above is too high. The question is not a fair one in an examination, unless the use of textbooks is allowed.

Ques.—(a) How much coal is used per horsepower per hour, in ordinary plants? (b) How much coal may be burned per square foot of grate surface?

Ans.—(a) The consumption of coal under the boiler will depend both on the quality of coal burned and the style of boiler used. When burning a fair quality of coal under an ordinary flue or return tubular boiler, with natural draft, an average fuel consumption may be assumed as 4.5 lb. of coal per b.hp. per hr.

(b) The weight of coal burned, per hour, with natural draft, is commonly taken as 10 lb. for anthracite and 15 lb. for bituminous coal per sq.ft. of grate surface. These are only fair average values, as much depends on the quality of the coal burned, amount of draft and kind of grate and furnace used.

Ques.—In case one of the fire plates of a boiler is "bagged" or bulged, over the fire, how would you repair it?

Ans.—The boiler should be thrown out of commission and drained, to enable a thorough examination of the plate, which may be cracked in addition to being bulged. The bulged portion should then be cut out and a patch put on the inside of the boiler sufficient to cover this spot. It is important to put this patch on the inside rather than on the outside of the plate, as it will then better withstand the pressure within the boiler.

Coal and Coke News

Washington, D. C.

It seems now practically certain, as the result of semi-official intimations, that the 5 per cent. railroad rate decision will be handed down within the next two weeks, or very shortly thereafter. The Interstate Commerce Commission undoubtedly recognizes the need of haste and is understood to be working hard on the decision.

It is an interesting fact that the Commission, though, of course, maintaining the utmost official secrecy as usual, is now pretty generally regarded as inclining more to the side of an advance than it did a short time ago, when the argument in the case had just been closed. This supposed alteration of front is due undoubtedly to the fact that there is strong pressure for some further concessions to the roads, and that they are regarded with more sympathy by the public at large, so far as indications here available may be taken to prove anything. There has, however, been nothing thus far to indicate any change of attitude as to coal, which is admitted to be paying high enough rates today.

Secretary of the Interior Lane in his report for the year, made public on Dec. 10, reviews the work of the Bureau of Mines during the past 12 months, and says that the Bureau has:

1. Invented and applied methods for extracting radium from the carnotite ores of Colorado and Utah with greater efficiency than is attained by any foreign producer of radium, and at an indicated cost of less than one-third the present selling price.
2. Developed the fact that the annual value of the by-products wasted in present methods of making coke in this country amounts to $75,000,000, and conducted investigations looking to the use of better methods of making coke and the upbuilding of byproduct industries.
3. Saved $200,000 or more to the Government in purchase of coal through the use of the specification method of buying coal on the basis of its content of moisture and ash and its heating value, and the selection of fuels best adapted to certain power plants.
4. Through an expenditure of not more than $15,000 in investigation and demonstrations, has been instrumental in saving natural gas valued at $15,000,000 during the last 18 months.
5. Conducted investigations and experiments with petroleum with a view to increasing efficiency in the petroleum industry, in which preventable wastes and losses in the development of oil fields and in transporting and storing oil are fully $50,000,000 yearly.
6. Carried on tests for perfecting "permissible" lamps, electric motors and switches, and other safety devices, which, if generally used in mines, cannot fail to greatly reduce the number of fatal and other accidents.
7. Designed and demonstrated devices for arresting dust explosions in coal mines.
8. Was first in bringing about the use of "permissible," or relatively safe, explosives, of which more than 25,000,000 lb. were used last year in many gaseous and dusty coal mines, with a corresponding reduction of the danger of explosions.
9. Rescued men after disasters; trained over 8500 miners in rescue or first-aid methods; was instrumental in greatly increasing the number of rescue and first-aid corps equipped and maintained by mining companies. Nearly 25,000 miners have received this training, and more than 12,000 sets of rescue apparatus have been purchased by private companies. (More than 3000 men were killed and more than 100,000 men were injured in the mining and metallurgical industries of this country during 1913. The money loss from these accidents is estimated at not less than $12,000,000, and hundreds of millions of dollars were lost or wasted from not employing efficient methods of mining and treating ores and minerals.)

The Geological Survey, says Secretary Lane in his report, has:

1. Completed detailed geological surveys covering 12,000 square miles, including 180 square miles in Alaska, and reconnoissance geological surveys of 57,000 square miles in the United States and 6500 square miles in Alaska, the total territory surveyed geologically during the year being as great as the combined area of Denmark, Switzerland and Greece.
2. Made topographic surveys covering 23,000 square miles in the United States, 6000 square miles in Alaska, and 342 square miles in Hawaii, or an area more than the Netherlands and Belgium combined.
3. Continued stream gaging at 1400 stations in 39 states, Alaska, and Hawaii.
4. Classified 47,000,000 acres of public lands, an area larger than the New England states, including the following items:
   a. Designated as nonirrigable and open to entry under the enlarged homestead act, 33,000,000 acres in 12 states, or enough land to make 100,000 homesteads of 320 acres each.
   b. Examined and classified 2,400,000 acres of Indian lands and 1,700,000 acres of withdrawn phosphate lands.
   c. Restored to entry nearly 9,000,000 acres of land of all kinds previously withdrawn for classification, including 8,275,000 acres of coal-land withdrawals, of which 1,300,000 acres were appraised and made available for purchase as coal lands, 188,000 acres determined not to contain oil, 260,000 acres classified as nonphosphate, and 90,000 acres decided not to be essential to water-power development.
   d. Caused the withdrawal of a total of 752,500 acres, including 209,000 acres of oil lands, 170,000 acres of phosphate lands, 92,000 acres as possibly containing potash, 183,000 acres reserved for water-power sites, and 75,000 acres of public water reserves.
5. Made its annual census of mineral production through correspondence with about 90,000 mineral producers.

HARRISBURG, PENN.

Judge Van Swearingen in an opinion handed down on Dec. 1, upholds the constitutionality of the bituminous mining law, which requires operators to maintain boreholes in the face of mine workings where gas is generated. Although this feature has been law since 1911, it has not been observed by many of the operators. They have contended that the maintenance of such boreholes ahead of the opened work was not necessary for the safety of the miners. An account of the stand of the operators in this regard can be found in "Coal Age," Vol. 4, p. 900, Dec. 13, 1913, and in the Proceedings of the Coal Mining Institute of America for 1913. It will be seen in these references that the operators claim that a change of punctuation was the cause of the change in the law and that no rewording of the statute was intended by the legislature. Certainly the new feature was not discussed before enactment. The operators contended that the law added materially to the mining cost and did not make mining safer.

Suit of State vs. I. T. Mullen and E. H. Halbert

Mine Inspector Walsh, of the 9th bituminous district, began a test case by arresting I. T. Mullen, superintendent, and E. H. Halbert, mine foreman, of the Royal mine of the W. J. Rainey Coal Co., for failing to maintain boreholes ahead of the working face. The case was argued before the court without a jury.

The court supported the Department of Mines and the inspector directed the defendants to enter pleas. The operators immediately took steps for an appeal from the decision to a higher court.

The provision of the law out of which the case grows, is Rule 18, of Article XXV, of the Bituminous Mining Act of June 9, 1911, which reads: "In the cutting of clay veins, spars or faults, entries or other narrow workings going into the solid coal, in mines wherein explosive gas is generated in dangerous quantities, a borehole shall be kept not less than 3 ft. in advance of the face of the workings or 3 ft. in advance of any shothole drilled for a blast to be fired in." The decision of Mine Inspector Walsh under this rule was that a borehole must be kept 3 ft. in advance of the face, even though clay veins, spars or faults are not being cut and are not known to be in the vicinity. It was also contended by the state that a dangerous quantity of gas is any quantity that can be detected by an approved safety lamp.

Operators Declare Borehole Rule Unnecessary

The principal contention of the operators was that even if the rule means what the Department of Mines contends, so much of it as requires a borehole kept in advance is an invalid attempt on the part of the legislature to exercise the police power of the state, and that such requirement of the rule is void. They argued that this contention is based on the proportion that there must be a real and substantial relationship between the end sought to be accomplished by the legislature and the method provided for that purpose, and that as applied in the concrete to the facts of the case the keeping of a borehole in advance does not furnish any added element of safety to the men engaged in mining the coal, in entries or other narrow workings going into the solid coal, except in cases where there are clay veins.

The court referred to the recent decision of the U. S. Supreme Court, on the famous barrier-pillar case brought by the state against the Plymouth Coal Co., in which it was held that under the act the mine inspector and the engineers of the adjoining property had authority to determine in what cases boundary pillars may be omitted. The court declared that there is no contention that by rule 18, now under consideration, authority is given anybody to declare in any case that boreholes need not be maintained.

The court held that while there may be an honest difference of opinion as to the benefits derivable in all cases from a

compliance with the provisions of rule 18, as an added element of safety in the operation of mines, the action of the legislature in adopting the rule was in the legitimate exercise of its police powers of the state, being a matter germane and properly related to the purposes of the act, and that the rule is valid.

Providing for a Real Election of Mine Inspectors

It has been alleged that some of the mine inspectors' examining boards in the anthracite region have restricted the award of certificates of eligibility, so as to nullify the law granting the electorate the right to choose mine inspectors by ballot. These boards would only certify as many men as there were vacancies to be filled.

It is said in some districts, that though a number of intelligent and competent candidates appeared before the board, only a sufficient number were passed to fill vacancies, leaving no choice to the electorate between candidates. Although the law prescribing the election of inspectors has been in existence 15 years, in all that time it is said there has not been a real contest for the office of mine inspector.

An amendment is advocated to the present law requiring the board to qualify the three best candidates appearing for examination, if there is one vacancy to be filled, and providing that not less than five candidates shall be qualified if two vacancies exist.

It is believed that this will meet the difficulty and insure a genuine contest. In addition, a provision is suggested requiring the board to make public the standing of the candidates in their examination.

This last provision is no doubt inspired by the recent decision of the Schuylkill County Court that it could not examine charges of fraud and violation of the law on the part of the examining boards, because the board members are given by law discretion to grant or refuse certificates at will, and the court could not undertake to substitute its own discretion for that of the board.

PENNSYLVANIA

Anthracite

Bethlehem—Navigation on the Lehigh Canal, between Mauch Chunk and Philadelphia, came to an end on Dec. 1, with the passing through the local locks of the last boat load of coal consigned to Philadelphia. The canal will be drained for repairs.

Plains—The First National Bank of Scranton filed an assumpsit suit against the Miners Mills Coal Co., on Dec. 3, asking over $21,000 on two promissory notes made in favor of Rissinger Bros. and made payable by the latter to the plaintiff.

The E. I. Dupont de Nemours Powder Co. filed an assumpsit suit against M. J. Healey to recover $2140 for powder purchased from the plaintiff for mining operations.

Wilkes-Barre—Objections have been made by the Lehigh Valley Coal Co., Delaware, Lackawanna & Western R.R. Co., and the Delaware & Hudson Co., to the assessment on their holdings here. The companies appealed from the assessment of $250 per foot-acre, the rate adopted by city officials and county assessors.

The Lehigh Valley Co. claims the valuation of its property in the city has been increased $400,000 by city assessors. All the companies declare that the city assessors erred in accepting the county rates and applying them in Wilkes-Barre.

Hazleton—Opportunity to study mining problems will be given the boys and men of the Hazleton region. This was decided upon at a meeting of the executive committee of the Hazleton Mining Institute held at the Y. M. C. A. building on Nov. 30. The plan of establishing a complete mining course for the aid of the boys and the men of the mines had been considered and discussed from time to time, but this is the first time that the matter has reached the stage where something definite can be expected.

The only condition surrounding the establishment of the course is that a sufficient number of applicants be registered with the committee. If the interest displayed in this plan is sufficient to justify the institute in the expenditure for the course, the work will be started at once.

Sunbury—The Mineral R.R. & Mining Co. and the Shamokin Valley & Pottsville R.R. Co., under Pennsylvania R.R. control, filed deeds for the transfer of 2142 acres of coal land in the Shamokin basins to the Susquehanna Coal Co. for $1. The railroad company also filed releases for hundreds of acres under lease to the Susquehanna Coal Co. The property is said to be worth more than $1,000,000.

Hazleton—Recognition of the value of water in the hard-coal fields, which are denuded of timber, is shown by the action of the Lehigh Valley Coal Co. in awarding the contract to build the third series of dams to hold the flow of Dreck's Creek, six miles from here. With this completed, Hazleton can be supplied with water even though it should not rain for a year.

Scranton—Thirteen men were killed in the Diamond shaft of the Delaware, Lackawanna & Western R.R. Co., on Dec. 9, when a cage in which the men were being lowered collapsed, dropping the victims to the bottom. It was an hour before the first man's body was recovered. Among the victims was Thomas Thomas, of West Scranton, a veteran miner.

BITUMINOUS

Hanover—Another contest is promised over the working of the Hanover Township roads for the coming year, as Frank Knuss, representing the coal companies, has filed a petition with the court, asking to be given the contract. He sets forth in his petition that he wants the work under the act of assembly, enabling taxpayers to contract for making and repairing highways at their own expense, paying salaries of road officers, and thus preventing the levying and collection of a road tax. There are 33 miles of highway in the township.

Clearfield—Unusual business conditions compelled the Morrisdale Coal Co. to acquiesce in an application for a receiver on Dec. 1, in order to conserve its assets. The application was made to the court and resulted in the selection of Frank H. Wiggon to manage the affairs of the concern.

The Morrisdale Coal Co. holds leases and mining rights in Clearfield County, but inability to market its coal, officials of the company said, made it impossible for the concern to meet its payroll. As a suspension of operations at this time would cause the pumps to be stopped and the mines to be flooded, stockholders joined in the application for a receiver.

Pittsburgh—Ten million bushels of coal, the largest shipment in the history of Ohio River traffic, will have been moved southward to Ohio and Mississippi River points, with the week ending Dec. 14, if the forecast of the local weather bureau materializes.

The refusal of Judge Dayton, in the federal court, to sanction the application of second mortgage holders for a sale of the Four States Coal Co., brought a statement from John H. Jones, president of the company, in which he declares that the company, relieved of uncertainty, will now rapidly rehabilitate itself, and that its reorganization will be completed within the next six months.

Waynesburg—J. V. Thompson, of Uniontown, has closed a deal with a New York syndicate, involving the transfer of 41,000 acres of virgin coal land, valued at between $25,000,000 and $30,000,000. The land is underlaid with Pittsburgh coal.

WEST VIRGINIA

Charleston—Col. M. T. Roach, president of the New River & Ohio Coal Co., has expressed the opinion that the coal trade in West Virginia has a heavy business ahead of it, as conditions are excellent all through the West Virginia fields at present, and the continuance of the Ohio strike is throwing a large amount of business to this state. Mines in the New River and Kanawha districts are operating on a normal basis, according to Col. Roach, and with prices for mine-run maintained at $1 a ton on contract and a large volume of business in sight, the prospect could not be much more favorable.

A verdict in favor of the Buffalo Creek Coal & Coke Co. has been returned in the United States District Court, in its ouster suit against H. C. Jones, et al., involving the possession of more than 1000 acres of land in Logan County. The plaintiff was given the title to 1000 acres, and J. D. Brown, one of the defendants, was awarded 15 acres.

ALABAMA

Birmingham—Coal operators are confident that the Interstate Commerce Commission will suspend the increase of 15c. per ton on coal shipped from here to New Orleans and other points in the Mississippi Valley. The committee of coal operators from Alabama who went to Washington to enter a protest for a suspension of the rate advance are confident that the rate will be suspended, pending a complete investigation of the petition of the railroads. The Memphis shippers are fighting with Birmingham against the increased rate from Birmingham to Memphis.

Birmingham—Coal companies with property along the Warrior River are preparing for the completion of lock 17. Seventeen coal mines will be ready to dump coal from the mine tipple onto the barges when the lock is completed.

KENTUCKY

Frankfort—The Workmen's Compensation Board of Kentucky is mailing to employers, subject to the recently enacted law, copies of the notice which must be posted prominently in their offices and workrooms. There are three forms, one for each class of employer—those who insure with the state, those who carry their insurance with liability companies and those who carry their own risks. In any event, it is provided that both the injured employee and his physician must notify the employer and the State Board of injuries. The notices are required to be posted by Jan. 1.

Lexington—Seventeen coal mines were in operation at McRoberts and Jenkins when the war in Europe broke out, according to Judge Allen W. Young, general counsel for the Consolidation Coal Co., who was here for a few days recently. "Now," he continued, "only two are running on full time, four on half time and the remainder have shut down altogether. The eastern Kentucky coal mines had a big export trade before the war, but fear of confiscation of ships and cargoes caused the export trade to fall almost to nothing. The timber industry of the mountains was affected in about the same way and when these two industries, which are the biggest in eastern Kentucky, are paralyzed, business of all kinds suffers." Judge Young expressed the opinion that business was due to improve rapidly.

OHIO

Toledo—Toledo coal men are watching with considerable interest the outcome of the southern Michigan coal dealers' fight against alleged excessive high freight rates charged by various railroads. Evidence was taken this week before the Interstate Commerce Commission at Kalamazoo, Mich. The railroads claim justification for the heavy charges from the coal fields on soft coal shipments.

Considerable disappointment was felt by eastern Ohio operators and their representatives in this city over the failure of the recent Cleveland meeting to adjust the difficulties. The conference lasted for three days, but was finally broken up without the contestants getting any nearer to a settlement than they have been before. The situation is looked upon as serious both by the operators and the miners. The operators here were anxious for a settlement and reopening of the mines. It is declared on what appears to be good local authority that the eastern Ohio mines will not open until after the Supreme Court has passed finally upon the anti-screen law. The miners however, declare that it is the intention of the operators to reopen the mines with strike-breakers. The tension in the mining districts is high-strung and the situation is serious. The suffering among the miners and their families is great. Some time ago the children of the miners were offered here for temporary adoption by any who cared to undertake the care and expense, and a "tag day" subscription has been taken for the benefit of the sufferers.

Columbus—After a conference lasting for several hours the Ohio Industrial Commission succeeded in harmonizing the views of oil and gas men on the one side and coal men on the other with reference to drilling for oil and gas on coal lands. The results were obtained through the special commission named by J. M. Roan, head of the mining department. The former order of the commission compelled the charting of all oil wells in coal territory, and the consent of the commission was required before drilling could be started. One of the new rules is that no well shall be drilled where it will penetrate an inaccessible part of the coal mine, that the agents of the industrial commission be allowed to make locations and that wells be protected by concrete or brick walls.

Zanesville—John Winefordner, of Duncan Falls, has been appointed receiver for the Henry Coal & Coke Co., of Zanesville, after a suit of dissolution was filed in the local courts by George S. Sarver, M. F. Sarver, W. L. Bush, R. H. Koontz and W. W. Barty. The company was organized with an authorized capital of $200,000, to develop coal lands in Guernsey County. It is claimed that there are not sufficient funds to continue mining operations.

INDIANA

Boonville, Ind.—Agitation has begun to endeavor to stop the mining of coal by stripping, and an effort will be made to have a law passed at the session of the Indiana legislature that meets in January. The representatives-elect from this county have promised to introduce the bill. Stripping is said to be against public policy and community welfare. Hundreds of acres of fine farming land are made unfit for future cultivation and destroyed as a substantial source of taxation. In this county stripping has thrown 700 miners out of employment as 10 men can do the work formerly done by 100. It is believed that legislation suggested by business men and miners will be recommended by Governor Ralston in his message.

ILLINOIS

Peoria—John S. Jones, president of the Jones & Adams Coal Co., has recently made a deal by which he becomes one of the largest coal operators in the country. Mr. Jones has purchased the capital stock of the Sunday Creek Coal Co., which concern operates about 60 mines in Ohio and West Virginia, besides owning docks at Milwaukee, Duluth and West Superior.

Springfield—Alleging that the Pittsburgh Coal Co. is seeking to freeze out other bondholders in the $2,000,000 Illinois Colliery Co. failure, Samuel H. Pulman, of New York, has filed a bill in the Circuit Court, demanding that the sheriff be compelled to accept his tender for redemption of the properties instead of a proffer by the Pittsburgh concern.

Kankakee—Clay Marcotte, a farmer three miles northeast of here, believes he has struck a rich vein of soft coal on his farm. An expert mining engineer from Wilmington will make tests as to the richness and extent of the field. If the vein proves rich and large, it will be extremely valuable because it would be the closest coal to Chicago.

Belleville—Two cars of the Illinois Mine Rescue Station, of Springfield, are now stationed here and will remain for a period of three weeks, giving instructions in mine-rescue work and first aid to the injured. All miners desiring to pass mine-examiner and mine-manager examinations for certificates will have to pass the first aid and rescue examinations also.

ARKANSAS

Fort Smith—A syndicate, headed by B. J. Jordan, of Columbus, Ohio, has been formed to purchase the mines and property of the Sanbois Coal Co., at McCurtain, Okla., and to operate the property as open mines. Several St. Louis capitalists, with others from Ohio, are interested in this proposition. The Sanbois property has been purchased for $350,000, it is understood, from the receivers, who took possession of the property after the explosion in March, 1912, when 75 miners were killed.

FOREIGN NEWS

Toronto, Can.—The approximate output of the Dominion Coal Co.'s mines in Cape Breton, N. S., for the present year, will amount to about 4,300,000 tons, as compared with 4,740,000 tons in 1913. The Springfield Collieries, which are a subsidiary of the Dominion Coal Co., will produce approximately 430,000 tons, as compared with 381,000 tons in 1913. The net decrease in the combined outputs will, therefore, be about 390,000 tons. Shipments to the St. Lawrence market show an increase. The total shipments this year were 1,921,491 tons, as compared with 1,698,131 tons in 1913. Work at the mines until the first of the year will be slack, but there is every indication that operations will be carried on steadily in 1915.

PERSONALS

John Zeller, manager of the Brazil Clay Co., has resigned to go to Indianapolis to become head of the general sales department of the American Coal & Mining Co., in which Brazil capital is interested.

A. D. MacFarlane, of LaFollette, Tenn., chief engineer and assistant manager for Neil Robinson, receiver of the LaFollette Coal, Iron & Railway Co., spent several days at Charleston, W. Va., this week.

George J. L. Wulff, who for several years has been chief clerk of the Western Coal & Mining Co., has been appointed division sales agent for the company to fill the vacancy made by H. Raymond's retirement. Mr. Raymond has been forced to retire on account of ill health.

Thomas Hammond, for the past 4½ years chief mine foreman for the Pine Run Coal & Coke Co., Vandergrift, Penn., was presented with a gold watch by the men employed at the mine when he left, Dec. 1, to accept a position with the West Penn Coal Mining Co. near Apollo, Penn.

I. M. Fleming, president of the Fleming Coal Co., returned to Kansas City after spending several days in southern Kansas visiting the mines. He reports that some of the mines are working nearly full time; most of them, however, are working less than four days a week.

F. L. Bunton, who for the past two and one-half years has been manager of the Chicago office of the Heine Boiler Co., has severed his connections with that company to become manager of the Chicago Office of the Goulds Manufacturing Co., 3801-3811 S. Ashland Ave., Chicago, Ill. Previous to his connection with the Heine Boiler Co., Mr. Bunton was for eight years manager of the Philadelphia and St. Louis offices of the Allis-Chalmers Co.

CONSTRUCTION NEWS

Lorain, Ohio—The Lorain Crystal Ice Co. has started the erection of a large storage plant for coal to hold 1200 tons. It will be completed by Jan. 1.

Lykens, Penn.—The new shaft of the Susquehanna Coal Co. is in the last stage of completion; it will add materially to the capacity of the colliery.

Kansas City, Mo.—The Eureka Coal Mining Co. having mines at Panama, Mo., and offices at Richmond, Mo., has opened an office in Kansas City. The latter is in the Dwight Building with W. Barlum as manager.

Centralia, Penn.—Work has been started on two new messhouses of hollow terra cotta at the Franklin and Parker No. 5 collieries of the Lehigh Valley Coal Co. It is understood that more of these messhouses will be put up at other collieries when the design has been tested by actual use and approved.

The new houses are 40x25x12 ft. in height. There is not a stick of wood in their construction, and they are absolutely fireproof. The houses will contain a room with tables and benches, showers and wash-basins with hot and cold water, and a locker-room for the men's working clothes.

Logan, W. Va.—The Logan Light & Power Co., recently incorporated with an authorized capital stock of $1,500,000, is planning to erect a large plant at Logan, to be operated by waterpower, for the purpose of generating current for the use of the large number of mining operations in the Guyandotte valley. It is understood that in magnitude and extent the project will rival that of the Appalachian Power Co., which supplies the operations in the Pocahontas fields. Philadelphia interests are involved, and abundant capital is said to be insured to make the project a success.

NEW INCORPORATIONS

Columbus, Ohio—The Douglass Coal Co. has been incorporated with a capital of $40,000, to mine and sell coal. The incorporators are F. J. Shaffer, D. W. Jones, R. H. Furney, M. Curto and E. E. Learned.

Akron, Ohio—The F. F. Coal Co. has been incorporated, with a capital stock of $30,000, to handle coal and coke. The incorporators are G. E. Kneedler, J. M. Shaffer, F. M. Patrick, C. G. Wise and H. E. Andress.

Philippi, W. Va.—The A. T. Thompson Co., organized with a capital stock of $100,000, by Gordon B. Ramsey, A. S. Hawkins, Austin G. Merrill, W. T. Ice, Jr., and A. S. Dayton, of Philippi, will deal in coal lands.

Castleton, Ind.—The Castleton Lumber, Coal & Supply Co. has been incorporated here, with $2000 capital, to deal in lumber and fuel. The incorporators are C. B. Williamson, C. A. Rassmann and Chas. L. Anderson.

Boonville, Ind.—The Newburg Coal Co. has been organized at Newburg and incorporated with $5000 capital stock, to mine coal in Warrick County. The directors are J. E. Abshire, Wm. A. Epperson and William O'Brien.

New Philadelphia, Ohio—The New Philadelphia Coal & Mining Co. has been incorporated, with a capital of $5000, to mine and sell coal, by Emery Ankeney, Henry Diefenbach, J. F. Gerber, Edward Lahmers, Frederick Balmer and Chris. Knecht.

Switzer, W. Va.—The Alemma Coal Co. has been organized, with a capital stock of $25,000, for the mining of coal. Fred C. Prichard, Rufus Switzer, Thomas A. Wiatt and R. H. Williams, of Huntington, W. Va., and J. M. Vest, of Switzer, are the incorporators.

New York, N. Y.—The Black Band Fuel Co., incorporated in West Virginia with an authorized capital stock of $600,000, will handle West Virginia coal lands. Walter Haviland, Henry M. Haviland, John B. Summerfield, Arthur N. Taylor and Charles A. Lewis, of New York, are the incorporators.

Tuscaloosa, Ala.—The Riverside Coal Co. has been incorporated, with a capital of $62,000. The incorporators include John S. Riegel, New York; Albert Gildersleeve, Connecticut; and R. K. Miller, of Brownsville, N. Y. The company will operate and lease mines and do a general mining business.

INDUSTRIAL NEWS

Sandusky, Ohio—The shipping season ended at the Lower Lakes Dock Co.'s plant here Dec. 1. Coal shipments for the year amount to 2,500,000 tons.

Philadelphia, Penn.—The U. S. collier "Jupiter" cleared this port for Hampton Roads with a cargo of 9800 tons of coal. The cargo is destined for the Pacific Coast.

Nelsonville, Ohio—Dow Shaffer has taken over the properties of the Silcott Coal Co. of Nelsonville and will operate them under the name of the Standard Coal Co.

Boonville, Ind.—The Sunlight Coal Co. has received and installed the third steam shovel at its mines near here. It is said that this last shovel is the largest in use in southern Indiana.

St. Clairsville, Ohio—One of the biggest coal deals ever made in Belmont County was consummated by the filing of a deed transferring 6000 acres of coal from Albert Gaddis to the Fayette Coal Co.

Lisbon, Ohio—Extensive drillings are being made near New Waterford to test a seam of coal. A number of leases have been secured and if the tests are satisfactory, development will be started at once.

Cumberland, Md.—A seam of bituminous coal, measuring between 4 and 6 ft. in thickness and of splendid burning qualities, was accidently discovered by Julius Wagner in the upper Patterson's Creek Valley.

Henderson, Ky.—The People's Mine participated actively in the recent home industries exposition which was held here. Every grade of coal taken from the mine was exhibited and attracted much attention.

Punxsutawney, Penn.—James H. Corbett and sons were recently in this vicinity, making necessary purchases and arrangements for operating their extensive coal fields just east of here. They will put up a large plant.

Gallipolis, Ohio—Almost 2,000,000 bushels of coal left this place last week on barges for Cincinnati, as a result of the flooding of the pools above the dams known as Nos. 26 and 11. It is the first shipment of river coal for some weeks.

Indiana, Penn.—The Operators Coal Co. is extending its holdings in East and West Wheatfield Townships. A number of purchases have been made recently, among the most important were 134 acres from James A. McCormick, for $8069 and a tract from Peter C. Clark for $3123.

Buffalo, N. Y.—The Secretary of War has issued an order, which he declares to be final, that no vessels may be moored alongside the Delaware, Lackawanna & Western coal dock at the mouth of Buffalo River, claiming that the practice is an obstruction of navigation. It is not known what the shippers will do to enable them to continue in business in the port.

Columbus, Ohio—George Robson, a machinist employed at the plant of the Jeffrey Mfg. Co., is the inventor of a new mine pump, which is said to be superior to those now in use. One of the pumps has been operated in an Ohio mine for about two years with the best of results, and steps are being made to put the new pump on the market in the near future.

Coonville, Ohio—The Starr-Hocking Coal Co., which has for some time been in the hands of a receiver, is operating at only about 50 per cent. of its 500-ton capacity, on account of poor market conditions prevailing recently. The mine has been cleared of water from old workings which flooded it a short time ago and is ready for full-time operations when the market revives.

Buffalo, N. Y.—Edward P. Aspinwall has brought suit against the Delaware, Lackawanna & Western and Lehigh Valley R.R. and coal companies, the members of the shipping firms of Williams & Peters and E. L. Hedstrom, demanding $963,000, or three times the amount he claims he has been defrauded of by them in driving him out of the coal trade in Buffalo. The statute provides for such claims in that ratio. The business in question is still in operation under the name of Spaulding & Spaulding.

Chattanooga, Tenn.—The Chattanooga Gas & Coal Products Co. has let all contracts for the big plant which is in course of construction in Alton Park, near here. Beaumont & Co., of Philadelphia, will furnish and install the coal-handling equipment, which will include conveyor-belt machinery for loading and unloading cars and transferring coal and coke among ovens. The daily capacity of the plant will be 500 tons of coal. In employing labor for the work the company and the contractors are giving preference to married men and those who are residents of Chattanooga.

Coal Trade Reviews

General Review

Anthracite under pressure and working schedules heavily curtailed. Bituminous continues flat with prices weak and irregular. Slack the best feature. Reactionary effects of the mild weather.

The heavy storms have failed to relieve the pressure on the anthracite trade, and a sweeping reduction in working schedules went into effect the past week. The more seasonable weather conditions have steadied up the domestic grades slightly, but the market on the steam sizes is at the lowest point for a number of years; manufacturing demand has dropped off to practically nothing, while the mild weather has naturally restricted the consumption in hotels and apartment houses. It is clear that the companies have been pushing the production faster than the market requirements justified and the outlook for the season's business is less encouraging. In spite of a heavy Lake movement last month, the gross tonnage for the season is substantially behind last year.

Heavy gales and storms, accompanied by dense fog, have seriously interrupted the bituminous movement, causing embargoes at some points and backing coal clear up to the mines. But with excessive supplies in every direction, this has not stimulated any activity or caused anxiety among consumers; as a matter of fact, sales agencies view any developments tending to curtail the movement and reduce supplies with a favorable eye. The most aggressive canvassing for business fails to shake out more than an occassional order, while prices on spot coal are weaker, if anything, and there are definite indications of lower levels on new contracts. With ocean freights continuing at record high levels, and showing indications of advancing still further, export business is more restricted, and it is clear that no relief can be anticipated in this direction.

Although mine operations in the Pittsburgh district are heavily curtailed, the production is still in excess of requirements, while prices are irregular and tending toward lower levels. The persistent reports of a better tone in business conditions must have something back of them, though selling agents, facing the problem of keeping mines supplied with orders, are unable to discover it. The reduced supply of slack has forced an advance on this grade in Ohio, but the former stiffening of prices on other sizes has given way under the influence of the warmer weather. The arrivals are in excess of the market requirements, and some accumulations of demurrage coal seem inevitable. In the Southern markets inquiries are few and the tonnage small; ten days to two weeks of cold weather will be required to reduce retailers' stock to a point where it will be necessary to place orders with the mines.

A stiffening up in steam prices is the feature of the Middle Western market, but, on the other hand, the effects of the recent cold snaps have entirely disappeared, and there is a decided reactionary tendency noted in all directions, though operators are making every effort to maintain prices. The situation is notably quiet, but there is a marked optimism among operators in anticipation of the colder weather to come.

ATLANTIC SEABOARD

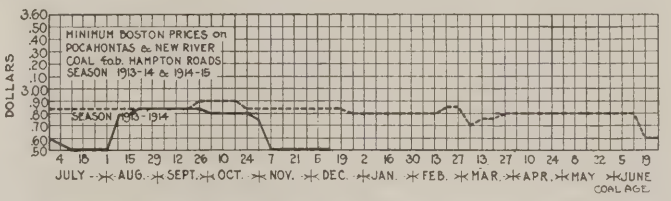
BOSTON

Dull market continues on Pocahontas and New River. Contracts placed on $2.70 basis make $2.85 price seem dubious for next year. Coal in excessive supply at all points. Georges Creek steady but Pennsylvania grades very dull.

Bituminous—There is no relief to the general dullness in Pocahontas and New River. Some of the agencies have been making desperate efforts to place spot coal but so far there has been no particular result. New England buyers are not inclined to be interested at any price and shippers with cargoes on the market find the going hard. A large powerhouse contract has been placed for an 18-month term at a price to net around $2.70 f.o.b. Hampton Roads and this is regarded as a further indication that it will be difficult next year to maintain anything like $2.85. The contact demand has sagged off again, notwithstanding the unfavorable weather and the slow movement of boats, and there are no signs of activity in any direction.

Pocahontas and New River are freely offering at all the distributing points and on-car prices are weak in consequence; $3.20 on cars, Providence, seems a normal figure now and $3.30 is about the price level at Boston for inland delivery. The market is druggy even at these prices, and no improvement is looked for before the end of the year.

The off-shore trade continues dull and without special feature. South American bottoms are harder than ever to secure and the volume of coal moving to the Mediterranean is still relatively small. Coal has been offered on Long Island Sound this week that was taken out of trans-Atlantic liners interned in New York. The lack of bunker trade at Boston is responsible for some of the lessened receipts here from Hampton Roads.



Georges Creek supply is now about normal with enough orders to keep the fleet of barges and steamers up to a fair movement.

Inquiry for the Pennsylvania grades continues very light, with prices still soft. Most of the mines are on a two-day a week basis. The entire market is being thoroughly canvassed but except for a spasmodic demand all-rail the tonnage sold is very small. Operators are, however, trying hard to be in line for increased business in New England next year. The great objection this market has always had to Pennsylvania bituminous has been that the coal was not properly cleaned. With new equipment at many of the mines this objection can be met and an enlarged market is generally looked for.

Anthracite—The colder weather is helping out the retail demand, but there is as yet no life to the wholesale market. All sizes are in ample supply and there is practically no delay in securing shipments.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.45	$1.15@1.50	$1.67@1.77	
Philadelphia*	2.10@2.70	2.35@2.70	2.92@3.02	
New York*	2.40@3.10	2.65@3.05	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.50@2.75
Boston†	.....	.....	.....	3.40@3.73
Providence†	.....	.....	.....	3.20@3.63

* F.o.b. †On cars.

NEW YORK

Embargo at South Amboy the only feature of interest in an otherwise dull market. Anthracite production exceeding the demand and mines curtailing operations. Prices easy.

Bituminous—The New York soft-coal market is so absolutely flat that there is an almost complete absence of any news. The only development of moment has been the establishment of an embargo against both bituminous and anthracite at South Amboy, due to the severe gale and heavy storm interrupting water shipments. The embargo became effective Friday night of last week and was declared off Monday at midnight, but again reëstablished at 9 a.m. With the heavy supplies in all directions, the embargo had little effect on conditions; as a matter of fact anything tending to reduce the movement is regarded rather favorably by local agencies.

The bunkering trade is about the only department that seems to be holding its own. The movement on contracts is fair. The Berwind-White Co. is reported to have increased operations to about 50% capacity. Now that this company has lost most of its market in the bunkering of ocean liners,

there is considerable speculation as to whether they will compete on the April contracts.

The local market is not notably changed, and we continue as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70 @2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—While the domestic grades are showing a tendency to steady up as the season advances, the steam sizes have seldom ever been in a worse position. It is not a question of price; there is simply no demand and No. 2 buckwheat has sold as low as 25c. at the mines. The steam demand is clear off and there has scarcely been any call at all from hotels and apartment houses because of the mild weather. There are well defined rumors that the D. L. & W. has put 150,000 tons of buckwheat back into storage since the depression began.

Egg coal has shown a very slight improvement, though reductions are still necessary to move any large tonnage. Stove continues in fair demand, and chestnut moves promptly at concessions of 10 to 15c. on the regular circulars. It is becoming more and more evident that the large companies have been pushing production faster than market conditions warrant, and as a result they are now facing the necessity of a rigid curtailment. The reduction in operating schedules was general all last week, the Reading company working only three days and still further reductions were outlined for the current week. The outlook is not as encouraging as it has been, and there are indications that work in the mining regions will be more or less intermittent till after the holidays.

The current market is quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.00@5.35	5.30	4.80@5.30
Stove	5.35	5.35	5.30	5.20@5.30
Chestnut	5.60	5.45@5.60	5.55	5.40@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.50@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.35@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

PHILADELPHIA

Anthracite trade somewhat stimulated by better weather conditions. Large surplus of steam sizes accumulating. Bituminous situation distinctly unfavorable.

Anthracite—More seasonable weather the past week has created some activity in anthracite, but it will require a couple of weeks of good winter weather to relieve the situation. The week started in with a severe storm which caused anxious investigations of the coal bins, frequently resulting in requisitions for coal. This covered all sizes from egg to pea, which is an indication that the stocks are commencing to dwindle, and the wholesale market is likely to feel this shortly.

The cessation of Lake shipping has thrown considerable extra coal on the market, in addition to the regular current output which has eased the situation on stove and nut, although these continue in good demand. Egg is still heavy and is offered at liberal concessions by the individual operators; broken continues easy. It is doubtful if any of the operators are moving off their output of the small sizes. It is claimed that the storage places of many of the large companies are filled with the steam sizes, and with the low prices prevailing on soft coal, no improvement is looked for in the near future, though pea coal is somewhat steadier.

Prices at Tidewater are about as follows:

	Circular	Individual
Broken	$4.75	$4.35 @ 4.50
Egg	5.00	4.75
Stove	5.00	5.10
Chestnut	5.25	5.25

Bituminous—The continuance of restricted mining is probably a better index of conditions in the soft-coal trade, than any fluctuations in demand or prices. While it is claimed that the calls on contracts are better, the trade generally is inclined to be pessimistic, and most of the operators can see nothing favorable in the near future. There is a distinct lack of tone to the trade.

BALTIMORE

Slack fairly strong, but the market otherwise is dull and listless with prices entirely unsatisfactory. Anthracite moderately firm.

Slack is holding steady at 70@75c. per gross ton because of the growing scarcity with the cutting down in the production of the three-quarter. The situation is exceptionally dull in both West Virginia and Pennsylvania. In the former state three-quarter gas is heavy at 85c. and Pennsylvania low-grade steam coals are selling at from 90c. up to $1.30. The storm early this week caused some delay in shipments, but the supply on hand is too liberal to make any possibility of change in market conditions. The export trade is slowing up. Fewer charters were announced the past week than for several months past. The demand for American coal to the Mediterranean has apparently dropped off again with the reopening of the large shipments of Welsh coal under admiralty orders.

BUFFALO

Better demand for slack but little general improvement anticipated before the first of the year. Some increase in factory demand. Anthracite hit hard by warm weather, but doing fairly well.

Bituminous—The feeling is better each week and there is some real reason back of it, but the actual improvement is small as yet. One jobber claims that slack went up 5c. a week ago and has dropped back again now, but others differ as to that. Mine owners, or those in close touch with mines that are making a fight to keep running strong, state there is no improvement and that there is a natural output far exceeding the ordinary consumption. It is generally felt that the price of slack is going to advance soon and that it will come close up to mine-run. There is much reason for making as much as possible of slack in the Buffalo market, as it is more easily sold in Canada, on account of the lower duty.

Canada is buying more freely now, some of the idle factories being very busy on war orders. There is practically no complaint now of coal standing on track unsold. As a rule the jobber fights against consignment coal, even if he does not have to stand the demurrage, but he is not always able to shut it off. There is a stir in the local pig-iron furnaces, but there is not much assurance of better business yet. Prices show little change, Pittsburgh lump being quoted at $2.80 for very best, with much selling at concessions, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with quite an amount of slack contracting at that price. Allegheny Valley coal is about 25c. lower than Pittsburgh.

Anthracite—The weather has been very much against this trade all the fall except for a week or so about the middle of November, as will be noted on the Pittsburgh temperature chart shown on next page. The shippers now feel easy about being able to meet the winter demand as they do not look for much clamor for coal now. The local retail trade has been only fair.

Lake shippers are winding up the season. Most of them have closed up their trestles, but one or two will continue as long as they can get tonnage, which will not be long. Rates have gone up to 50c. for the head of the Lakes, which ports are taking practically all the coal now. Shipments to the end of November for the present season amount to 4,292,536 tons as against 4,930,596 tons to the same time last season. The shipments for November were 597,495 tons, the amount for the same month last season being 525,500 tons.

To transport the final cargoes of hard coal, Buffalo shippers paid an advance of 20c. a ton on four vessels, two to Lake Superior and two to Lake Michigan ports. This was the only high rate paid this season; in an ordinary year as many as 30 or 40 ships would be paid from 10c. to 80c. extra freight.

TORONTO

Market again weak with the return of mild weather.

With the recurrence of unseasonably mild weather the trade has again fallen off This is particularly the case as regards anthracite, as many workingmen are out of employment on account of the depression and can only buy in small quantities. The city council has appropriated $1000 for the purchase of coke to be resold at cost to the poor. Wholesale prices for bituminous show a slight falling off. Quotations are as follows: Retail anthracite, egg, stove and nut, $8; grate, $7.75; pea, $6.75. Bituminous, steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale f.o.b. cars, three-quarter lump, $3.68; screenings, $2.54.

HAMPTON ROADS

Shipments slowing up. Good bunker demand but exports light. Quite a fleet of bunker vessels. November dumpings show a decline.

Dumpings at Tidewater piers have failed to come up to expectations. A large number of foreign steamers have been here but the majority took bunker coal only, export cargoes being few. Coastwise movement has also been light. Weather conditions during nearly the entire week have been such that sailing vessels and barges were compelled to remain at anchor either off the piers or in the Roads.

The demand for all coals continues light and the greater portion of the coal moving has been on contracts made earlier in the season. Prices on export and coastwise business are being held at circular. Beginning Dec. 1, however, retail

dealers increased prices somewhat, the circular now being $8 for anthracite egg, nut, stove and broken coal, $6.50 on pea, $6 for splint and lump, $5.50 for New River and Pocahontas nut and $4.50 for steam coal.

Reports for November show that the total coal shipments from Norfolk and Newport News amounted to 869,365 tons, a decrease as compared with the same month last year. Market conditions have interfered with the movement, but taking everything into consideration, shipments have shown up considerably better than was anticipated. Of the total movement the Norfolk & Western dumped 416,931 tons, the Virginian Ry., 234,302 and the Chesapeake & Ohio 218,132 tons.

OCEAN FREIGHTS

Vessel owners holding for grain shipments on which heavy premiums are offered.

The freight market is even firmer than a week ago, and the few boats available seem to ignore coal; owners are holding them for grain, on which they are able to secure fancy figures. About $9 per ton is offered on grain to Genoa, and proportionate rates to other destinations.

A steamer was chartered last week to load coal at Baltimore for Genoa at $7.20; it is also reported that two or three steamers have been chartered for Italian coals, at rates which will probably figure somewhat in excess of this charter.

On a market like the present, it is simply impossible to quote probable rates. The situation changes not only day by day, but hour by hour.

To	Rate	To	Rate	To	Rate
Havana	$1.75@2.00	Kingston	$1.85@2.00	Tampico	$2.25*
Cardenas††	1.90@2.10	Curacao	1.75	Rio	6.00
Cienfuegos	2.00@2.25	Santiago	2.10@2.25	Buenos Ayres**	5.76
Port of Spain	2.25@2.50	Guantanamo	2.10@2.25	Mediterranean	7.20
St. Lucia	2.25@2.50	Demerara	3.00		
St. Thomas	1.80@2.00	Bermuda	2.00@2.25		
Barbados	2.25@2.50	Vera Cruz	2.25*		

*About. †Small boats to Kingston $2.10@2.25. **Or La Plata. ††Or Sagua.
W. W. Battie & Co.'s Coal Trade Freight Report.

COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Mar Cor	Italian	Norfolk	Italy	2059	
Albergen	Dutch	Baltimore	Tampico	1118	
Frontenac		Philadelphia	Rio Janeiro	1457	$5.50
Clara A. Donnell		Philadelphia	Galveston	990	1.10
Edith S. Cummins		Philadelphia	Guanica	545	
T. W. Dunn		Philadelphia	Christianstad St. Croix	635	
F. & T. Lupton		Philadelphia	Galveston	797	1.10
Pendleton Sisters		Philadelphia	Fall River	899	
John A. Hooper		Baltimore	Virginia*	1321	4.95
Peter H. Crowell		Baltimore	Virginia†	2423	
Posteiro	Brazilian	Norfolk	Pernambuco**	1390	
James W. Paul, Jr.		Baltimore	Porto Rico	1653	

* And to San Diego or Tiburon or both (Jan. 10).
† And to San Diego or Tiburon or both (Feb. 5).
** Or Rio Janeiro.

Note—Steamers are indicated by **bold face** type, all others being schooners.

COKE

CONNELLSVILLE

Contracts closed for about 50,000 tons monthly of furnace coke, with an equal tonnage under negotiation, but much business expiring this month is not the subject of fresh inquiry.

A fairly good batch of furnace coke contracts was closed last week, and, including one contract closed the preceding week, the movement now totals five or six contracts, involving about 50,000 tons a month, chiefly over the first half of the new year, but one contract is for first quarter only and another is for two years. There remains inquiry for 50,000 to 60,000 tons a month, but this week negotiations do not seem to be progressing so rapidly and it is possible that the entire tonnage open will not be closed at this time.

There is no likelihood of much additional inquiry appearing during the next few weeks, as furnacemen are always averse to negotiating coke contracts at the holiday season, since the prompt market is usually particularly strong at that time, due to weather and other conditions. Business that is not closed now will likely go over to January or February, the furnacemen meanwhile buying prompt coke, as nearly all running contracts expire at the close of this month. The total purchases and inquiries do not represent at the outside more than half the business that ought to be done at this season.

Much of the business closed has been on a sliding scale basis, but with a fixed price for the first quarter, and market prices are fairly well established. We quote: Prompt furnace, $1.60; furnace coke contracts, first quarter, $1.65@1.70; first half, $1.70; prompt foundry, $2@2.20; contract foundry (nominal and for best grades), $2.35@2.50, per ton, at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 28, at 179,439 tons, a decrease of 21,365 tons, and shipments at 176,749 tons, a decrease of 23,273 tons. The decreases are attributable to the holiday.

BUFFALO

The demand for coke does not improve, though the feeling in the trade is a trifle better. Everything depends on the movement of pig iron and if that continues to sell better there will be a market for coke shortly, but the price has been at the bottom for so long that the improvement will be slow. Prices remain on the basis of $4.25 for best 72-hr. Connellsville foundry, with stock coke $3.30.

BIRMINGHAM

There is no demand for either furnace or foundry coke.

CHICAGO

There is a strong demand for coke at fair prices, which is the one particular bright spot in the fuel situation in the West. There are many inquiries out but buyers seem to be haggling over prices. Current quotations are as follows: By-product, $4.75@4.95, Connellsville, $4.75@4.90; Wise County 72-hr. (select), $4.75; gas coke, $4.25@4.35 furnace coke, $4.50@4.75.

THE STEEL INDUSTRY

Market fails to respond to lower prices. Orders continue light.

December buying of steel products, which was expected to follow rather promptly upon the appearance of a 1.05c., Pittsburgh, price for bars, plates, and shapes, is not yet large. Five weeks of better feeling have done something for order books and buying has increased in the past week, but there is thus far no repetition of the free contracting of three years ago or even of the lesser movement in January of this year.

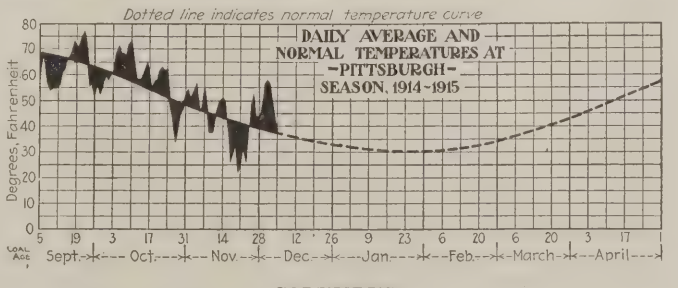
It is still true that when any considerable business is done prices suffer. But there are rather plain indications that the response to 1.05c., Pittsburgh, quotations has not been enough to convince the mills that the market can be lifted by temporarily going under it.—"The Iron Age."

OHIO VALLEY

PITTSBURGH

Operations under 40% capacity, with prices, if anything, more irregular than formerly. Weather unfavorable to domestic demand and manufacturing demand not improved.

Mine operations on an average are less than 40% of the capacity, but are proving too heavy nevertheless, and free coal is selling at lower prices than ever, though the market is so irregular that prices cannot be quoted with any degree of precision. The weather has been unfavorable to demand for domestic coal, being on the whole unusually mild for the season. Manufacturing demand has experienced no material increase, though it has not lost in average volume for two or three weeks. Slack has been firming up with unusual slowness, since the end of Lake shipments. We quote ordinary asking prices, which are usually shaded: Slack, 80c.; nut and slack, $1; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per ton at mine, Pittsburgh district. In the case of screened coal these are prices to consumers, dealers being usually given a concession of 10c.



COLUMBUS

Warmer weather causes a reaction. Prices continue irregular and the trade is quiet. Steam buying mostly in the open market.

The return of warmer weather has caused a slight reaction against the stiffening of prices in the domestic grades. This was to be expected as the trade is purely a weather proposition now. Prices have not suffered to any great extent as they were somewhat weak even during the colder weather.

Dealers are again slow in placing orders; stocks are not generally large but they are taking a chance on being able to fill orders for the present. Collections are still bad which is having an effect on the business of the retailers. Dealers in rural sections are now buying more freely. Retail prices are fairly well maintained.

The steam business is still slow although some signs of future improvement are seen. Railroads are not taking a large amount of coal and much of the fuel for steam purposes is being purchased on the open market.

The Lake trade is now over and this has the effect of still further curtailing the production of small sizes, and these are growing stronger. Nut, pea and slack and coarse slack are all in good demand and prices have advanced. The records of the Toledo docks of the Hocking Valley show that 2,432,124 tons were handled during the present season.

Production in Ohio fields has been on the following basis: Hocking Valley, 50@60% normal; Pomeroy Bend, 75% or better; Crooksville, Cambridge, Jackson and Massillon, 50% of the average.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.55	$1.65	.....
Inch and a quarter	1.50	1.55	$1.40
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.50	0.55	0.45
Coarse slack	0.40	0.45	0.35

CLEVELAND

Receipts light and the market weak. Outside markets stronger and difficulty is being experienced in filling orders for slack. A few cargoes still moving in the Lake trade.

Warm weather has restricted the retail business and domestic sizes are not moving. Pocahontas lump and egg are plentiful and there are close to 100 cars on track unsold. Shipping prices are off 25c. a ton on lump and egg sizes and spot coal can be bought at $3.25@3.30. Bergholz domestic sizes are held firmly at quotations because the production has been small. There is little or no demand for coarse coals, which has caused an advance in the price of slack; Fairmount mine-run and three-quarter coals are on nearly the same level. Slack is worth more than mine-run.

About 300 cars of coal arrived over Sunday which was more than the market was able to absorb. The Ohio fine coal is now so poor under the new mine-run law that operators are having trouble placing it. The fine coal on track is largely from West Virginia, but there is not much from the Fairmount district. Lack of orders for coarse coal has reduced the production of slack in all the Ohio fields as well as in Pennsylvania and West Virginia. Ohio slack on track is selling at $1.60 to $1.65, while West Virginia and Pennsylvania grades bring $1.70 to $1.75.

Buffalo coal shippers have come into the market for vessel space for the season of 1915 and one Cleveland boat company has arranged to float 1,500,000 tons of anthracite. The rate to all the principal ports on Lake Superior and on Lake Michigan, except Chicago, will be 30c., the same paid this year. Chicago also will take the 1914 rate of 40c. a ton.

A few cargoes of coal will be shipped next week and this week a number of boats have been loaded. The weather has been so warm and the Lakes so free from storms that a lack of cargoes alone is keeping ships in port. One cargo of coal will be shipped from Lorain next week.

Prices for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.35	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.35	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1½ in.	.....	$2.40	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$1.95@2.00	$1.95@2.00
Mine run	2.55	2.25	1.95	1.85@1 90	1.90
Slack	2.40	1.75@1.80	1.70@1.75	1.85@1.90	1.80

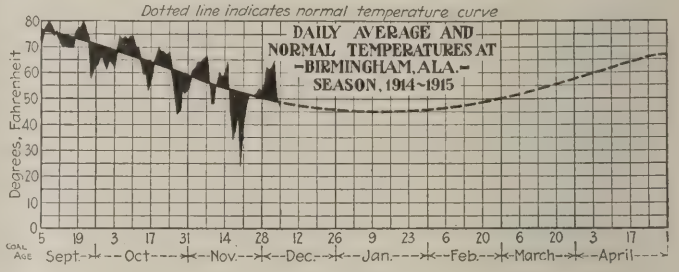
SOUTHERN

BIRMINGHAM

Market continues heavy with inquiries few and movement light. Contract for 175,000 tons placed.

Inquiries are few, and tonnage sold, small. The only feature of interest the past week was the placing of the contract of the New Orleans Railway & Light Co., amounting to 175,000 tons of steam coal for delivery over the next 12 months in equal monthly installments. This contract went to the Sloss Sheffield Steel & Iron Co., and is to be filled from their Ivy mines at Dora, Walker County. This is not a new contract for this district, but simply a change in the operator supplying the coal.

It will take at least ten days of cold weather to make any impression on the retail stocks, and until their tonnage is materially reduced, the operators will receive no benefit. The prices on both steam and lump coal, however, are holding up.



LOUISVILLE

Cold weather fails to help the market and business is approaching a summer basis. Hopes of a turn after the first of the year.

General pessimism pervades the Kentucky market though occasionally some operators and dealers report a good business. But for the most part this is not the case; even cold weather does not seem to help the trade now, and there are some that expect to see the market go on a summer basis at any time. All dealers have their yards full to capacity which is enough to run them through two months of brisk business. This is about the maximum amount of cold weather that can be expected in this section with perhaps a few weeks added if spring is late, but that will not create enough of a demand to help.

As a consequence operations continue to be curtailed in most cases and there is little movement of coal in any direction. Operators continue to look forward to the first of the year in the hopes that industrial requirements will improve and that there will be a general quickening of trade all over the country.

Prices are virtually unchanged since a week ago though, in fact, the range is so wide that definite figures are scarcely quotable.

MIDDLE WESTERN

CHICAGO

Demand for screenings still stronger. Domestic coals entirely a weather proposition. Prices generally holding moderately firm.

A large public service corporation here has been heavily buying screenings recently, which, together with restricted production, has naturally stiffened up prices on fine coal. Some operators have even sold their screenings for several months ahead and the bullish prices are reported to have caused the reopening of a number of manufacturing and industrial plants. An advance of 5c. to 10c. a ton measures the betterment of the week. There has not been, however, a corresponding rise in the price of other steam sizes; mine-run and steam lump are about on the same basis of the past two or three weeks. A good deal of nut coal, which is ordinarily consumed by domestic dealers, has been diverted to the steam trade.

Indiana and Illinois domestic sizes show little material change; prices vary considerably, some operators receiving circular figures while others report extremely low prices. Unfortunately the cold snap of two weeks ago lasted but a few days.

All chestnut anthracite sent to this market has been absorbed and movement from the docks has increased. The stocks of both egg and stove sizes are in excess of the demand.

The smokeless trade is again inactive; prices are far from attractive, although there is some evidence of a scarcity of lump and egg sizes.

Splint coals average about 25c. below circular and the demand is mediocre, although the docks have been showing a tendency to hold coal for stronger figures.

Hocking coals, if anything, are softer than last week.

Carterville grades show a reaction although producers have been trying to hold prices firm.

Springfield operators have been obtaining a fairly good price for the domestic sizes and have felt the firmer tendency for screenings to marked degree.

Prevailing quotations are as follows:

	Franklin Co.	Springfield	Harrisburg	Sullivan	Clinton
Lump	$1.50@1.75	$1.50	$1.50@1.75	.....	$1.50@1.60
4-in. lump.	.....	.....	.....	$1.50@1.60	.....
Steam lump	.....	.....	.....	.....	1.15@1.20
2½-in. lump.	.....	.....	.....	1.50	.....
1¼-in. lump.	.....	.....	.....	1.10@1.25	.....
Mine-run	1.15@1.25	.....	1.20@1.30	.....	1.10
Egg	1.40@1.50	.....	1.50@1.75	.....	.....
6x3-in. egg.	.....	1.35	.....	.....	.....
Nut	.....	1.30	.....	.....	.....
No. 1 nut	1.35@1.50	.....	1.40@1.75	.....	.....
No. 2 nut	1.30@1.40	.....	1.35	.....	.....
Screenings	0.65@0.75	0.60@0.70	0.65@0.75	0.65@0.75	0.65@0.75

Hocking Valley 1¼-in. lump, $1.25@1.50; mine-run, $1.25.

New River and Pocahontas lump and egg, $2.25; mine-run, $1.25@1.40.

Somerset Smokeless lump and egg, $2@2.25; mine-run, $1.25@1.40.

Carterville lump, $1.50@1.75; 6x3-in. egg, $1.40@1.50; No. 1 washed egg, $1.40@1.50; No. 2 washed egg, $1.25@1.35.

Green County 5-in. lump, $1.50@1.65; 3-in. lump, $1.30@1.40; 3-in. egg, $1.30; mine-run, $1.10.

Eastern Kentucky 6-in. block, $1.60@1.90; lump, $1.50@1.75; egg, $1.35@1.50.

ST. LOUIS

Steam grades improving but domestics weaker. Illinois producers slightly optimistic.

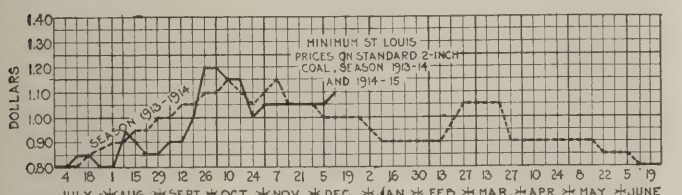
Steam sizes are advancing, but domestic grades are dropping correspondingly. Colder weather may change this, but in a general way the steam market usually improves from now until about the first of the year and then domestic sizes will begin to outstrip the demand and there will be a surplus of coal on the market.

Screenings and nut coal from No. 3 down have been in demand, while Nos. 1 and 2 are somewhat of a drug on the market. The same applies to washed coal. In the Standard field several hundred cars of 2-in. lump have been selling at as low as 95c. and dealers have been able to buy 2-in. lump at 92½c. Screenings advanced from 25 and 30c. to 35 and 40c., and everything indicates that 2-in. screenings will go to 55 or 60c. within the next week or ten days.

Practically no anthracite is moving in and there is no demand at all for smokeless. Illinois operators, in a way, are optimistic for the future, believing that conditions could not be any worse than they have been for the past five or six weeks.

The prevailing wholesale prices are:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.25	$0.95@1.10	$1.20
3-in. lump	.....	....	1.40	....	.....
6-in. lump	$1.30@1.60	....	1.50	1.10@1.25	1.40
Lump and egg	1.85@2.15	$2.25	.....	....	1.35
No. 1 nut	1.20@1.40	....	.....	0.85@0.95	.....
Screenings	0.50@0.55	....	0.80@0.85	0.40@0.45	0.20
Mine-run	1.05	....	.....	0.85@0.90	.....
No. 1 washed nut	1.50@1.60	2.00	1.60	....	.....
No. 2 washed nut	1.30@1.35	....	1.45	....	.....
No. 3 washed nut	1.15@1.20	....	.....	....	.....
No. 4 washed nut	1.10@1.15	....	.....	....	.....
No. 5 washed nut	0.30@0.40	....	.....	....	.....



INDIANAPOLIS

Slack scarce and commanding better figures. Less call for domestic lump. Mines on about same running schedule. Prices generally unchanged.

Continued mild weather, following the slight cold spell in late November, has reversed the situation, making slack scarce and higher-priced and cutting down the demand for domestic lump. The open-market price for screenings is now around 80c. Sales were made at 75c. but one Chicago buyer has had to pay 80c. The retail trade is fair, despite the unseasonable temperature. Anticipation of winter acts as a stimulant to consumers. Although retailers say there have been advances both at Indiana and Eastern mines, they have not changed the prices set in mid-September. They seem to be afraid to do so, especially those well stocked up with the Eastern coals. Indiana mines are near and retailers do not have to buy in large quantities, taking up yard room.

The running schedule at the mines remains about the same. The industrial demand keeps up to the recent average, with a tendency toward improvement, as factories make further efforts to increase operations.

A furniture installment house here is renewing its customary winter practice of offering coal at cut prices; it advertises the best grade of Linton at $2.75, which is 50c. or more below what regular dealers charge. The company states that it had great difficulty in making a contract with the mining interests.

PORTLAND, ORE.

Cargo arrives from Australia, but no more importations expected this winter. Trade quiet.

The French bark "Vendee" arrived here recently with a cargo of about 3000 tons of coal from Newcastle, Australia, half of which was delivered at Astoria and the balance is being discharged at the bunkers of the Pacific Coast Coal Co. Two sailing vessels are reported here to load grain for Europe, but instead of bringing coal cargoes, they will come in ballast, the Australian Government having placed an embargo on the exportation of coal due to the war.

The weather here has moderated considerably the past week and as a result the coal business has fallen off again, as far as domestic purchases were concerned.

KANSAS CITY

Weather continues mild and the movement slow. Illinois coals very weak but Kansas grades steady.

The long anticipated and much desired cold spell has failed to arrive and all grades are moving slowly. The weather for the last two weeks has been a little cooler, but not sufficient to create any added demand. The market on Illinois coals has broken badly while Kansas grades seem to be holding their own, due to the strike at Pittsburg, Kan., which has forced the Santa Fe R.R. to buy coal from other sources.

There has been no change in any of the price lists, but coal has been sold for as much as 25c. below the circular. Retailers have maintained normal prices.

PRODUCTION AND TRANSPORTATION STATISTICS

NORFOLK & WESTERN RY.

Distributions of shipments for September and October compare as follows:

	September			October		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas	1,225,197	16,952	1,242,149	955,892	12,534	968,426
Tug River	292,570	2,762	295,332	268,372	2,279	270,651
Thacker	246,980	9,057	256,037	217,655	9,292	226,947
Kenova	99,941	10,217	110,158	103,691	8,764	112,455
Total	1,864,688	38,988	1,903,676	1,545,610	32,869	1,578,479

Shipments of coke, entirely from the Pocahontas field, amounted to 18,734 tons in September, as compared with 55,043 tons in October.

SAULT STE. MARIE CANALS

Coal shipments through the Sault Ste. Marie Canals for October and November compare as follows:

	October			November		
	Canal			Canal		
	U. S.	Cana.	Total	U.S.	Cana.	Total
Anthracite	211,810	25,900	237,710	318,844	20,500	339,344
Bituminous	1,313,170	295,941	1,609,111	805,763	62,619	868,382

ANTHRACITE SHIPMENTS

Anthracite shipments for November and the first eleven months of this year and last year were as follows:

	November		11 Months	
	1914	1913	1914	1913
Phila. & Reading	1,082,344	1,119,247	11,043,952	11,856,164
Lehigh Valley	1,139,467	1,114,014	12,081,410	11,948,792
Cent. R.R. N.J.	761,897	727,107	8,214,332	8,429,038
Del. Lack. & West	881,645	810,921	9,010,438	9,064,157
Del. & Hudson	638,892	575,976	6,671,589	6,504,100
Pennsylvania	595,819	600,648	5,904,737	5,804,780
Erie	622,154	654,219	7,565,548	7,482,921
Ont. & Western	206,068	184,799	2,148,337	2,317,058
Total	5,928,286	5,786,931	62,640,343	63,407,010

VIRGINIAN RAILWAY CO.

Shipments over this road for October of the current year amounted to 341,703 tons, as compared with 379,113 tons the preceding month. Shipments in October of last year amounted to 476,482 tons.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable in which event a notice to that effect is made. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

CONTRACTS PENDING

Contract No. 18—Brooklyn—It has been recommended that the bid of the Bacon Coal Co. at $2.24 per 1000 lb. be accepted on this contract (pp. 933, 854), which provides for furnishing 560,000 lb. of anthracite pea coal to the 26th Ward Disposal Works, at the foot of Hendrix St., Brooklyn. Address Bureau of Public Buildings and Offices, Borough of Brooklyn, Room 1003, No. 50 Court St.

Contract No. 19—New York—Bids on this contract (p. 892), which provides for furnishing, storing and trimming coal for use in public buildings, were as follows:

3,000,000 LB. BUCKWHEAT NO. 1—Archibald McNeil & Son, Inc., $1.60; Charles B. Norton Co., $1.56; Gavin Rowe, $1.54; John W. Peale, $1.60; William Farrell & Son, $1.70; The Skeele Coal Co., $1.55.

26,000,000 LB. BUCKWHEAT NO. 2—Archibald McNeil & Son, Inc., $1.35; Chas. B. Norton Co., $1.31; Gavin Rowe, $1.29; John W. Peale, $1.34; William Farrell & Son, $1.40; The Skeele Coal Co., $1.35.

13,000,000 LB. BUCKWHEAT NO. 3—Archibald McNeil & Son, Inc., $1.24; Charles B. Norton Co., $1.16; Gavin Rowe, $1.16; John W. Peale, $1.85; William Farrell & Son, $1.15; The Skeele Coal Co., $1.19.

1,300,000 LB. BROKEN COAL—Archibald McNeil & Son, Inc., $2.59; Charles B. Norton Co., $2.85; Gavin Rowe, $2.59; John W. Peale, $2.59; William Farrell & Son, $2.80; The Skeele Coal Co., $2.53.

4,000,000 LB. BITUMINOUS COAL, MINE-RUN—Archibald McNeil & Son, Inc., $1.68; Charles B. Norton, $1.72; Gavin Rowe, $1.71; John W. Peale, $1.65; Wm. Farrell & Son, $1.70; The Skeele Coal Co., $1.70.

TOTAL ON ALL BIDS—Archibald McNeil & Son, Inc., $66,107; Charles B. Norton Co., $64,405; Gavin Rowe, $63,447; John W. Peale, $65,012; William Farrell & Son, $66,890; The Skeele Coal Co., $65,309.

Address, Auditor, Room 2141 Municipal Building, Borough of Manhattan.

Contract No. 20—New York—The bids on this contract (pp. 892, 933) which provide for furnishing and delivering 300 gross tons buckwheat coal No. 1 were as follows: Burns Bros., $3.95; Gavin Rowe, $3.74; Garfield Proctor, $4; N. L. Bird, $3.89; Joseph T. O'Connor, $3.66; Meeker & Co., $3.72. Address Auditor, 400 East 29th St., Borough of Manhattan.

Contract No. 21—Cleveland, Ohio—Sealed proposals for furnishing and delivering 2000 tons of Pittsburgh nut coal, 100 tons of the best grade soft lump coal and 50 tons of the best grade Lackawanna egg coal will be received by the County Commissioner until 10 a.m., Dec. 12, each bid to be accompanied by samples of not less than 25 lb. A certified check for $500 must accompany each bid. Address E. G. Krause, Clerk of the Board of County Commissioners, Cuyahoga County, Cleveland, Ohio.

Contract No. 22—Philadelphia—Sealed proposals for furnishing anthracite coal of various sizes to the different departments of the city will be received until Dec. 16. Deliveries are to be made as per specifications. Address Director of Supplies, Room 312, City Hall, Philadelphia, Penn.

Contract No. 25—Stockholm, Sweden—Press reports are to the effect that the Swedish State Railways have invited tenders from American operators for approximately 130,000 tons of coal. Deliveries are to be made the early part of next year.

Contract No. 26—St. Louis, Mo.—Sealed proposals are requested at the United States Engineer's office for furnishing 30,000 tons of coal. All bids must be in by 11 a.m., Dec. 23, 1914. Address B. McD. Townsend, Colonel of Engineers, United States Engineer's Office, Custom House, St. Louis, Missouri.

Contract No. 27—Delphi, Ind.—The city water-works at this place is in the market for about 1000 tons of coal. The coal must be on a 65c. rate, and may be either mine-run, pea, or screenings. Address F. L. Woodruff, Delphi, Indiana.

CONTRACTS LET

Contract No. 4—Providence, R. I.—It is authoritatively stated that this contract (pp. 696, 735, 775, 814) has been let to H. N. Hartwell & Son, representing the Smokeless Fuel Co. The duration of the contract was extended from 12 to 18 months, and the price is surmized to be $3.33, alongside, Providence. It will be filled with either Pocahontas or New River coal. Address E. H. Raquet, Engineer of Tests, South Station, Boston, Massachusetts.

Contract No. 17—New York—This contract (pp. 854, 933) has been awarded as follows:

MANHATTAN (anthracite), 900 tons egg, Meeker & Co., $5.37; 900 tons of egg, $5.37, Pattison & Bowns; 900 tons stove, Gavin Rowe, $5.70; 7000 tons buckwheat No. 1, Pattison & Bowns, $2.79; 800 tons pea (L. H.) Meyer-Denker-Sinram Co., $4.85.

MANHATTAN (bituminous)—10,000 tons, George D. Harris & Co., $2.87; 400 tons gas coal, John W. Peale, $2.45.

BROOKLYN (anthracite)—7000 tons pea, Bacon Coal Co., $4.62; 700 tons stove, Bacon Coal Co., $6.81.

RICHMOND (anthracite)—400 tons egg, Gavin Rowe, $6.17; 250 tons stove, John E. Donovan, $6.43; 6000 tons buckwheat No. 1, Joseph Johnson's Sons, $3.38.

Address, Contract Clerk, Department of Public Charities, Room 1034, Municipal Building, Borough of Manhattan.

FOREIGN MARKETS

GREAT BRITAIN

Colder weather stimulates activity. Ocean freights continue high and exports heavily restricted.

The colder weather has stimulated the trade in the London district, and orders for all qualities have become more plentiful. Prices are unchanged, but collieries are endeavoring to withdraw the special quotations of a week ago. Slacks and small nuts have also slightly improved. A notably better demand is developing from manufacturing districts, and consumption at engineering works, especially government, is well maintained. The demand is still insufficient to keep the collieries working full time, however, and the general rule is three or four days a week.

In consequence of freights having reached an abnormal level it has been impossible to transact fresh business in the coal export trade, and the market has become very dull and depressed. On the Tyne and Wear and at Cardiff the effect is naturally felt most. The Government demand at the latter place has not been so great during the past week, and the market generally is very irregular. On the other hand, the inland trade markets have slightly improved, the colder weather being the contributing cause.

Recruiting in the South Wales coalfield has been so brisk of late that the War Office has decided not to accept miners who fail to produce certificates from their managers stating that they can be spared.

The Admiralty have imposed restrictions on navigation in the Firth of Forth which will have the effect of closing the ports. This will be keenly felt by the coal-carrying trade of the district.—"The Colliery Guardian."

Nov. 27—Tonnage is still scarce and with stocks of coal excessive, values of the large descriptions are weak for prompt delivery, although sellers are unwilling to reduce forward values. Owing to colliery stoppages small coals are scarce and prices continue to rise. Quotations are approximately as follows:

Best Welsh steam	$4.80@5.28	Best Monmouthshires	$3.96@4.02
Best seconds	4.32@4.56	Seconds	3.78@3.90
Seconds	4.08@4.20	Best Cardiff smalls	2.46@2.54
Best dry coals	4.32@4.56	Cargo smalls	1.32@1.74

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage, and for cash payment.

Freights—Outward chartering is not so active but this is doubtless due to shortage of tonnage. Rates are approximately as follows:

Gibraltar	$2.88	Venice, Ancona	$4.92	Singapore	$5.04
Malta	3.12	Alexandria	4.80	Las Palmas	2.76
Marseille	3.96	Port Said	4.80	St. Vincent	3.00
Algiers	4.19	Aden	4.80	Rio Janeiro	4.20
Genoa, Savona	3.60	Colombo	4.92	Monte Video	3.96
Naples	3.72	Sabang	4.80	Buenos Ayres	4 20

Note—These indications are for Bristol Channel loading. Rates from the East Coast of England are considerably higher than this.

COAL AGE

Vol. 6 NEW YORK, DECEMBER 19, 1914 Vol. 25

"England was merry England when Old Christmas brought his sports again. A Christmas gambol oft could cheer the poor man's heart through half a year." That was Walter Scott's idea of the old time Christmas. "Cheer the poor man's heart through half a year." That's the kind of Christmas we need this year. With men out of work, and almost unheard-of conditions in the coal trade; with coal-mining companies on the verge of bankruptcy; yes, we need a Christmas that will help. "Easier said than done," you say. Sure, but the point is, let's do it. Christmas is peculiarly a celebration for the children; it's children's work to get down to the very bottom of discouraged men's hearts and make them forget all about their troubles; and they do it without realizing that they have accomplished anything. Put the children to work. But wait—first remember that many a child is troubled now and grievously troubled; don't let that keep you long, however; just establish a new road to Santa Claus' house, the old one has been lost this year, and too many children have been told about the lost trail. English and German, French and Russian, Pole and Hungarian; they are all in our midst and their hearts are heavy just now thinking of their bleeding kin across the sea. But nations have passed through sorrow before and also want; Christmas reaches back through many such experiences. It had a mission then and has a mission now. The children hold the key. It is only necessary to lend them material encouragement. Let every coal-mining community in America arrange for the biggest "doings" this Christmas that have ever taken place. The joy of the youngsters will radiate and permeate through every home, and the heavy hearts of the grown-ups will be warmed with gladness.

Ideas and Suggestions

Mining Publicity

In connection with the discussion that has been carried on of late through the public press in regard to the present condition of the coal trade, one item, at least, has been overlooked, that is, the item of publicity insofar as it affects the education of the general public that buys the coal. Is such education necessary? Many believe that it is, because there is a very general misconception in regard to the coal business.

It has been widely stated by those engaged in mining and handling coal that very little money is being made in the business and that no similar industry in the United States of equal importance receives so small a return on the capital invested and for the risk run, both by the operator and miner. The public as a whole does not believe this, and therefore, very naturally does not take kindly to the proposition to increase its fuel bill, for every one, corporation or individual, wants to get the greatest amount for the least possible outlay.

The idea is entirely too prevalent that the coal producers are trying to put one over on the public when they ask for an increased price for their product, while it is undoubtedly true that great fortunes have been made out of coal mining and while others will be, undoubtedly, in the future, the competitive conditions under which the business is now being carried on are not understood by most of those who buy coal, nor even by many of the financial centers where the coal industry has been capitalized.

Would a better understanding between the buyer and the seller in regard to just what it costs to produce a ton of coal remedy the present unsatisfactory conditions? The present hand-to-mouth policy under which so many coal operations are now being carried on cannot continue indefinitely.

Coal Mining and the Daily Papers

Why is it that the metropolitan daily papers give so little attention to the mining business, excepting the purely speculative features and these often only by a few of the distinctly financial journals? The latest divorcée in Chicago or New York gets ten times the space in the daily paper that the failure of a coal company involving millions does. The public wants scandal, do you say; very true, but the coal companies should want and demand publicity.

Why do the agricultural interests obtain immediate attention from a legislature? Because by consistent publicity the general public, which includes legislators, has been made to think that the farmers are the greatest people on earth and that they should have everything they ask for. No one would for a moment attempt to deny the importance of the agricultural interests, but the mining industry should copy some of the publicity methods of the agriculturists and if this is done, there will not be the great differences that now exist between the appropriations made by the national and state governments for the benefit of the two industries, and legislation that tends to place mining upon a more stable basis will not be tabooed as it now is. An industry that furnishes fifty per cent of the freight of the country has a right to be heard and to have its true story known.

If the real nature of coal mining were better known and the importance of the industry better appreciated, remedial legislation in states in which coal mining is upon a competitive basis would be more easily obtainable.

Need for Uniform Laws

Safety-first legislation is very desirable, but is it fair to compel the operator in one state to use measures that materially increase his costs, while his neighbor working under practically identical conditions and shipping to the same market, is practically granted a bonus upon his coal through lack of such safety legislation? Public opinion should be made to understand the differences, so that it may compel state legislatures to give equal protection to all, for unless this is done Federal control is inevitable in order to equalize the burdens upon the industry.

People as a whole are fair-minded and if they are made to understand that the present difference between the cost of mining a ton of coal and the selling price does not give a suitable return upon the enormous capital invested, they will be willing, we believe, to grant an increase, so that the miner can receive the fullest possible protection and the operator secure a just return upon his investment.

Very little has been done in this country to let the people in general know just how mining is carried on. In Europe and particularly in Germany every effort is made to teach the public about industrial undertakings. In Berlin and Munich, for instance, though comparatively remote from the mines, there are magnificent mining museums open at stated intervals to the general public and in which are exhibited all kinds of mining machinery, both separately and in combination, as, for instance, working mine tipples that show the elaborate processes of preparing coal. Methods of mining are well shown in models and every detail almost of the operation of a mine is so strikingly illustrated that the ordinary layman may understand the difficulties of the business.

Museums as Publicity Agents

America has thus far provided no such museums excepting through the world's expositions and through the small collections of mine models exhibited at some of the mining schools. Some of the models from the expositions have been collected in Washington, but a single museum in the capitol can only do a small part of the work of popularizing the coal business. Models and museums are mentioned not as *the* "cure" but as representing one phase of the cure and as one medium of publicity. Cooperation of the buying public may possibly be secured if some of the supposed secrets of the business are given out.

The uncertainty of the application or misapplication of

the Sherman law and similar legislation has naturally made the operator timid about giving too much information to the public. Even when it is not wise to give out costs, information in regard to the difficulties of operation and the many processes involved in the mining and preparation of coal can be given out without fear of giving away trade secrets or putting dangerous information into the hands of pestiferous government agents. Such companies as the H. C. Frick Coke Co. and other subsidiaries of the U. S. Steel Corporation, and the Peabody Coal Co. of Chicago have started the publicity ball rolling by presenting through the medium of moving pictures many of the operations about modern coal mines.

The Folly of Imitation

By I. C. Parfitt*

What are you? Miner, fireboss, foreman or superintendent? Are you yourself, or are you the caricature of the man higher up? Whatever position you aspire to in the mining world, if you be the possessor of good red corpuscles, you have an ideal of what the position is, what it requires, and what you should be to fill it.

Are you preparing yourself for the responsibilities and dignity of that position by a judicious or an injudicious adoption of the methods and mannerisms of a present or former incumbent, or by the cultivation of your individual faculties and character in conformity with your ideal? Are you dependent for the required qualifications upon imitation, or are you independent by acquisition?

When the position is attained, will you grace it by an honorable individuality or disgrace it by an affected personality?

Emulation is an honorable and praiseworthy ambition; imitation is a despicable one.

Two of the most powerful factors to success are *concentration* and *application*. They are not characteristic of any particular individual, but may become common attributes; they may not be possessed by every individual to the same degree in the same vocation, but they may be possessed in the highest degree by every individual in the vocation for which he has a predilection. The cultivation of these faculties develops individuality. The aping of the manners and peculiarities of another not only destroys individuality but excites derision and contempt.

Analyze them and see if the qualities you admire in others are not those which, by cultivation, you may possess yourself.

Are you imitating the peculiarities of the "man higher up"? Cut it out; you may awake to the fact that you have been worshiping false gods.

Get the habit of studying yourself and your moral relations to your fellowman.

Imitators never make any progress themselves and never confer any blessings upon the world.

If you have the ambition to get higher up, study the nature of the position and yourself; bring about a conformity; don't dress up in the other fellow's clothes, the asininity might be revealed by the bray.

Be an efficient man in the position you hold. Efficiency in a subordinate position is the best recommendation for advancement to a higher one, whether it be recognized as such or not. If you have learned how to command the respect of your fellow miners you have learned how to command respect in any position to which you may aspire.

Respect is not secured through arrogance, superciliousness, officiousness or exclusiveness, but by the individuality acquired through the commercialism of mutual recognition.

Position will not give dignity to a man, but a man may confer dignity upon any position.

Don't imitate. Emulate, and cultivate the individuality of Truth and Right.

*Jerome, Penn.

Better Things to Come

By F. S. Johnson*

The truest index of an individual's or of a nation's sanity is the ease with which they endure and then forget extreme hardships, and in the degree of firmness with which they maintain their grip upon things in general in times of stress.

So as we draw near to the close of 1914 and pause to recount the experiences that have come to us since its beginning, let us pay to it the tribute usually accorded the dying, by looking longest upon the best it has given us, and forgetting—save the benefits derived therefrom—the hardships endured.

To the coal men of America the passing year has brought its full quota of trying situations. But be it remembered that this year has also witnessed one of the greatest advancements in first aid, safety-first and general-welfare movements that the country has ever known. This fact reflects credit upon those men who have been able to hold fast to their ideals and accomplish so much toward their realization, amid such adverse conditions.

It is one of the blessings of human nature that misfortunes when viewed in retrospect lose much of their bitterness, and, if considered at sufficient length, always present some feature that has added materially to one's welfare.

Therefore, the very things that have appeared to conspire against the coal industry this year, such as the long drawn-out deliberations of the Interstate Commerce Commission, unreasonable state legislation, unsettled labor conditions and the paralyzing effect of the European war upon trade, have at the same time taught valuable lessons, and left as a reward, in the breast of every man who has performed his duty faithfully, an increased measure of self-confidence, a broader knowledge of his business and its powers of endurance, and a keener appreciation of the responsibilities devolving upon him.

With the dawn of 1915, there will come to the doors of the United States the loud rappings of opportunity, and to the men engaged in the coal industry, which forms the bone and sinew of our natural resources, will be given the unprecedented privilege of arising to their fullest efficiency, and of applying to the new conditions which will prevail, the principles drawn from the important lessons that have been learned during the past 12 months.

So as we stand on the threshold of another year, let every man look backward with the satisfaction that comes from the consciousness of a duty well done; and forward, with a confidence and sense of preparedness for what is to come, with an energy that will prove to the world the sanity of the coal-mining fraternity of America.

*Coalton, W. Va.

Steep Pitch Mining of Thick Coal Veins--I

By W. G. Wildin*

SYNOPSIS—The writer discusses the use of steel timber, declaring that it has distinct advantages where squeezing is not to be anticipated. He also illustrates the methods adopted in opening the coal by the breast and chute methods and finally describes the means by which it has been customary to attempt the removal of pillars.

This paper will be confined to a discussion of the methods in use on the property of the Lehigh Coal & Navigation Co. in the Panther Creek valley. Only the methods used in mining the Mammoth vein will be considered, those in the smaller veins being adaptations of the same.

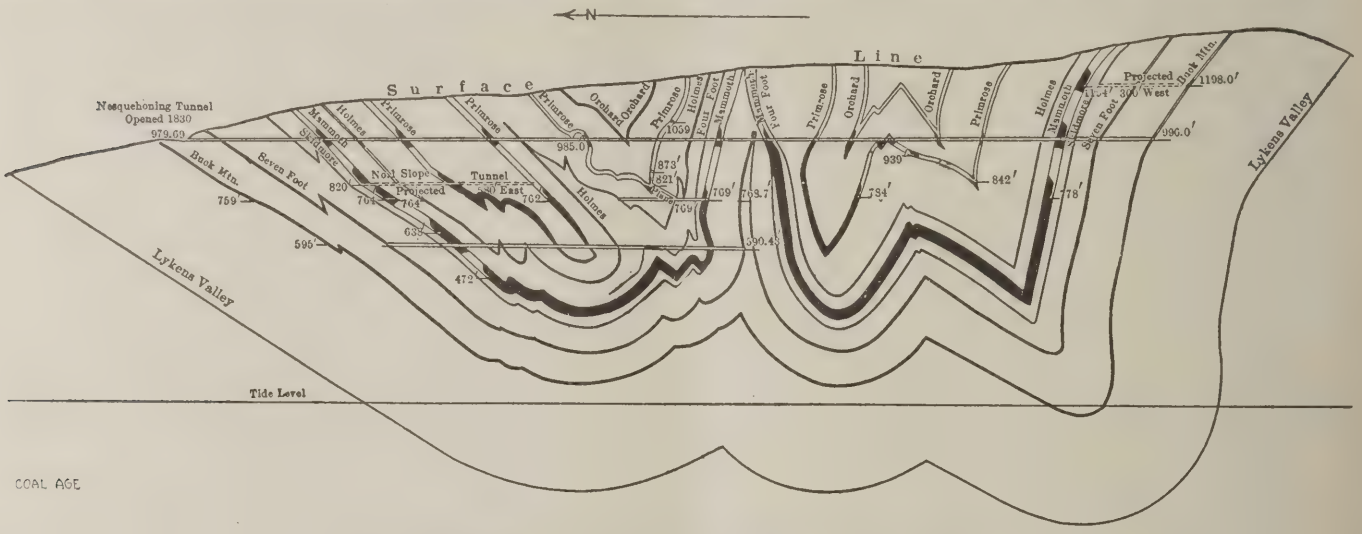


Fig. 1. Cross-Section of the Nesquehoning Tunnel

Typical cross-sections of the coal basin are shown in Figs. 1, 2 and 3.

Description of Mammoth Vein

The Mammoth vein varies in thickness. It is 21 ft. thick at one colliery, 50 to 125 ft. at another, and over 200 ft. at a third. Its normal thickness is 35 to 40 ft.

At some points in the Panther Creek basin the Mammoth vein is made up of three splits—the Bottom, Middle and Top, while in other portions the dividing strata between the benches are only 18 to 30 in. thick and the vein is practically in one. The Mammoth vein at the Greenwood colliery shows a thickness of 60 ft. The miners know it by benches, as follows: The Three-Foot, the Four-Foot, the Eighteen-Inch Slate, the Bony, the Grey Slate, the Grain Clear, the Five-Foot, the Seven-Foot, the Slaty or Dirty benches, the Blue Slate, and the Top bench.†

The present-day methods of mining are an outgrowth of the experiences of the last 100 years in this territory. The first attempt at mining, according to the company's maps, was made at Summit Hill in 1792, when open cuts and pits were made. Later the pillar-and-breast method was introduced. This and other methods will be discussed hereinafter.

Expensive Timbering

Drifts, slopes and shafts, according to the requirements and physical conditions, are the main openings, from which the gangways are driven. The gangways (haulageways) and airways are driven along the strike of the vein; the former in the various veins on the same level being connected by tunnels through the intervening rock. The gangways and airways in thick veins are heavily timbered throughout. The sets of timber, consisting of a collar and two legs, are spaced 5 ft. apart, and later, after the ground has settled, additional sets, called "liners" or "relief sets," are placed between, to relieve the strain on the original timbers, so that the result is a set of timber every 30 in.

The sizes of the ordinary timbers, when of wood, are: Collar, 8 ft. 6 in. long and 15 in. diameter; legs, each 9 ft. long and 14 in. diameter, set on a batter of 3 in. to the foot. A section of the gangways in the clear, therefore, is 7 ft. 6 in. in width at the top and 11 ft. 9 in. in width at the bottom at the height of the track, and 7 ft. 6 in. high above the track.

Steel Advisable Where Squeezing Is not Anticipated

The timber in the airways is 10 to 12 in. in diameter when of wood, and the opening in the clear is 5 ft. in width at the top and 8 ft. at the bottom, and 6 ft. in height. A considerable amount of steel timber is used, the sections for gangways being a 10-in. I-beam, 25 lb. per foot, for collar, and 8-in. H-columns, 34 lb. per foot, for legs. In airways we use a 9-in. I-beam, 21 lb. per foot, for collar, and 6-in. H-columns, 23.8 lb. per foot, for legs. Experiments are being made, using for collars 6-in. H-

*Mining superintendent, Lehigh Coal & Navigation Co., Lansford, Penn.

†This cross section was illustrated, with several others, in our issue of May 10, 1913, on page 727. On page 723 of that issue is a profile cross section of the valley at Lansford, Penn.

NOTE—Paper read at Pottsville, Penn., meeting of the Pennsylvania Anthracite Section of the American Institute of Mining Engineers, July 25, 1914.

beams, 23.8 lb. per foot, instead of the I-beams, and so far better results are being obtained.

Where wood is subject to dry rot the use of steel timber has been very successful, but where there is a constant squeezing or heaving it has been found inadvisable to substitute steel for wood. A considerable saving in the maintenance of timbering has been made up to this time by the use of steel, and its use is being extended.

All turnouts and permanent openings, where timbering is necessary, are being timbered with steel, and sections of various sizes up to 70 lb. per foot are used, according to the requirements. I cannot state at this time what the average life of a set of steel timber in a gangway will be, but the material will probably last at least 10 years.

steel will be fully 100 per cent. A turnout which had to be retimbered every nine months at a cost of $20 per set for labor and material is a notable instance of the greater economy of steel timber as compared with wood. Steel timbering costing $40 per set for labor and material was installed four years ago, and will last many years yet. It will be seen that the saving amounts to more than $60 per set to the present time.

We use practically all peeled timber, although at times we are unable to procure it. We have not used treated timber in the mines, although some of the other anthracite companies have experimented rather extensively with it for a number of years at one or two of their collieries. We are testing steel timbering instead of wood in a few of our main chutes, those which will have to be held open

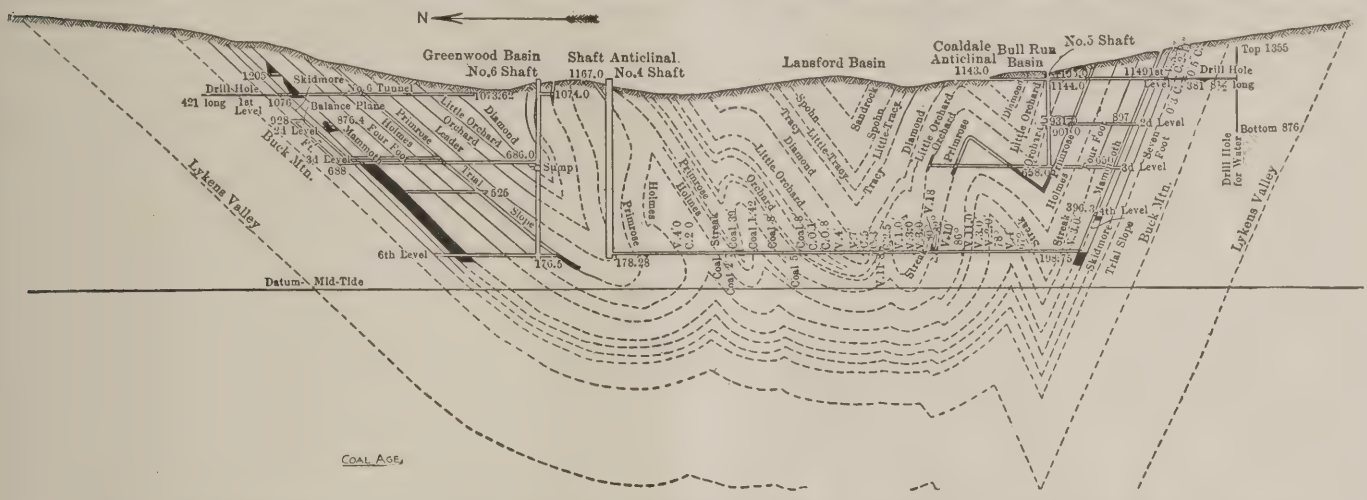


Fig. 2. Cross-Section through Panther Creek Valley on Line of Nos. 4, 5 and 6 Shafts

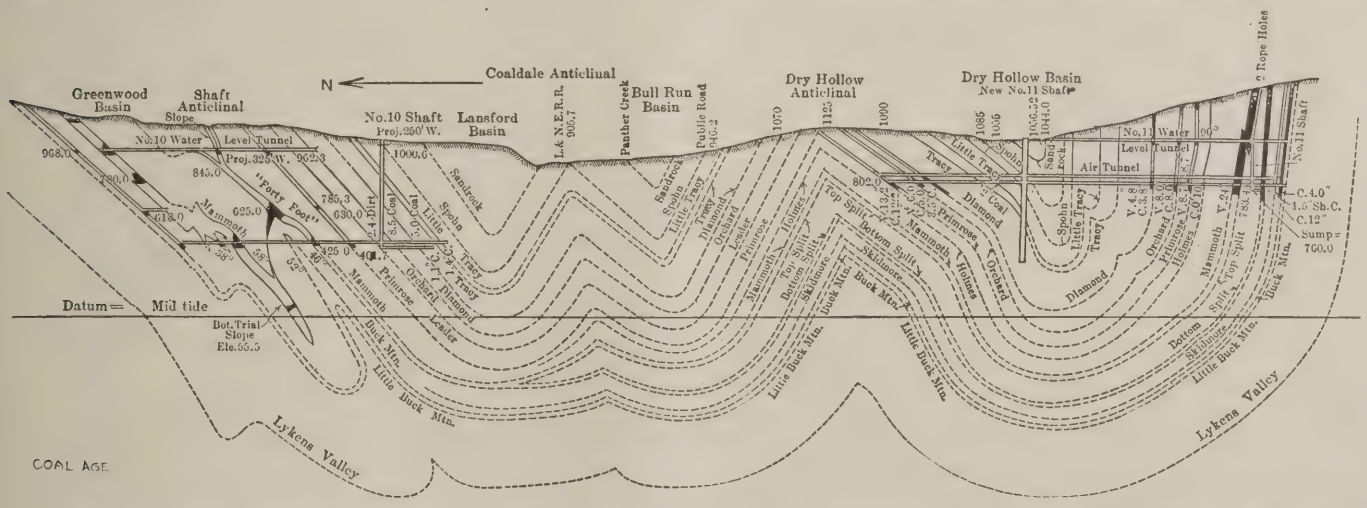


Fig. 3. Cross-Section through Panther Creek Valley at Greenwood and Rahn Collieries on Line of Nos. 10 and 11 Shafts

The average life of wooden timber in a gangway is three years. In many instances wooden timber has lasted 15, and in many others it has lasted less than one year, depending entirely upon the physical conditions. There are also many instances where it was almost physically impossible to hold open certain stretches of gangways and airways until steel timber was installed.

Steel Is Clearly Half as Costly as Wood when Life Is Considered

Figuring the average life of wooden timber as three years, and of steel timber as 10, the saving made by using for five or six years, and we believe that the use of steel will result in a saving.

Location of Gangways

The proper position of gangways and airways with reference to the top and bottom rocks is sometimes a question. In veins pitching from 60 deg. to vertical the gangways and airways are driven along the top rock, for the reason that the loading chutes, on about 30 deg. pitch, can be driven back from the top rock to the bottom rock. In this way a safe working place is provided for loaders, and the loose coal can also be controlled. In veins

with lesser pitches the gangways are driven on the bottom rock and the airway along the top rock.

The distance between a gangway and its airway, when both are driven along the same rock, varies according to conditions. Years ago the distance varied from 20 to 30 ft., while during the last few years it has been found advantageous in some cases to increase this distance to 50 ft. in the sections where the chutes were driven on 60-ft. centers, as it results in lowering the maintenance cost of the gangways.

From Gangway to Bottom-Breast Crosscut

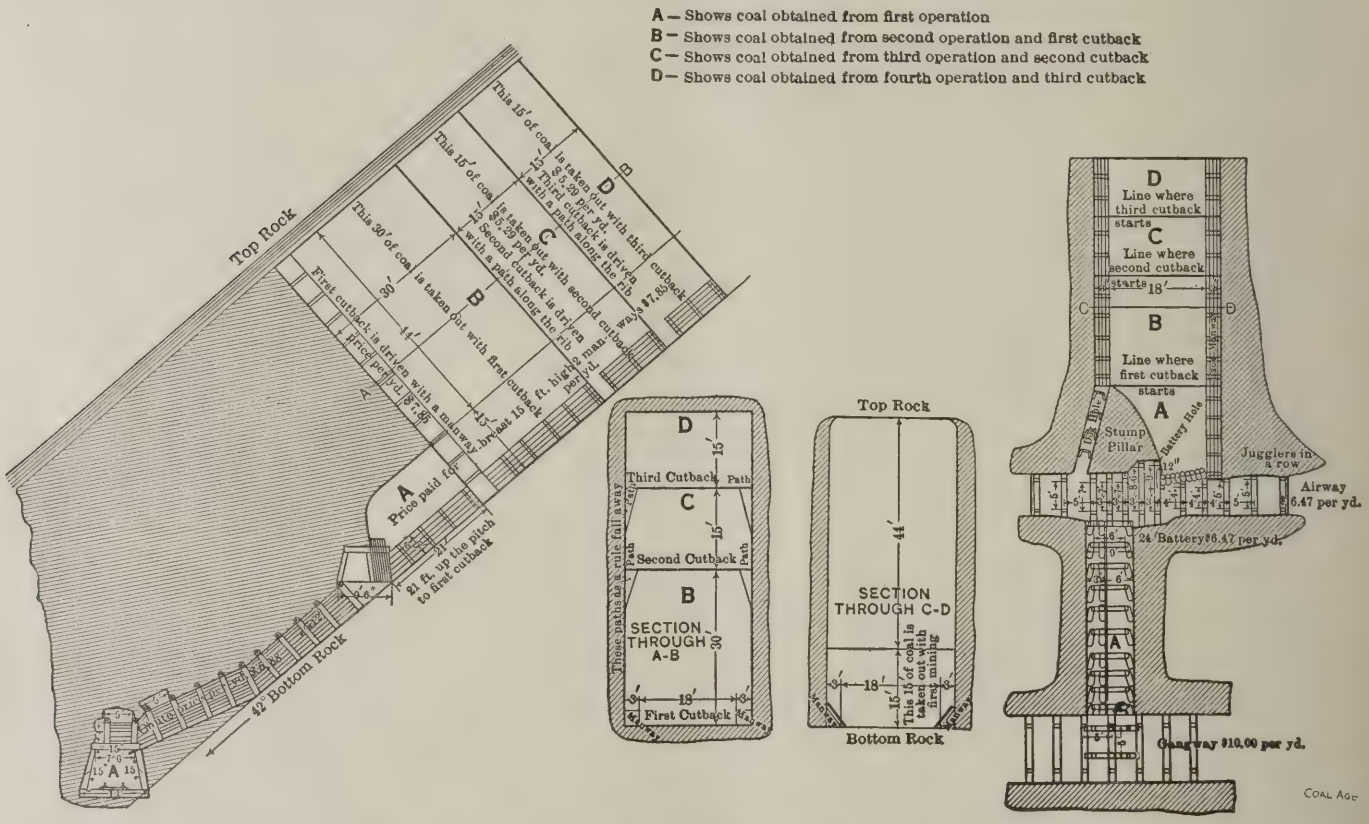
The method of opening a breast is as follows (see Figs. 4 and 5): Chutes, 6x6 ft., partitioned off to make a traveling way and a loading chute, are driven from the gangway on a pitch of 22 deg. until the bottom rock is met. They are then extended up the pitch of the bottom rock, to the height at which it has been decided to have the stump heading or bottom-breast crosscut. At this point a juggler battery is put in and a 4x6-ft. crosscut is driven connecting the top of the chute with the top of the next chute. This crosscut is used for ventilating and travel, and is locally known as the "bottom-breast crosscut."

The Breast Proper and Its Frequent Normal Developments Termed "Cut-Backs"

In forming a breast, the "front" manway or dog hole is driven on one side 20 ft. up the pitch, and a back manway carried on the other side; both these are opened off the bottom-breast crosscut. The opening between the back manway and the battery collar is 10 ft. wide and 8 ft. high, and this opening is carried up the pitch and gradually widened until it reaches the top of the dog hole, where a connection is made. Thus is formed what is called a "stump" above the battery. The breast is now 18 ft. wide between the manways.

A length of manway is put in on top of the dog hole and the first cut-back is made in the following manner: The top of the dog hole forms the bottom of the cut-back; manways are carried on both sides and the coal is blasted 18 ft. wide between the manways and 10 ft. high all the way back to the top rock of the vein.

After the first cut-back has been completed the breast is driven 30 ft. farther up the pitch, where the second cut-back is made. The second and additional cut-backs are similar to the first. Where the pitch of the vein is 45 deg., for instance, the loose coal does not fill the whole space made. In this case the miners carry a "path" along each rib of the cut-back. Two miners blast the coal, each traveling his own path, until the top rock is reached and all the coal is taken out between the first and second cut-backs.


A — Shows coal obtained from first operation
B — Shows coal obtained from second operation and first cutback
C — Shows coal obtained from third operation and second cutback
D — Shows coal obtained from fourth operation and third cutback
Top Rock
This 15′ of coal is taken out with third cutback
This 15′ of coal is taken out with second cutback
This 30′ of coal is taken out with first cutback
First cutback is driven with a manway
Price paid per yd. $7.85
Price paid per yd. $7.85
Price paid per yd. $7.85

and another breast opened, probably reaching the old level.

At one colliery where the vein is practically vertical and the breasts are driven along the bottom rock, the manways are driven along the top rock, and this has been found of great assistance, because the manways are not so liable to become blocked by falls, thus interfering with the ventilation of the breast.

Another Method Made Necessary by Split Seam

The driving of breasts as I have just described is the common practice, but where the vein is divided into its various splits, a different method is used. At the Tamaqua colliery there are a bottom and a middle split, the parting slate being from 12 to 18 ft. thick. The bottom

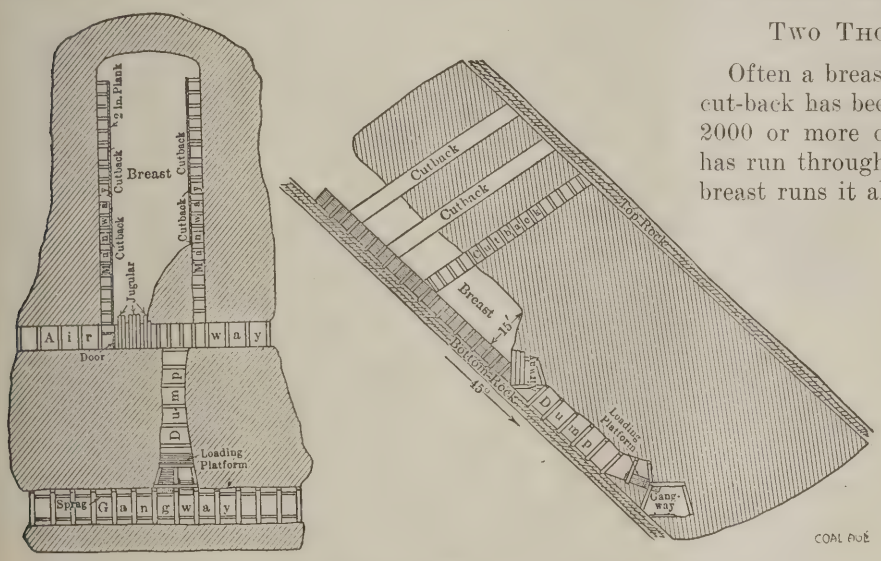


Fig. 5. Method of Working Mammoth Vein, Lower Level, Colliery No. 8

split is 7 ft. thick and the middle split 4½ ft. The gangway is driven in the bottom split, as is also the airway. 40 ft. above.

Rock holes, 50-ft. centers, are driven from the bottom-split airway to the middle split. The middle split is mined by breasts 8 yd. wide, and robbed by skipping the pillars, beginning at the top. After the completion of the robbing, the bottom split is mined in the same way directly underneath the middle-split breasts. The cost of coal mined by this method is high because two breasts have to be driven for 12 ft. of fuel thickness.

It was originally planned to use the breast method in the middle split and the chute method in the bottom split; the chutes being driven while the breast was being worked. Care was taken, however, not to commence the robbing at the top of the chutes in the bottom split until it had been completed at the top of the breast in the middle split.

It was found that as soon as the pillars were cut in the middle split there was so much squeezing and heaving in the chutes in the bottom split that it was almost impossible to hold them open, and the plan had to be abandoned. At the present time, breasts are being driven in both splits satisfactorily, except that the cost is high.

Breasts Are Now Narrower and Pillars Wider

Many years ago breasts were driven 10, 12 and 20 yd. wide, and in the old Rhume Run tunnel of Nesquehoning colliery some were even as wide as 30 yd. At the present time breasts are driven 8 yd. wide, and where the vein is free the width is not permitted to exceed 6 yd. I think it is safe to say that about 40 per cent. of these breasts are of this latter width.

As the width of breasts has decreased, the size of the pillars between breasts has increased. For instance, where 12-yd. breasts were driven on 50-ft. centers, the pillars were 14 ft. wide. At the present time 6-yd. breasts driven on 50-ft. centers give a width of pillar of 32 ft.

In thick veins breast work is preferable to chute work, especially where there is a good supply of air. The amount of blasting necessary is much less, and consequently the yield of prepared sizes is larger, for after the first cut-back has been made there is a loose end.

Two Thousand Cars of Selfmined Coal

Often a breast will run away after the second or third cut-back has been made, or sooner if the vein is soft, and 2000 or more cars will be loaded out before the breast has run through to the old lift above. However, when a breast runs it always fills with gas, and so remains until it has run through to the old workings. Great care must be taken, under such circumstances, to avoid explosions.

In chute mining in new ground the chutes are driven almost to the old lift above, and as soon as the upper section of the vein has been worked and breaks through to the old workings there is not much further trouble with gas.

The coal is mined by driving chutes back toward the top rock, where breasts are driven first along the top rock, and later up the pitch. Retreat is made down the main chute for 30 to 50 ft. and another chute driven to the top rock, and the operation repeated. This method is carried on until the chute has been robbed down.

Breast Method Cheaper But More Wasteful

All the coal has to be blasted, as heavy falls cannot be expected because of the shortness of the sections, and also because there are no loose ends. The maintenance cost of the chutes is high. The result of a test made at one colliery from 1907 to 1909 showed that the breast method cost only 60 per cent. as much as the chute method. However, the recovery by the former was only 92 per cent. as much as by the latter.

Various Pillar-Drawing Methods

The most important question in mining, especially insofar as the ultimate yield of the vein is concerned, is the robbing of the pillars. In the early mining, the practice was to cut the pillars at the bottom of the breast by stripping a slice off the pillar at the top of the dog hole and bearing into and cutting it through if possible. The pillar was followed up the pitch until it became dangerous to go any farther, or until the gob from the old breasts rushed in. By this method a large percentage of the pillar was left standing, as the heavy rock from the breast would soon rush in and the place would be abandoned.

A later method was, to drive a chute in the center of the pillar some distance up the pitch, where the pillar was

cut through from the rib of one breast to the rib of the other. A larger percentage of coal was obtained by this method, but it was soon found that the maintenance cost was high, due to the squeezing of the pillars, although it was more successful on the slighter than on the heavier pitches. On the heavy pitch, the coal and rock coming down the chute knocked the timber out, causing heavy maintenance charges.

Another former method was to couple up the old manways of the breasts on each side of the pillar and put in a battery, the old breasts being left full of coal. The bottom benches were taken out between the manways and were cut back in the middle of the pillar toward the top rock, care being taken to leave a small pillar on each side above the old manways which had been coupled, in order not to break them.

After these pillar breasts had been driven up to the same height as the face of the old breasts, loading was commenced from the three batteries, trusting that the small pillars over the manways would crush, and all the coal would be won. This method was found objectionable, as the pillars squeezed so much that it became too dangerous for men to continue to work, and they were seldom able to drive the pillar breast as far as the face of the old breast.

Experiments were then made with the chute method of robbing pillars. These chutes were driven about 25 ft. apart and to within 30 ft. of the old level above, and robbing commenced at the top. It was first thought that by this method it would be easier to reach the coal between the chutes; however, it was soon noticed that so many openings caused such a general squeezing in the chutes that it was almost impossible to keep them open, and in fact, many of them were lost. This distance between centers was then increased to 50 ft., and later to 60 ft. The main chutes were connected up by slant chutes, which were used for ventilation and later for robbing the various blocks of coal in the pillar. This method is the present practice.

A Modern Coal-Handling Machine

A contract has been awarded by the receivers of the Cincinnati, Hamilton & Dayton R.R. for the construction of a modern coal-unloading machine at Toledo, Ohio, which will cost about $350,000 and provide additional facilities for handling the road's coal traffic consigned for trans-lake shipment. The capacity of the new machine will be 40 cars an hour, and, replacing the present unloader, the capacity of the terminal will be 3,000,000 tons a season.

The steelwork will be fabricated and erected by the Wellman-Seaver-Morgan Company, Cleveland, and the foundations will be built by the Smith-McCormick Company, Easton, Penn. Work on the improvement will be started at once and must be completed, under the contract by April 27, 1915, in order to be ready for the opening of lake navigation. A feature of the new machine is that its operation will entail but a 3-ft. vertical lift, thus overcoming breakage to a large extent.

During the season recently closed a new record was established by the Cincinnati, Hamilton & Dayton R.R. when 2,000,020 tons were handled over the docks at Toledo.

Extracts from a Superintendent's Diary

Undoubtedly, we are soon to have another strike; it's in the air.

The pit committee finds something to wrangle about every day. Many little contentions hardly worth considering have suddenly become "crying wrongs" that must be righted.

Some of our foremen have been inclined in the past to yield a point here and a point there to the committee rather than waste valuable time in compelling them to live up to the spirit of their contract in little things. And now the committee is attempting to fall back upon some of these concessions, trying to force them down our throats.

The indications are that the strike is not to be local, but will affect the entire state. Some of our men who are known as good organizers are becoming very irregular about reporting for work, missing just as many days as they possibly can, without being subject to discharge according to contract, and are probably assisting to bolster up the Union organization in camps where the men are not manifesting sufficient enthusiasm.

The miners' checkweighman on our tipple has suddenly become the village wiseacre. He is literally surcharged with recollections of how we have been gouging the men on weights in spite of all his watchfulness, but he insists that it won't be possible to hoodwink him any longer, and he is proving it to the men constantly, much to the disgust of our regular tally boss, who is helpless in the matter, by stopping and starting loaded and empty cars on the scale platform in a most absurd manner, thus delaying the operations at this point unnecessarily.

We have had an understanding that required a quarterly test to be made of the tare weight to be used for the cars. Lately, we have made two special tests at the request of the checkweighman, but he is still not satisfied. It always happens that a few of the cars are missed by the men in spite of being cautioned to go into every room of the mine for the sole purpose of seeing that every empty car does get to the top; the checkweighman insists that he will not be satisfied until every car is actually brought to the scales.

As a sort of feeler, to find out just how complete is the influence of the union officials on our men, last week we gave the president of our local a chance to show his hand, and he promptly embraced the opportunity.

It happened that the said president was driving a heading that reached its limit and notwithstanding the fact that the heading just completed has been the most desirable working place in the mine for several years, we insisted that the president must take the next heading to be turned, which as it happens will be a most undesirable one because of low coal and bad top. We assured him that we regretted having to make the change, but it wouldn't do "to play favorites" (a phrase we appropriated from the president's last speech to his local). He said nothing but left the foreman's office with lowering brow.

Within two days he stirred up a hornet's nest, by suggesting a new interpretation to an old rule about extra pay for low coal and bad top when found simultaneously in an entry, and all our men are clamoring now for an adjustment in rates on this class of headings, which, if granted, will compel us to abandon that part of the mine.

Yes, undoubtedly a strike is on the way.

Concrete Lining for Steel Bunkers

When building its new plant at Duluth, Minn., the Minnesota Steel Co. also built a large circular steel tank (Fig. 1) for supplying coal to the coke plant. This tank is approximately 55 ft. in diameter, 40 ft. high and holds 2100 tons of coal. For furnishing coal for the gas producers of the openhearth furnaces there are 33 bunkers, each approximately 20 ft. wide, 12 ft. deep and 17 ft. long.

To protect these bunkers from the corrosive action of the coal, it was decided to cover the coke-oven bins with a 5-in. lining and the producer bins with a 2-in. lining of concrete, using a cement gun.

Fig. 2 shows the workmen on the inside of the round tank in the process of depositing the gunite lining. Fig. 3 is a view looking from the top into a line of parabolic bunkers after the work of gunite lining had been finished.

Numerous iron lugs were placed around the inside of the tank. To the lugs vertical rods were wired, and to the rods triangular-mesh wire cloth was secured in horizontal bands. The wire mesh was held approximately ¾ in. away from the steel and gunite was then applied. The first layer is shot through the mesh and serves to hold the wire cloth in place, thoroughly covering and protecting the steel plate. The second layer is then applied, bringing it to a total thickness of 5 in. When the work is finished the concrete is monolithic in construction and the surface is smooth and even.

The cement mortar consists of a mixture of portland cement and torpedo sand in the proportion of 1 to 3, mixed dry. It is then shot through a hose by the cement gun having an air pressure of from 40 to 60 lb. Immediately before emerging from the nozzle, the dry mixture is hydrated, the water coming through a separate and smaller hose and being under the control of the operator.

The sand in the first mixture strikes a hard surface, like a steel plate, rebounds, then falls clear of the work to the bottom in the form of clean sand and leaves a coating of cement on the surface. As soon as this coating has attained an appreciable thickness, it acts as a matrix into which subsequent deposits of material embed themselves so that the gunite in contact with the steel plate is clean cement. As a result of this, and of the pressure under which it is applied, the adhesion of the gunite to the flat steel plate runs as high as 500 lb. per sq.in.

This work was executed by the Gun-crete Co., 914 So. Michigan Ave., Chicago, Ill.

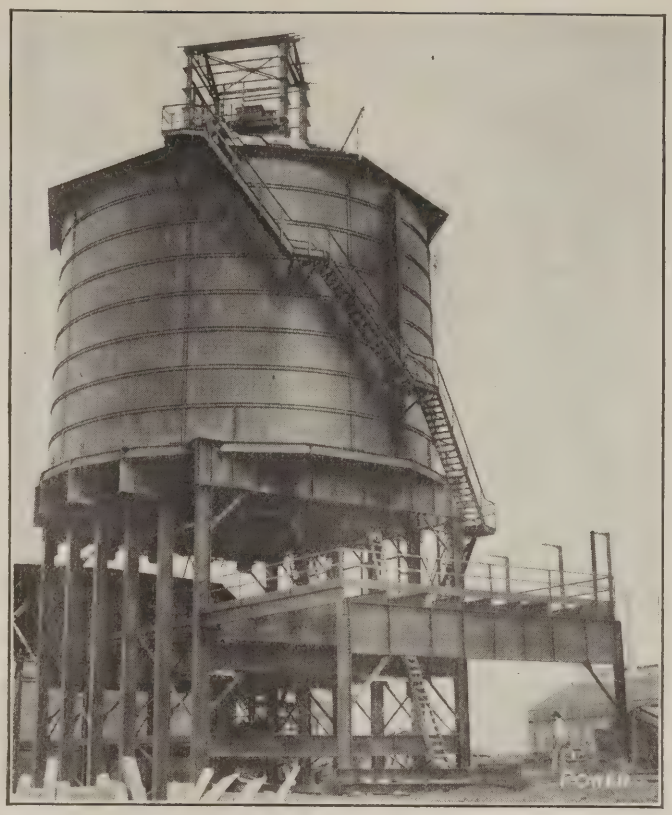


Fig. 1. A 2100-Ton Capacity Coal Bunker Lined with Gunite

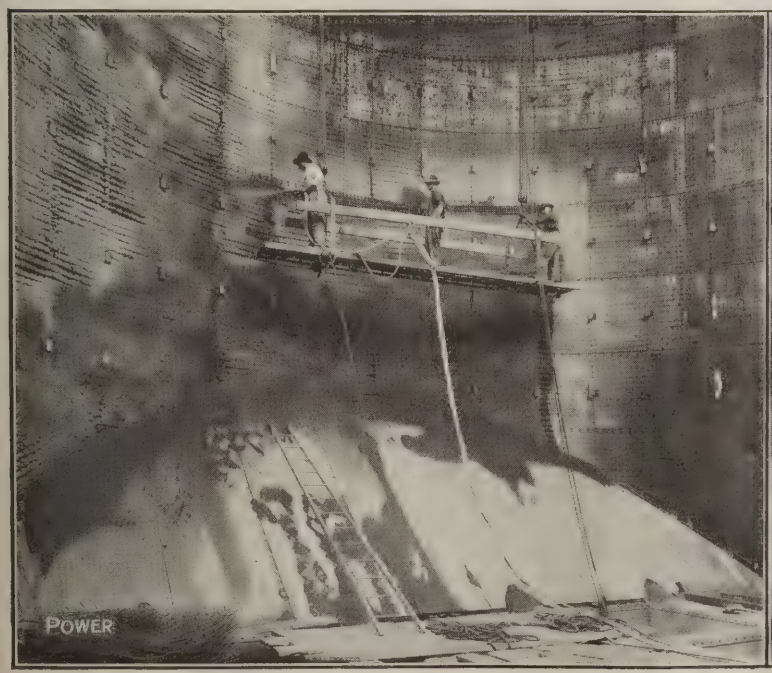


Fig. 2. Process of Lining a Coal Bunker with Gunite



Fig. 3. Finished Interior of Coal Bunker Lined with Gunite

The Last Stand of the Mine Roof

By R. Dawson Hall

SYNOPSIS—An explanation of the thrusts of the roof. These could not exist if the roof was always a true beam or plate. The significance of an arch theory of roof structure, the conditions which make for localization of strain and for an unequal balance of stress, the causes of horizontal shear and the reasons for ultimate collapse are explained.

Some phenomena which at first puzzle us considerably, after a while fail to interest us at all. Such a phenomenon is "the last stand of the mine roof." We remember when we first entered a mine and heard the roof crack way up above our heads. Reasoning from analogy, we thought that the roof was ready to fall, just as an overloaded beam will when it begins to crack and split. But to our surprise the roof took on a new lease of life. Silence succeeded the ominous rending of the rock; a few props perhaps bent a little, or even broke, but the roof stayed up, silent and apparently unchanged. We have seen it so often that we have ceased to question why.

I have wearied you already by the analogy between the mine roof and a beam or plate and showed how it broke over the support on its upper surface and between the supports on its lower surface. But this is not the whole story, for a roof is by no means ready to fall in its entirety when fractured, even if those fractures reach from the workings to the surface.

The Beam Metamorphoses to an Arch

Let us suppose, as in Fig. 1, that two areas of coal have been extracted, two ranges of rooms with their pillars on either side of a double entry. The result has been a break over the solid coal ahead of the ranges of rooms at *CC* and *DD* and another *EE* over the chain pillar. The roof is also split on the underside in the midspan of each range of rooms as *FF* and *GG*. I have represented these breaks on the underside by dotted lines in the plan.

The huge blocks into which the roof is thus divided rest with their edges on the faces of the solid coal and on the flanks of the entry pillar. They promptly begin to fall forward and downward toward the open spaces, but as they do so they revolve and crowd one another as shown in the diagrammatic cross section at *F* and *G*.

The immediate effect is most harmful to the pillars. The expression generally used to express the ominous change is that the roof is "throwing her weight." Before breakage, the roof was bent into a saddle shape over the center pillar. It now tries to teeter on the edge and the change is not for the good of the room stumps. On the whole, the heart of the chain pillar is helped, but as it is customary not to have the headings anywhere near the heart of the pillar, the entries usually suffer severely and often close entirely.

The change which takes place when the roof first fractures replaces continuous beams or plates by disconnected arches or vaults. Let us now ask what constitutes a true arch or vault. It has nothing to do from a structural point of view with the form of the opening. That is really only incidental.

An arch is a structure where the stresses due to the weight combine with horizontal thrusts so that support is secured without bending-moment strain. In fact, an arch cannot exist so long as a structure is so constituted that its bending-moment strains are adequate to the support of the load. The arch may consist as in the example before you of two solid blocks only, wedged firmly into place by other blocks which may or may not form parts of other arches.

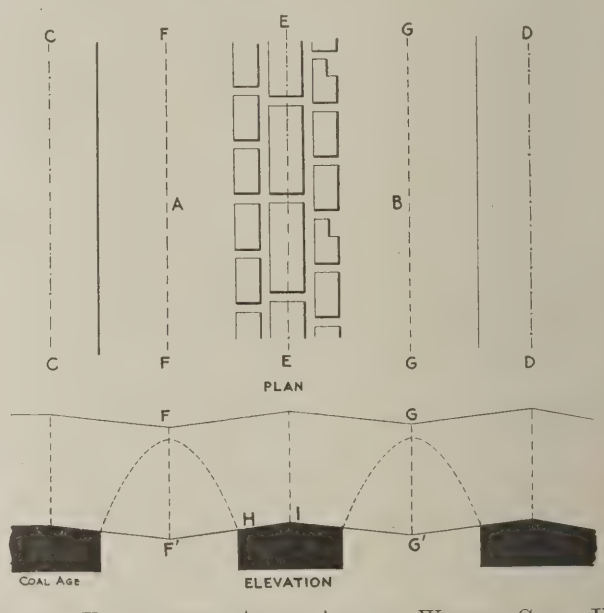


Fig. 1. Exhibiting Arch Action Where Coal Has Been Removed from Both Sides of a Heading

At each of the points *F* and *G* in Fig. 1 or near them are two equal and opposite thrusts of such a magnitude that when combined with the successive weights of the various vertical slices of rock they will form a curve of forces, an inverted funicular parallelogram passing through the arch abutments, that is, the coal pillars.

Lines of Force not Lines of Fracture

Such curves of forces I have endeavored to indicate by dotted lines on the cross-section, but it is essential that we do not misconceive their purpose. They do not represent the edges of fracture. It is true, fracture may ultimately extend somewhat in the manner indicated, but, on the other hand, it may not.

The arch is just as truly an arch if the slabs of which it is composed never show the well known arch effect. But if they do, the structure is thereby strengthened, a great load is removed from the center of the span and the thrust at *F* and *G* necessary for the permanence of the structure is reduced. And thus again further breakage tends to permanence instead of to demolition.

Horizontal Shear

It is clear that each of the two big roof slabs comprising each arch is, at the commencement of the arching action, a huge rectangular parallelopiped, or rather

NOTE—Paper read at the winter meeting of the Coal Mining Institute of America, Dec. 9, at Pittsburgh, Penn.

tends that way for probably none of the rents *CC, FF, EE, GG* and *DD* pass from the surface to the coal or from the inside of the mine to the surface, as the case may be, and perhaps the rents as far as they go are not by any means as straight as portrayed.

But supposing the blocks as giant rectangular parallelopipeds, if they are to revolve so that *F' G'* touch the mine floor they must be distorted into trapezoidal parallelopipeds as indicated in the figure, and this could be done either by a continuous deformation from the surface to the inside of the mine or by the sliding of one stratum past the one below it at points where the conditions were most feasible for that action. Where beds of slate, sandstone, shale, coal and clay appeared, the degree of malformation would be greatest and would develop soonest, roughly in the order in which those beds have just been named.

It is clear that at the mid-span *F* of the opening the deformation arises at the surface first and from the thrust

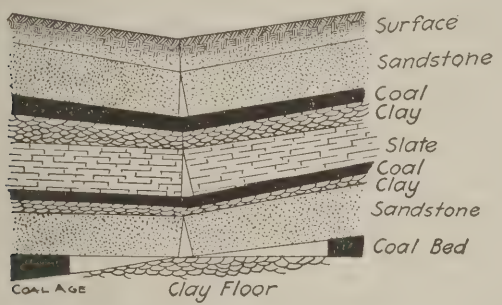


Fig. 2. Horizontal Shear Destroys Roof Mass at Its Weak Coal and Clay Strata

of the arching blocks on one another, but the deformation in the mine is from the thrust of the blocks forming the arch on the blocks against which they abut. These thrusts in the lower strata of the arch arise from those in the upper, for it can easily be seen that the block can revolve on its fulcrum at *H* without crowding at *I*, providing it is free at *F*. The thrusts at *F* keep crowding the lower strata of the roof mass toward the adjacent rock masses at *I* and *J*.

Thus all the roof is subject to horizontal shear, and if the abutting roof masses remain firm the roof will not give way till that shear has taken place and the final demolition may be delayed, as has been seen, by breakage of parts of the arch and consequently reduction in the burden to be carried.

Partial Breakage Undesirable

The partial breakage reduces thrust, but it often preserves enough of it to do the dreaded harm, and whereas a complete fall would make further pillar extraction easy, a partial fall leaves further work subject to all the dangers consequent on the existence of large vaulted areas with great crushing strength and large overturning thrusts.

Where the measures are near the outcrop, the arch is weakened by the reduced strength of the measures in horizontal shear with the consequent ease of deformation of the parallelopipeds and by the weakness and inconsiderableness of the adjacent roof masses which move freely under severe thrusts. When working against old broken areas, the abutting roof masses are not sufficiently resistant, and without much or even any horizontal shear the arched masses may settle down easily onto a support.

First Opening in Virgin Coal

But when the coal extraction starts in the heart of the hill and the roof masses around are unmacerated by the weather, unbroken by mining, vast in extent, and cannot well be thrust into flexures because other parts are not mined, then indeed it is hard to break the roof so completely as to overcome its final resistance. It is true that some compression on surrounding roof masses will permit some accommodation to the stress demands of the arched opening, but it is insufficient, and the result is that an opening in virgin coal is apt to cause a squeeze. The roof will over-ride the pillars before it will give way.

It is important to keep in mind the arch action of the roof, to visualize it by imagining spans of actual highway or railway bridges so as to get a concept of the conditions which may result in failure. It is well known that the thrust of two arch spans equally loaded per foot run will depend on the lengths of the respective spans. If the two openings are parts of one bridge and the arches spring one on each side from a common abutment, that abutment will tend to be thrust over toward the smaller span because the thrust from that span is the less important of the two.

Overturning Action

Against such an action the abutment must be designed. When the spans are equal, however, a less massive abutment will serve. It then needs only to be strong enough to uphold the downward pressures and to withstand internally all the stresses which come on it, but it does not need weight or breadth of base to cope with an overturning and unbalanced thrust. Just as an abutment between two equal spans is favorably situated, so is a mine pillar between two batteries of rooms of equal length. In some cases where the wicket system gives rooms aggregating 500 or 600 ft. on one side of the heading, and the single-entry system gives rooms about half that length on the other, the balance is far from perfect and the risk of pillar overthrow not by any means inconceivable.

Fortunately, the direction of thrust cannot be often less than 30 deg. to the horizontal, and as the coal is rarely as thick as piers are high, it is not so likely to fall over and beyond the "middle third" of the foundation even when the pillar is small.

Thrust Often Noted, but Its Source Is Overlooked

There are many mining phenomena which we overlook. I have mentioned already the partial collapse of the roof at points beyond observation, and as has been generally thought beyond stress, and also the recovery of strength of a roof which offhand might be believed to be beyond further resistance. But there is another more patent action; that is, thrust. We have all seen it and noted it, yet most of us are still convinced that the roof collapses from shear.

Testimony from all sources is that the roof just breaks and comes down; that is, shears. "Yes," some men have stated, "it breaks almost straight along the pillar edge and falls till it chokes. You can see for yourself that rock when piled in an irregular mass fills up an excessive amount of room. So the roof rock when it ultimately falls completely chokes the open space. Then only is the weight relieved."

I am persuaded that there is some truth in this story where the distance to the surface is not great. In most of such cases, shear is evidently the leading cause of demolition, and the ease of examination makes the evidence so overpowering that it is accepted as universal rather than as particular.

Thrust Is Not Rare and It Presupposes Preliminary Fractures

But the frequency of thrust should convince us that the arch action is just as common as that of the beam. If the roof did not act as an arch, there could be no thrust, and I think it true also that arch action could not exist in an unbroken roof beam. It would be a beam then, not an arch.

A continuous girder crosses abutment after abutment. The spans are now short, now long, but there is no thrust, for the truss is self-sufficing and sustains in itself its tensions and compressions just as does the roof beam till it breaks. Then it has to rely for its stability on its abutments, the pillars and the abutting roof measures, and depends on these till failure is complete.

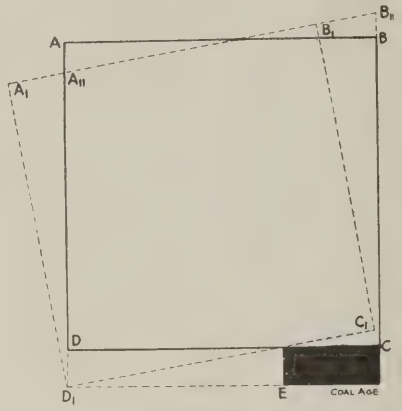


Fig. 3. Shows How the Distortion of the Roof May Easily Be Greater Than Its Subsidence

For present purposes, we will assume that the pillars do not crush, the bottom heave, the adjacent roof mass give way either by compression, folding or sliding or the falling block bend toward the opening and so by flexure reach the mine floor. What, then, must be the distortion of the block of rock which falls forward to crowd into the excavated space?

Let us suppose the block to be *A B C D*. If it fell forward unrestrained it would reach the position *A′ B′ C′ D′*, but instead it is distorted into the shape *A″ B″ C′ D′*. The vertical fall *DD′* involves the distortion *A′ A″* and *B′ B″*, and this will be greater or less than *DD′*, as *B C*, the cover, is greater or less than *D′ E*, the collapsed half span. It is also proportional to *DD′*, which is the coal thickness.

Modifying Actions

Of course the tendency is for the ends *AD* and *BC* to sag and consequently the fall is less than *DD′*; moreover, the bottom will heave and the pillar will crumble, decrepitate on the edge and compress. All these actions reduce the value of *A′ A″*. But in any event, the distortion is significant and one begins to see roof demolition in its true light. When we see how immense is the change in shape, we begin to wonder that the roof ever falls. Its strength in bending moment and still more in shear and as an arch is marvelous, though the latter resistance is soon rendered futile when the pillars or abutments on which it rests are removed.

Thrust a Local Action

But there is another consideration. You have often noticed in pictures of European churches and perhaps also in the illustrations of the new cathedral of St. John the Divine, New York City, buttresses which take up roof thrusts and curve them harmlessly to the ground. There is little prospect of such stress-line curvature in the coal pillar itself, because the load is mostly on the pillar edge and the downward pressure declines as the heart of the pillar is reached. Still the stress line in the coal rib like that in the cathedral buttress is somewhat curved in its short length and, in any event, is located definitely by Nature. That is, we may not know where it lies, but lie it does at some place and not at any other.

The curvature in a bending beam, the tilting in a broken roof mass and the arching which follows, all put pressure on the edge of the pillar and not on its center. That is why it is so important to emphasize the flanking strength of pillars rather than to consider what their power of resistance would be if they were stressed over their whole area.

By the strength of the edge, a pillar stands or falls. If the edge is unequal to the load and thrust, it is annihilated and a new edge appears. If this is unequal to the work of resistance, it fails and the burden moves back till it comes to an edge which is resistant or until the whole mass is overborne. The pillar is destroyed not

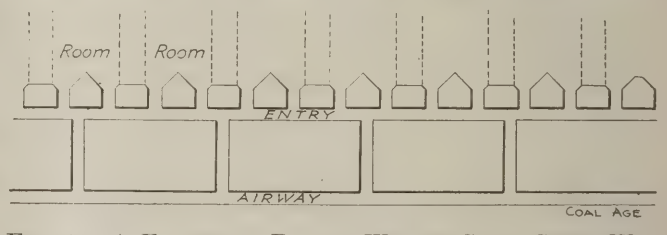


Fig. 4. A Flanking Pillar Which Soon Gives Way, Destroying Mine Entry

so much as a whole as in parts, even as an adequate army may be overcome by progressively attacking with superior forces detached battalions along the front.

Nevertheless, we always make the mistake of making the edge of the pillar weaker than the heart. It is, for instance, on the edge we break it up with room necks. Sometimes we weaken it further by widening our rooms with a 45-deg. slope on one or both sides, but everything beyond the room neck proper is gone beyond repair.

No argument based on structure can defend the funnel-necked or half-hopper-mouthed room. The only excuse for such a chamber is to be found in convenience in widening. The argument for funnel-necked rooms is that coal anywhere is a source of strength. It is about as true as the statement that a regiment anywhere, even with the enemy surrounding it, is a help in the battle line.

Two Necks to a Room or Three Rooms to a Neck

Also it is necessary to call your attention to the fact that the flank of a heading from which rooms are turned is nearly always weaker than the chain pillar which is only pierced by crosscuts. Especially is this true where double rooms are driven with two mouths to each chamber. It would be far better if we could get to the better "Main Line" or "Altoona" System and put three rooms to a neck.

Some of the expense in making room necks long and the stumps thus adequately deep could be met by reducing the size of the chain pillar and economizing in crosscut payments.

Chain Pillar a Ventilating Device Only

For the chain pillar is first, last and all the time a ventilating device and not a roof support. It does not sustain the roof. That work is done by the heading stumps if it is done at all. In fact, as has been seen, it may be seriously doubted whether the heart of a chain pillar is as heavily burdened after mining around it as it

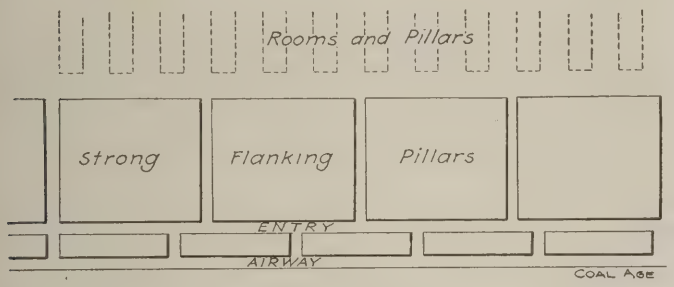


Fig. 5. The "Main Line" or "Altoona" System, with Strength Concentrated on the Flanking Pillar

was before a pick entered the territory. The old military rule of protect your frontiers is as true of mining as it is of strategy.

Perhaps I may add another military maxim: "Always respect your adversary." There has been a disposition to adopt the panel system to excess. The first man who said "panel" to me urged a panel every ten rooms. He wanted a room-and-pillar space left at every tenth room. This might work in the weak-topped Freeport measure. It might work anywhere—where it is not needed.

But when paneling is expedient, excessive paneling is worse than none at all. The roof must be given a chance to break, and if it will not break, to bend and come down. The wicket system of operation is the most desirable except where a long continuous breaking face extending from room heading to room heading is provided.

Some people favor drawing just a few rooms at a time, and then a few more. If the top breaks easily, this does no harm, for no harm can possibly be done when the roof is fragile. But where it breaks with difficulty, there can hardly be a worse method. A break is what is needed, and the area to provide one should be opened up as speedily and as completely as possible, and around that prepared break, strong pillars should be provided.

Mere Shear Theories Overlook the Facts

Finally let me remark that no matter what may be said about the roof, the statement is bound to be attacked. There are always a number of people who believe that a theory regarding anything is a waste of time and a folly. So we are told the roof is not a beam or a plate, not an arch or a vault. It is so much easier to say the roof just "comes down and chokes the opening as anybody would know if he went into the mines." Such "practical" people, as voice such sentiments, refuse to consider the question and completely overlook, as usual, the fact that they have an unacknowledged theory which put into scientific words is "all failure is from shear." Let us hear affirmatively from those whose whole attitude has hitherto been negation.

Till such a time one may be permitted to believe in a progressive advance in demolition. First, a condition as yet, I believe, unnamed, a condition symbolized by the tunnel in solid rock in which roof and sides and floor all partake of the beam strain. Second, a horizontal shear which converts the sides into mere supports and the roof into a true beam or plate. Third, a rupture of the roof which converts it into an arch, and finally, a failure of the arch or vault by one of the many weaknesses to which such structures are subject.

Composite Pit Propping in Great Britain

The following article from the Glasgow *Herald* of Oct. 26, 1914, says the *Daily Consular and Trade Reports,* shows the working of a new British system of pit propping:

"On the invitation of the Lothian Coal Co., the members of the National Association of Colliery Managers, to the number of 150, visited Newbattle Collieries, Newtongrange, to inspect the system of composite pit propping which has been successfully inaugurated in the pits there. Consequent on Germany declaring pit wood to be contraband of war, there is a perceptible scarcity in the material commonly used for propping underground. On that account the system practised in Newbattle Collieries, by which the use of pit wood has been almost entirely eliminated, has aroused considerable attention in mining circles.

"The visitors were received by the mine managers for the Lothian Coal Co. They were taken through the workings underground and shown the propping arrangements at the working faces, the machine runs, and in the vicinity of the conveyors. The composite type of support used is a steel tube containing a wooden prop and renewable end pieces. The renewable end pieces, 6 to 9 in. long, are made of seasoned larch. It is claimed that the props are easily set, that they occupy a minimum space at the face, that they can be easily withdrawn, and that when even buried under a fall of roof can be recovered if they are seen. The workmen have a feeling of security when working with these supports, as the roof is allowed to creep down steadily on the props, while the latter, instead of weakening under the load, are strengthened. Old tubes may be utilized, such as those from water-tube boilers or disused compressed-air piping. An advantage is that these composite props can be conveniently made at collieries.

"The coal company's agent indicated that the system, which was begun about three years ago, was now proving successful in every way. It took time and supervision to make it successful, but he claimed for these composite props that they possessed infinite possibilities for underground work."

The council of the Derbyshire miners has expressed itself in favor of electric lamps. Recently this council discussed a proposal to introduce electric lamps at the Glapwell colliery. It was pointed out that the spread of nystagmus among the miners was a serious matter, and that the leading medical authorities had expressed the opinion that the general introduction of the electric lamp in collieries would mean a diminution of nystagmus cases, and might lead to the stamping out of the disease altogether.

Meeting of Coal Mining Institute of America

By R. Dawson Hall

SYNOPSIS—The session at Pittsburgh was well attended and fully up to the high standard maintained by the organization. The papers were of exceptional merit. No summer meeting will be held next year.

The Coal Mining Institute of America met at Pittsburgh, Dec. 8, with the officers afflicted with a severe attack of the blues. The summer meeting at Monongahela, Penn., had been a comparative failure; the finances were in as unfortunate a condition as at any time in the history of the organization and "ways and means" seemed the most important matter to discuss.

But Pittsburgh always seems to galvanize the institute into life. The winter meetings held there are always successful, many members coming from long distances to take part in the discussions. Even a summer meeting called almost without notice was fairly attended eighteen months ago. But as has been said, the officers arrived discouraged and proposed dispensing with the summer meeting, and the members showed no resentment so the recommendation was adopted.

But the idea did not arise out of the attendance at the winter session. No more successful meeting was ever held. Someone had overlooked sending invitations to the Carnegie Technical School and the University of Pennsylvania, relying on the newspapers to do the work. The papers though furnished with printed press notices of the meeting were too busy recording the war to have space for technical societies. As a result the attendance of the institute consisted solely of members and yet was larger than a year ago when numbers of students filled the chairs.

The Annual Election

The morning was devoted to the election. Unfortunately the full attendance had not then arrived. The returns were as follows:

For president: J. K. Johnston, East Haven, Conn., 23; W. Seddon, 18.

For first vice-president: W. Seddon, Brownsville, Penn., 24; W. R. Crane, 8, and J. Williams, 8.

For second vice-president: J. Williams, state mine inspector, Altoona, Penn., 26; W. R. Crane, 11, and R. D. Hall, 5.

For third vice-president: W. R. Crane, dean of mining, State College, State College, Penn., 20; R. F. Monteith, 11; C. L. Clark, 9, and H. Kinlock, 8.

For three executive board members: George E. Gay, consulting engineer, Uniontown, Penn., 39; W. E. Fohl, consulting engineer, Farmers Bank Bldg., Pittsburgh, Penn., 35; J. Knapper, state mine inspector, Philipsburg, Penn., 34; C. L. Clark, 29.

For secretary-treasurer: C. L. Fay, president, Lehigh Oil Co., 18; C. L. Clark, 13; R. D. Hall, 7; S. B. Smith, 5.

It will be seen that J. K. Johnston and C. L. Fay have been reëlected, which is evidence of the confidence the members have in their management of affairs.

Longwall in Pittsburgh Measure

The afternoon session opened with the president's address and as is usual in such institutes, it dealt with the discouraging question of finances. Then the question box was opened with W. E. Fohl in the chair. W. Seddon opened the discussion on the query: "Is the Longwall System Applicable to the Pittsburgh Seam of Coal?" S. A. Taylor followed, pointing out its lack of applicability to the bed in Ohio which is known as the No. 8 seam. The roof breaks up too high, sometimes as much as 20 ft. and the bottom is too soft.

Leo Gluck, formerly assistant to the president of the Pittsburgh Coal Co., and for some time engineer of the Spring Valley Coal Co. in Illinois, spoke on the Illinois longwall methods and the conditions under which difficulties were encountered. Mr. Gluck declared that the irregular work in the Pittsburgh region would make longwall operation difficult as steady work day by day is desirable. Mr. Lewis emphasized the difficulties of driving longwall forward with a straight face and said that in Nova Scotia he had found that the scalloped working line gave far better control. T. A. Mather and W. H. Howarth also discussed the question.

Longwall Is Commercially Feasible if Someone Will Volunteer to Build the Packs

The criticism of the discussion made by one of the speakers was quite apposite. Nearly everybody avoided saying anything definite about the adaptation of longwall to the Pittsburgh measures. Those who did declared against any longwall advancing methods. The only possible form of longwall favored was retreating and the evident consensus of opinion was that a longwall which was a mere development of room and pillar was the only possible solution. By reducing the widths of the rooms and by increasing the size of the pillars, a long cutting face is obtained without any need for packwalling.

The miner today wants a definite pay for cutting coal and extra for building a pack. Though longwall coal can be dug more easily and rapidly than room-and-pillar coal, he wants to get the same price per ton. As for the packwalling, he will graciously consent to let the operator do it for him, if in so doing he will keep out of his way and not hinder the movement of cars to the face. That is largely why longwall fails and will fail. Neither miner nor operator seeks to sustain the severe burden of conservation of fuel resources.

The Vexed Question of Voltage

John I. Pratt opened up the question, "What Is a Safe Voltage for Use in Coal Mines?" He urged the abolition of overhead wires underground. No one doubts but what the trolleyless locomotive and the leadless coal cutter are desiderata but it will perhaps be some time before the first is generally used for main-line service, despite its unquestionable excellencies for gathering coal cars.

The difficulty of excessive weight and size *might,* however, be excused in such a locomotive but clearly a mining machine propelled by cells is at present too cumbrous for consideration. It is true the batteries could be kept on the rails but in that case, the mining machine would have leads and the present dangers would only in a small degree be eliminated.

W. A. Thomas, who was scheduled to reply, was not present. J. S. Jenks spoke in favor of high-voltage, saying that while much inadequate low-voltage equipment was on the market, the high potential equipment was generally reliable. Anybody could make the former, and competition caused frequent departures from safe practice.

He advocated the use of oil switches and, on an inquiry being made, denied that any risk of fire was to be apprehended from such apparatus if properly constructed. The temperature rise should be negligible and the flash-point of the oil such as to eliminate risk. He did not think that the one English instance mentioned by the questioner was an important evidence of the dangers of oil switches or would indicate that they should be excluded from any coal mines. It had been argued that where there was no danger of gas it was a mistake to introduce the oil switch and expose the mine to the risk of an oil explosion or a fire.

Mr. Jenks is not an enthusiast in the matter of high voltage, for while advocating 2200 volts alternating current for distribution purposes, he recommended that the voltage be reduced to 220 volts before the current was used or passed along open wires.

Do Compensation Laws Decrease Accidents?

E. N. Zern replying to the question, "Do Compensation Laws Increase or Decrease Accidents in Coal Mines?" spoke quite favorably of the effect of such legislation. This should be stated because the local press, emphasizing what was said about malingering, misconstrued Mr. Zern's remarks. Mr. Zern addressed a letter of inquiry to several operating concerns and his article was a brief of the replies. One operator reported an increase in accidents and eight others a decrease since the compensation laws went into effect. Twenty-five operators denied that there was any increased carelessness on the part of the miners. Ten found evidences of malingering, fourteen found none.

It appeared that the reform legislation quickened the conscience of the operator without any apparent dulling of the miner's sense of duty. The employer took an increased care to guard the workingman as a result of his knowledge that he must compensate the latter for all injuries. John Simpson refused to discuss the matter as the law had been in force at his mines only a few months and during quite a large proportion of that time the mines were idle. S. A. Taylor declared he had suffered from a perfectly obvious piece of malingering and he introduced the statistics from the State of Washington, to show that accidents had increased immensely since the compensation law went into effect.

Portable Electric Lights

Gus. H. Deike read an interesting paper in answer to the question, "What Are the Advantages and Disadvantages in the Use of Portable Electric Lamps?" J. L. Ryan, who was also scheduled to speak, was unable to be present, owing to ill health. E. M. Chance said that the Philadelphia & Reading Coal & Iron Co. had had marked success with electric hand lamps so long as they were used by officials but had found the results less favorable as soon as the lamps were given out promiscuously to all the men in the colliery. The cry about the failure to detect bad air had also been raised relative to acetylene lamps, but he hardly thought it worthy of the consideration given to it.

F. A. McDonald, chief engineer, National Mining Co., stated that there was difficulty in inducing the miners to accept flame safety lamps but that the men had taken quite kindly to the electric cap lamp, and he had found that it gave satisfaction, doing away with the necessity for mixed lights. It thus "filled a long felt want in the Pittsburgh district." He said the National Mining Co. had tried lamps of 10 different makes for several months and is now buying more. The compensatory provision in the mining scale is insufficient in itself to recoup the operator for his loss in introducing the lamps but the increased safety makes up for the defect in the differential.

Mr. Dunbar stated that there was really no objection to the safety lamp. Where it was used exclusively there was never any lack of men. It was in the mixed-light mine that there was difficulty in introducing safety lamps.

Regulation of Coal Prices

The banquet in the evening was addressed by H. Martin Chance, of Philadelphia, Penn. Mr. Chance said that the coal business needed no further regulation. It had already been subjected to enough. The wage of the employee, it is true, had not yet been made a part of legislation, nor had the actual price of coal, but only these items remained for further legislative interference. Perhaps no one present adequately realized, till the speaker pointed it out, how extensive and apparently burdensome the regulation was. T. L. Lewis, former president of the United Mine Workers of America, pleaded for a law setting a minimum price for coal and for a new era of safety and conservation in place of present ruinous competition.

Pollution of Rivers by Mine Waste

C. M. Young, of the University of Kansas, followed with an address on the pollution of streams by sulphuric acid. He has been conducting an investigation for the federal government to ascertain the causes, effects and means of correction of that condition. He said that the federal authorities were indisposed to put a burden on the coal industry by requiring it to remove the acid from the mine water but he could not say what might be done. Certainly the condition was liable to get worse rather than better as the streams were fast becoming acid, the natural alkalinity being removed by chemical reactions with the sulphuric acid of the pickling plants and the "sulphur water" of the mines.

Mr. Young said that the mine waters could be utilized to make paint, fertilizer and chemicals for gas purification. Whether ferric hydrate is merely a stimulant or a real plant food is not clear but certainly vegetation shows excessive greenness wherever this chemical is deposited by water. The sulphuric acid in the streams is causing some damage to locks and a solution is desirable if the cure is not more expensive than the injury it repairs. Prof. H. H. Stoek, dean of mining of the University of Illinois, though announced, was unable to be present.

An Embargo on British Coal

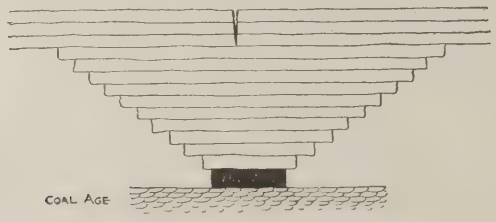
On the second day, Dr. E. W. Parker read an article on the "Foreign Trade of the United States." Dr. Parker suggested that Great Britain would probably shut off the export of her coals for fear of their ultimate exhaustion. Someone took strong exception to this and indeed anyone acquainted with the individualistic spirit of the British would find it hard to believe that they could

adopt such a policy before other nations. They may copy social measures of that kind but even the most serious necessity will not induce them to initiate them. As was stated, the 25c. export tax on coal was hardly imposed before it was removed.

E. C. Roberts spoke favorably of briquetting fuels for foreign use. E. M. Chance declared, however, that the finer sizes of anthracite, known as slush, were often too impure for the making of good briquettes. E. W. Parker urged that ground barley and rice coal would make a good grade of boulets at a lower price than could be placed on anthracite coal of equal size. It seemed generally believed that the boulet trade suffered from the antagonism of the anthracite retailers who found it competed with the unsophisticated egg coal.

The Progress of the Roof from Beam to Arch May Be Reversed

R. D. Hall read a paper on the "Last Stand of the Mine Roof." Lack of time prevented a sufficient criticism of this paper, but S. A. Taylor's comment, hardly understood by the reader of the paper, was nevertheless much to the point. He thought that when the mine roof was resisting as an arch, a large fall of the material composing the span might so reduce the loading that the bending-moment stresses might be able to take up the burden.



A Cantilever Mine Roof

The split in the roof may not be sufficient to destroy the beam resistance. The breaking of the beam over the open spans enables the tensile stresses to cope with the roof loads.

In fact it does seem that the change of the roof from a beam to an arch may be a gradual transition and may as Mr. Taylor suggests be retrogressive on occasion as well as progressive. The illustration shows a condition where the fracture at the surface may be insufficient to prevent the roof from acting as a cantilever after large falls have taken place in the spans on either side of the pillar.

C. L. Clark thought the author's criticism of his own paper was justified in that sufficient stress had not been laid on the dome as opposed to the arch structure. On motion of W. E. Fohl, it was provided that the editor and author should republish the two papers previously presented by him on that subject in the proceedings for 1914 so as to make the series complete.

Dr. Crane Describes His Interesting Experiences

Dr. W. R. Crane spoke at the afternoon meeting on "Personal Observations in Alaska." This was perhaps the leading feature in the program though a thoroughly untechnical number. Sumner S. Smith, U. S. mine inspector for Alaska, addressed the meeting on mining frozen ground.

L. M. Jones, assistant mining engineer of the U. S. Bureau of Mines, read a paper on "Coal Dust Experiments at the Experimental Mine, Bruceton, Penn." It seems that the failure of the Taffanel barrier in case of light explosions is probably due to the inability of such explosions to perform the task of upsetting the boards loaded with shale dust. At first it was suggested that the Taffanel barriers failed because they were completely discharged of dust before the last of the flame reached that point in the gallery. To correct this a barrier which could be partly discharged by a light wave and then completely destroyed by a heavier one was designed. The principal value of the Rice barrier appears now to lie rather in its sensitiveness than in its double-barreled action.

Kentucky Mining Institute

The regular mid-winter meeting of the Kentucky Mining Institute was held in Louisville, Ky., Dec. 4 and 5. There was a good attendance at this meeting, in the neighborhood of sixty coal men being present. The papers presented were interesting, and the discussions that followed their reading were of much educational value. The program was carried out practically as published in Coal Age, Nov. 7, p. 752. It will only be possible here to refer briefly to the several papers read, many of which were discussed by the members present.

The meeting was called to order Friday afternoon, at 2 o'clock, by the president, H. LaViers, of Paintsville, Ky. In the absence of the mayor of Louisville, the address of welcome was made by Charles F. Taylor, of the Board of Public Safety. A telegram was received from George H. Cushing, Chicago, Ill., expressing regret at his inability to be present; and his paper, dealing with the opportunities for an increased export trade for coal, was read at a later session. F. V. Ruckman, general manager, Highland Mining Co., Providence, Ky., read an interesting paper on "Coal Mining in Western Kentucky." This was followed by another paper presented by J. W. Paul, of the Federal Bureau of Mines, entitled "Some Benefits of First-Aid Work in Mining." An informal address, by J. T. Beard, on the need of more intelligent and efficient mining laws and legislation, closed the session.

At the banquet in the evening, White L. Moss, vice-president of the Continental Coal Corporation, Pineville, Ky., acted as toastmaster, and the occasion was enjoyed by all present. The speakers were H. LaViers, president of the Institute; Frank H. Cassell, president Merchants and Manufacturers' Association, of Louisville; W. H. Cunningham, of Ashland, and E. B. Wilson, of Scranton, Penn.

Following the reading of Mr. Cushing's paper on the coal-export trade, at the Saturday morning session, the Institute listened to a very interesting and profitable paper by K. U. Meguire, president, Harlan Coal Mining Co., Coxton, Ky., which discussed the features and possibilities of the Workmen's Compensation Law in Kentucky. The constitutionality of the law was then being considered by the Court of Appeals, which was expected to make its report the following Tuesday or Wednesday. After the reading of Mr. Meguire's paper, Assistant District Attorney Caldwell, of Frankfort, at the request of the members, outlined the general procedure that would be followed by his office, in case the constitutionality of the law was affirmed. Mr. Caldwell stated that proper blank

forms and instructions would then be issued and distributed to the coal companies for their information and direction.

Prof. C. J. Norwood, dean of the College of Mines and Metallurgy, of the State University of Kentucky, then read an interesting paper describing the need of the better education of miners, and the efforts being put forth by the university, to that end. This paper was followed by a very practical paper on the "Humidifying of Mine Air, as Practiced in Eastern Kentucky," which was prepared and read by J. W. Reed, assistant inspector of mines in Kentucky.

Owing to the heavy rain falling, few of the members made the projected trip to the Speed Cement Works, in Indiana. Those who availed themselves of the invitation were amply repaid by the demonstration given at the works, where a blast of 960 lb. of dynamite was exploded in the quarry, dislodging 960 cu.yd. of rock.

In the evening, the members of the Institute were entertained at a local theater, where they witnessed Billie Burke, in "Jerry." During the sessions, the privileges of the Engineers' and Architects' Club were extended to the members of the Institute by Malcom Elliott, president of the club.

It is to be regretted that it will be impossible to publish in full, in COAL AGE, the several papers presented at the meeting; but these will be abstracted in future issues.

A Unique Advertising Scheme

A Denver coal and coke company recently used a novel advertising scheme. An ordinary 10-in. electric fan was installed in the window, over which was placed a heavy wire guard, shaped like an inverted wastepaper basket. Inside and fastened to the upper part of this guard, six red lights were hung. Next, two dozen red ribbons, a half-inch wide and eighteen inches long were attached to the upper part of the guard; then chunks of coal about the size of a cocoanut were piled around the whole in pyramid form having a 12-in. opening at the top. Through this opening the ribbons projected, and were kept extended and fluttering by the draft from the fan.

At night a distance of forty feet away, the combination presented a vivid spectacle as of a mass of coal on fire with flames belching from the top. Placards, quoting prices and telling of the superior qualities of the coal handled by the firm were distributed about the window.

Many considerations should be taken into account when selecting the type of rail bond for any given track service; otherwise, the bond may fail to give satisfactory results through no fault in its design or construction. The first thing to be decided upon in making such a selection is whether the bond shall be concealed or exposed. In laying new tracks, bonds can be placed under splice bars at little or no additional cost, provided, of course, there is sufficient space for them. In this position they are protected from breakage, due to external causes, but are not open to visual inspection, nor can their conditions at later periods be determined except by making electrical tests at the joints.



How Much Longer Will He Be Driven?

The Labor Situation

SYNOPSIS—The Colorado strike is declared by the Union to be at an end. Another conference is planned in eastern Ohio.

The Colorado strike at last has come to an end and none too soon. The public will perhaps say how much better it would have been if the operators had conceded what the miners asked and saved for the country the eighteen million dollars which the struggle cost. The operators will say the same about the miners. Surely neither side can risk such a collision again for many years.

The operators can well afford to meet the possibility of renewed agitation by giving every reasonable and unreasonable assurance of their determination to subject their mine weights to the most careful supervision and to comply with every tittle of the law. Gradually by education they can bring their men to have a clearer conception of the economic situation and by taking the public into their confidence can assure themselves a better hearing than in the past before the bar of public opinion.

The union officials have paid out more than $3,000,000. The loss of wages is said to amount to more than $6,000,000; 66 persons have been killed and about 50 injured. It is disgraceful that disorders have been permitted to run to such length without prompt and due state control.

Mistakes in Publicity

The operators have been unfortunate in their publicity. There is no question but that the testimony given before the Federal Relations Committee about the booklet "Facts concerning the Struggle in Colorado for Industrial Freedom" must have done much damage. Yet only one bulletin was found to be at fault while the Union publications and the public-press notices have been full of the most obvious misrepresentations from end to end. It all goes to show that the operators are held far more accountable than their persecutors for what they say and do. As it is, a thousand people have read the criticism to one who has perused the book.

It is unfortunate that the operators did not, on the title page, acknowledge their action in publishing the volume. It is a mistake to veil such attempts to influence public opinion and, in this case, the disguise was so feeble as to be dangerous. All attempts to lead the public should be open and above board and the writer of the paper ought to be willing to acknowledge his work. As a matter of fact, no one was foolish enough to believe the book was a publication put out by nonunion miners in defense of their resistance to the Union. Such paper, editing, language and circulation argue the backing of money and education and no one was deceived.

The Conclusion of the Strike

The mine workers' officials pretend that the strike ends as a victory, though they find it hard to back up the statement with facts. The so called strikers are to try to obtain work. Those who do not will be supported by the Union in the tent colonies as before the strike, according to the statements of the Union officials. Meanwhile, Low, Mills and Gilday will make their inquiry and the miners hope they will yet get the recognition they desire and a commission which will regulate mine employment. The Federal Commission on Industrial Relations expected to complete its work on Dec. 16 and to leave for Washington, beginning further hearings on Dec. 28.

The Conference Which Failed to Confer

The development of interest in the labor situation in Ohio during the past week was the effort on the part of certain officials of the Ohio district of the United Mine Workers organization to call another conference of operators and miners to discuss the situation in eastern Ohio. The date set for the conference was Dec. 11 and the place, Canton, Ohio. But the operators were skeptical and refused to attend. Moreover, only a few of the miners appeared and so no meeting was held. The harmony committee of Wheeling, W. Va., was back of the conference. This is composed of the merchants doing business in the districts where the strike still continues.

No Open Shop in Ohio

At a meeting of eastern Ohio operators in Cleveland last week the question of opening mines on the "open shop" plan was discussed pro and con. It was learned that quite a majority of the operators were opposed to employing strike-breakers and as a result a declaration against the plan was made.

The sentiment of the meeting was that the operators would wait until after the convening of the next legislature in the hope of having the mine-run law repealed. Quite a few of the operators wanted to re-open their mines but they gave in to the larger number. It is doubtful if there is any strong sentiment in the legislature for the repeal of the measure but a strong fight will be made to that end.

A temporary agreement was made with the miners by the Oden Valley Coal Co., just west of Conesville in the Coshocton district. This fixes a price of 67.6c. per ton for pick-mined coal and the operators are to return the empty cars to the point of loading or are to pay at the rate of 4.5c. for pushing.

The West Wheeling Mine, it is said will reopen on Monday on a profit-sharing basis. It is said the Ohio Mining Department has been at Bellaire inspecting the mine. It is thought that other mines may test the value of such arrangements. The effect of profit-sharing as opposed to operation under a scale will be to utterly disrupt the Union and it will probably bankrupt the coal companies also.

The "United Mine Workers' Journal"

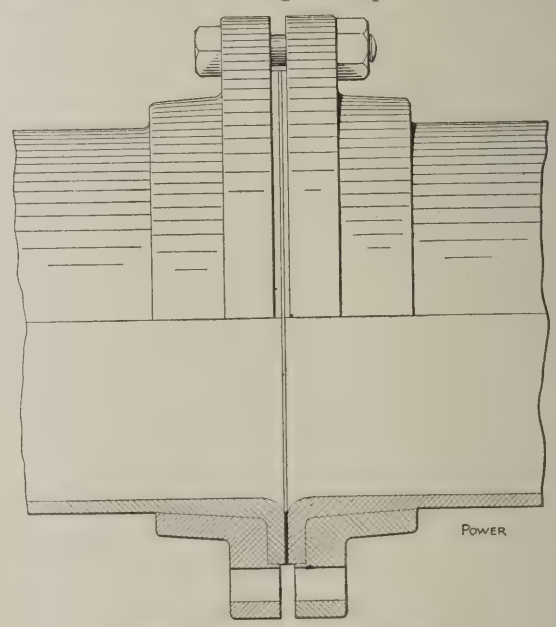
The "United Mine Workers' Journal" has appeared as a magazine. Instead of 8 pages, there are 32 including the advertisements and the cover. Its appearance is certainly more attractive than it was. The magazine measures 10½x13½ in. and will appear weekly as before. The operator will do well to notice an important innovation. Parts of the paper are published in three languages, English, Italian and Slovak. It is time that operators did as wisely as the Union in providing their men with information. They should impress their viewpoint on their employees year by year as steadily as the Union emphasizes its aims and ideas on its followers.

In Arkansas the strike still continues. E. Stewart, who is investigating conditions for the Federal Department of Labor, says it will last all winter.

Improved Reinforced Van Stone Joint

A type of Van Stone joint, known for a number of years as the improved reinforced lap joint, says *Power* for Nov. 17, is made by spot welding a collar to the end of the pipe, which is then flanged.

After flanging, the joint is faced on the front, edge and back and turned on a regular taper to the end of the



DETAILS OF NEW LAP JOINT

collar to fit a correspondingly tapered bore flange. The matching is done so that a neat fit is obtained between the pipe joint and the flange.

This joint gives about one and a half times the thickness of full-weight pipe on the face and double the thickness of the pipe through the curve. The joint, see illustration, is manufactured by W. K. Mitchell & Co., Inc., Twenty-ninth and Ellsworth Streets, Philadelphia, Penn.

Who's Who in Coal Mining

Leo Gluck

Another coal man, of long experience in coal-company service, has entered the ranks of the professional consulting engineers. The individual we refer to is no less a person than our good friend Leo Gluck, of Pittsburgh, Penn., who has just recently resigned his position as assistant to the president of the Pittsburgh Coal Co. The following record, therefore, of Mr. Gluck's work and accomplishments is of particular interest at this time.

His early education was obtained at the St. Louis Manual Training School, from which institution he graduated in 1883. From 1886 to 1889, he studied practical mining methods in the mines of Missouri, Illinois, Kansas, Colorado and Michigan. In 1889 he was graduated



Leo Gluck

from the Washington University, St. Louis, Mo., with the degree of mining engineer.

Following the completion of his university work, he accepted a position as chemist with the Mine La Motte Lead Co., of Mine La Motte, Mo. While serving this company, Mr. Gluck obtained valuable experience in the mining, milling and smelting of lead ores. From 1890 to 1893 he was assistant to the state geologist of Missouri, making a specialty of economic geology of coal. From 1893 to 1896 he worked for the Spring Valley Coal Co. in Illinois, holding the position of mining engineer. It was during this period that he received a State Inspector of Coal Mines certificate for the State of Illinois.

In 1896 Mr. Gluck left the Illinois field and became connected with the engineering department of the Anaconda Copper Mining Co. and the Senator W. A. Clark interests in Butte, Mont. He served these people for three years, when he was appointed superintendent of the Whitmore Mining Co., Leadville, Colo. This work held his attention for one year.

In 1900 Mr. Gluck returned to Illinois, and for six years thereafter served the Spring Valley Coal Co. as chief engineer; at the same time he acted in the capacity of consulting engineer for the Illinois Third Vein Coal Co. In 1906 he was appointed chief engineer of mines for the Chicago, Milwaukee & St. Paul R.R., this work taking him through properties in Colorado, Montana, Iowa, Utah and Illinois. In 1907 he severed his connection with the railroad people to accept a place as assistant to the president of the Pittsburgh Coal Co. This latter work has occupied his attention for the past seven years.

Mr. Gluck is widely known throughout the coal industry of the entire country. His experience has been so varied in its general character, and of such a broad scope, that he is specially well fitted for the general line of engineering work he has now entered.

Recent Legal Decisions

Rights of Owner of Coal in Place—Where coal in place is conveyed by deed, as distinguished from a mere lease, two separate perpetual interests arise: Ownership of the surface and title to the coal. The owner of the latter does not lose his title thereto howsoever long he may delay in removing it, unless, of course, the time for removal is expressly limited. (Indiana Appellate Court, McBeth vs. Wetnight, 106 Northeastern Reporter 407.)

Coal Company's Liability for Subsiding of Surface—A coal company is not liable for injury to the pipes of a water company laid under a township road in Pennsylvania, caused by the surface of the road subsiding in the conduct of mining operations by the coal company, if the water company laid the pipes without condemning the right to do so, since, being a trespasser, the water company cannot complain of an injury inflicted upon it without wantonness. (Spring Brook Water Supply Co. vs. Pennsylvania Coal Co., 54 Pennsylvania Superior Court Reports 380.)

Contributory Negligence of Injured Miner — Employer's Duty Concerning Appliances — Judgment against defendant coal company for injury to plaintiff, a miner, while engaged in moving an undercutting coal machine, is reversed on the ground that if he was injured while knowingly doing his work in a dangerous manner, in violation of instructions, he could not recover. But if the appliances were not in reasonably safe condition, and if the company was chargeable with notice of a dangerous defective condition which directly caused the accident, and if plaintiff was not chargeable with such notice, he can recover, although negligence of a fellow employee may have contributed to the accident. Plaintiff cannot be held to have assumed the risk of any defective condition which existed unless he knew thereof, or it was obvious. (Kentucky Court of Appeals, Fluhart Collieries Co. vs., Meeks, 169 Southwestern Reporter 686.)

Validity of Coal-Weighing Ordinance—It is within the legitimate police power of a town or city to adopt an ordinance requiring coal and other bulky commodities sold within the city to be weighed on public scales. "It will be noted that the ordinance does not require products weighed in the city to be weighed on public scales, where they are not to be sold or offered for sale within its limits. A municipality in the exercise of its police power may enact and enforce regulations for the protection of its inhabitants against false and fraudulent weights in the sale and exchange of bulky commodities." But enforcement of such an ordinance may be enjoined if ample provision is not made for weighing. Nor can the ordinance give the public weigher full discretionary power to fix the tare and reductions from the gross weight of coal, "according to the custom of the trade, or as conditions necessary to fairness and justice require," and make the tare or reduction thus ascertained by him a conclusive determination of the same. On the other hand, it is no objection to the validity of such an ordinance that it tends to destroy the business of a particular dealer. "Whatever injury or inconvenience one may suffer in such cases, he is, in the eye of the law, compensated by sharing the common benefit resulting from the exercise of this power for the protection and benefit of the public." (Georgia Supreme Court, City of Cartersville vs. McGinnis, 82 Southeastern Reporter 487.)

Editorials

It Is Not Full Pocketbooks as Much as Thankful Hearts that Make a Merry Christmas

A mine manager, perplexed with the problem of making ends meet, sat in his office a few days before Christmas. He could see from his window the big stores all filled with holiday goods. "The Blues" somehow obsessed him as he looked at the visible signs of "Merry Christmas" and thought of the hundreds employed by his company whom he could hardly imagine having a happy Christmas this time.

In his fit of melancholy he was forgetting that happiness and thankfulness are to be had even when money is scarce, but he couldn't see it that day.

He thought of all the work his company had done in looking after the safety and welfare of its employees, improving living conditions by furnishing comfortable and clean homes, pure drinking water, fenced gardens, sanitation, etc., to say nothing of schools, churches, picture shows, and efforts to keep the men from throwing their earnings away for beer, whiskey, etc. He had learned to love all this work. In fact, he was just the man his company wanted to carry out its policies through good times and bad.

But there were still outsiders who, in spite of visible signs of material progress and contented workmen, accused the company of ulterior motives, and today the manager was blue. To get rid of this depression he went out in the street for a walk.

Almost the first man he met was an old employee, a miner who had been in the service for years. Greetings were exchanged and the manager inquired as to how things were going. To his astonishment the miner said:

"Well, very good. I never had so much to be thankful for as now. Of course my four boys are working only half time, but I'm grateful for that. We've a little laid by, and I know the company is doing its best for us."

"But," the manager said, "How can you feel so thankful as you say?"

"Why," the miner replied, "It's when I look across the sea and think of my old home in England and where my four boys might be if I had not come to America, that I am happy. They would all be fighting there, and here they're safe at home with their wives and children.

"Thank God for America," the old miner said. "It's a grand country to live in, and it is companies like yours that make it better every day."

The manager was getting interested now and skilfully he drew still more on the miner's store of thankfulness. He learned how as a boy eight years old he had first entered the mines in Scotland because his presence in the pit meant another car in the day's turn for his father. The miner told him of how his first work was in 12-in. coal with a band of fireclay overhead; how the men must cut and take down with them their own mine timbers and often leave home at three in the morning to be first in the mine so as to get the first cars, and so on. Then, briefly he told the manager of what it meant to work in such mines as his company operated, where safety was first and the turn and wages were absolutely fair.

The manager interrupted and asked:

"Well, how about the rest of the men—how are they going to be fixed for Christmas? Will they be thankful too?"

"Why sure," the miner replied. Then he explained that since the yards were fenced, nearly all had winter gardens and many had a cow and chickens. Also that since the plan of operating the commissaries to make money off the men had been changed, so that the stores were run solely as an aid to them; the miners could buy the best goods as cheap or cheaper than elsewhere.

"And you know," the miner said, "you've got rid of the loan sharks and all those kind of people, and as the result of your policies you've trained the men to save some of their earnings. Oh, the men have all got lots to be thankful for this Christmas."

The manager went back to his desk and in his heart there was more of Christmas cheer, thankfulness for what his company had done for its men, and a strong determination to do more.

The foregoing is a true story. Many a mine manager can duplicate it in nineteen fifteen. How many will?

The Roscoe Letter

We are in receipt of a letter on the letter head of Eclipse Local No. 854, United Mine Workers of America, stating that the Union at that place has passed a set of resolutions asking for aid on behalf of those persons in that community who are in need of help.

They state that the miners in that town have been idle because of the war in Europe which has stagnated industry and owing to the lack of rain which has prevented the shipment of coal down the Ohio River to the Southern ports.

Leroy R. Bruce, who is secretary-treasurer of the Relief Committee and who asks for "anything in the line of food, clothing, blankets or money," says truly "The cotton grower of the South has been affected by the war and has raised the cry for help. We say help him, but do not forget the coal miner when you are doing it."

We have written to Roscoe to ascertain the facts in the situation and find that they are as represented. In reply to our letter, F. W. Allison, secretary of the Roscoe Welfare Association, writes that:

> While conditions are very bad here and all along the valley, we in Roscoe and vicinity believe we can, at present, take care of all appeals for help. Our people are responding nobly to the demands made upon them. On Wednesday evening, Nov. 26, 1914, a meeting of citizens was held and an organization was formed comprised of miners, business men, clergy and physicians to look after needy cases. As treasurer, J. W. Stevens, assistant cashier of the First National Bank of this place, was elected to take charge of all finances, and we believe that this organization, the "Roscoe Welfare Association," will conduct its affairs on strict business principles.

We are fully of the opinion that not only in Roscoe, but in many other places money is badly needed to tide the miners over the present severe depression. We hope everyone will do his best to see that the good name of the mining industry is not injured by niggardliness at this time.

The cry of a portion of the public will undoubtedly be: "Take care of America first and let Belgium go by the board." We should undoubtedly take care of our own people, no matter if seven million hungry persons need our help in Belgium. As a matter of fact, we are hardly measuring up to our high standard as Americans. We have hardly a right to pride ourselves as worthy of our heritage till we give more liberally to both our own people and that other nation which has cast its very life as a bleeding oblation to Liberty.

Let us take a look at our generosity to Belgium. To the Belgian Relief Fund, apart from the Rockefeller contributions, we have given perhaps a cent and a quarter per inhabitant of this country, including money, gifts in kind and promises, and to the Red Cross four-tenths of a cent. The men, women and children of the United States have not given more than three cents to the European war per head of population. Let us give at least another three cents to the miners and others who are suffering from the stagnation of business and if that does not suffice perhaps we can even find a dime. Our national honor demands that much liberality.

The people who are so urgent to help America first are many of them helping neither America nor Belgium, except as they assist the former through payment of their taxes. Seeing the Belgian Relief Committee only demands 4c. per ration per day from those who can pay for the food which the committee supplies, apparently the Belgian poor are living on less than a nickel a day. From what we have been able to learn, however, the cost of the food supplied will be about 5c. per diem. We are firmly of the opinion that if the Belgians can live on that, no one need starve here. Rather let those of us who have a competence open our hearts and give. There is no need that any miner or any workingman whether here or in Belgium should suffer from starvation.

Meantime, someone should volunteer to collect and distribute money to those who are in need, not only in Roscoe, but in many other places. In no better way could the solidarity of the salary earners and the miners be better shown. We do not doubt but what the records of many company stores will show a clear sense of duty on the part of operators to whom mining has this year been anything but a source of income. Others, few in number, who have given their men steady work and whose employees are consequently well cared for, could help to swell a fund to aid miners in places where, owing to trade conditions, business has been sorely depressed

A Shakeup in the Anthracite Industry?

As time goes by, it is becoming steadily more evident that the big hard-coalers are acutely feeling the loss of their powerful leader, Mr. Baer. As is well known, the responsibilities of Mr. Baer's office were distributed among a number of men, and there are persistent rumors current pointing to a breakdown of the harmony that has always been so characteristic of the anthracite trade.

For instance, close observers of anthracite conditions are of the opinion that there is a marked tendency to force the market this year, and there has arisen a latent suspicion between the different companies that their rivals are not in every instance adhering rigidly to circular prices. Certainly, the production records some companies are making, as compared with that of others, would tend to substantiate this contention. In fact, there are some who believe that, unless there is a prompt readjustment and a more thorough understanding effected, it is not unlikely that the so called anthracite trust may be subjected to one of the worst price-cutting wars in the history of hard-coal mining.

An American Merchant Marine

In the neighborhood of 110 vessels have come under American registry since Congress, on Aug. 18, amended the Navigation Laws to foster the growth of an American merchant marine. This action on the part of ship owners is significant in that it may mark the commencement of a period of regeneration for our flag on the oceans.

Last year, American vessels in the foreign trade had a total tonnage of only one million as compared with nearly twenty million for the United Kingdom and five million for Germany. However, our foreign trade is insignificant compared with our coastwise shipping. Of 27,190 American ships, 23,520 with a tonnage of nearly seven million are engaged in coastwise trade.

The principal advantage an American merchant marine now gives to foreign shippers is the lower rate of insurance. The rate on American vessels is ¾ per cent. as compared with from 3 to 5 per cent. for British ships. This favorable situation augurs well for the expansion of a really worth-while American merchant marine, and we trust that our government will lend such encouragement to this movement that before very long, the stars and stripes will enter foreign ports that have not been visited by our ships since those early days of American preeminence on the ocean highways.

No More Coal-Car Statistics

Our readers will learn, with regret, that the American Railways Association has announced that they will discontinue their bi-weekly report on the car surpluses and shortages. The decision was apparently due to the general retrenchment and economy propagandas instituted by all of the important carriers.

Coal Age early adopted a standard table and chart, giving in detail the exact status of the coal-car supply as shown by this report. This was by far the most detailed analysis of the coal-car situation given by any paper or journal in the country.

There are some statements to the effect that the statistics compiled by the Association have failed to effect the economy expected, but it is to be hoped that in the more prosperous days to come the publication of these statistics will be resumed. Until that time, these statements must necessarily be omitted from our columns.

The industrial supremacy of the Anglo-Saxon and Teutonic races is largely due to their possession of ample coal resources. The coalless countries have fallen back in the world race for commercial preëminence. Where coal is found, there we find great industries congregated.

Sociological Department

Club Houses for Mine Workers

Work has been started on two new mess houses of hollow terra-cotta tile at the Franklin and Packerton No. 5 collieries of the Lehigh Valley Coal Co. The design of these mess houses has been practically standardized, and it is understood that similar buildings will be erected at other collieries when the design has been tested by actual use and approved.

The first "mess," or club house, for the outside employees of the Lehigh Valley Coal Co. was opened at the Prospect Colliery in January last year, and was described and illustrated in COAL AGE in our issue of Jan. 25, 1913, p. 153. It proved such a success that a careful study was made of the needs of the men and the facilities which such buildings should afford. As a result a standard design was provisionally adopted.

The new houses measure 40x25 ft. and are 12 ft. in height. There is not a stick of wood in their construction, so they are absolutely fireproof. The hollow terra-cotta tile, which is a standard fireproof material, will be covered with plaster inside and out. The sashes of the doors and windows will be of steel, and the gable roof of corrugated asbestos laid on metal.

The houses will contain a messroom with tables and benches, showers and wash basins with hot and cold water, sanitary conveniences, and a locker room for the men's working clothes. Their sides will be largely of glass and they will be scientifically ventilated, and heated with steam from the boiler houses, so there will be plenty of light, air and heat. A caretaker will keep the houses clean and in order.

This is not the only enterprise of this sort of the Lehigh Valley Coal Co. The space beneath the coal pockets of the Buck Mountain breaker has been utilized for a mess room with shower baths and sanitary conveniences for the use of the men, and there are similar rooms for the benefit of the employees in everyone of the company's fifty boiler houses.

State-Wide Meet at Billings, Mont.

BY JOHN SANDERSON*

The first state-wide meet for first-aid workers in the State of Montana was held in the Coliseum Building, Billings, Mont., on Nov. 21, under the supervision of W. D. Ryan, of the U. S. Bureau of Mines, and Messrs. Steidle and Broadman, of U. S. Mine Rescue Car No. 5, stationed at Billings.

The meet was held under the auspices of the Montana Coal Operators' Association, the United Mine Workers of America, District No. 27, and the U. S. Bureau of Mines. On the committee of arrangements, M. F. Purcell represented the operators' association, H. Drennan and R. Condon, the Union, and D. D. Ryan and E. Steidle, the Bureau.

The judges were all doctors and included M. H. Arnold, J. B. Barrett, E. G. Balsam and W. R. Morrison, all of Billings. As only five teams competed the judges were well able to keep the events under observation.

*State mine inspector, Helena, Mont.

The teams and their ratings were as follows:

	One-Man Event	Two-Man Event	Team Event
Northwestern Improvement Co., Red Lodge, West Side Mine	97.5	96.0	98.5
Northwestern Improvement Co., Red Lodge, East Side Mine	97.0	98.0	94.0
Anaconda Copper Mining Co., Washoe	98.0	98.0	94.0
Republic Coal Co., Klein	96.0	98.0	95.25
Cottonwood Coal Co., Lehigh	96.0	92.5	94.0

It will be seen that the Washoe team of the Anaconda Copper Mining Co. took first prize for the one-man event, which was $15 cash. The West Side Mine of the Northwestern Improvement Co. took the second prize in that event, receiving $10. The East Side Mine of the same company obtained third place and a prize of $5.

In the two-man event the Northwestern Improvement Co. East Side Mine, the Anaconda Copper Mining Co. Washoe Mine and the Republic Coal Co. Klein Mine were first and equal. Another test gave the award to the last mentioned. The prize was $15. The second team was that of the West Side Mine of the Northwestern Improvement Co., and the third that of the Lehigh Mine of the Cottonwood Coal Co. The prizes were the same as in the one-man event, $10 and $5 respectively.

The team-event prize was won by the West Side Mine team of the Northwestern Improvement Co. This was a silver cup presented by the Montana Coal Operators' Association, to be retained permanently by the team obtaining first place for two consecutive years. Bronze badges were presented by the American Mine Safety Association. The second prize went to Republic Coal Co. Klein Mine and consisted of $15 cash. The third place was obtained by three teams and on a further competition the Northwestern Improvement Co. was awarded the prize for third place which was $10 in cash.

The names of the members of the cupholding team are Matt Woodrow, Wm. McIntosh, Ed Heidleston, John R. McFate and L. A. Woodbury.

University of Pittsburgh's Mining Extension Classes

The School of Mines of the University of Pittsburgh has opened its University Extension classes in the mining towns of western Pennsylvania for the third year. Five classes have been organized to study mine gases, ventilation, law and safety, in preparation for the examination for fireboss. These classes are located at Uniontown, Mt. Pleasant, Leisenring, Yukon and Russellton. In addition, a class in more advanced subjects, to prepare candidates for the examination for mine foreman, is being conducted at Irwin.

The enrollment in the six towns is 157, exceeding that of the two previous years. Among the numbers are 5 superintendents, 4 mine foremen, 8 assistant foremen, 14 firebosses, 3 hoisting engineers, 2 electricians and 4 mining engineers. The remainder are chiefly miners, motormen, machine runners, pumpers, timbermen, drivers and clerks, but a few have occupations other than mining. The ages of the students range from 16 to 51. Many are following the courses with a view of taking examinations for certificated positions, while others are taking the opportunity to review subjects already covered, or are pursuing the study as a matter of general interest. With few exceptions, all who have finished the course have passed the state examination for either fireboss or mine foreman.

Each class meets once a week in the evening, from October to April, and is instructed by a member of the faculty of the School of Mines. Notes covering the subjects taken up in the course have been prepared especially for this purpose, together with illustrative problems. The lectures are accompanied with demonstrations of the apparatus studied.

The cost of these courses to the student has been reduced to a minimum. The School of Mines offers the instruction without charge, and expects only that the traveling expenses of the instructor be met by the class. It is hoped that in the near future it will be possible to comply with all the requests received for the organization of mining classes.

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

The discussion that is being brought out on this subject is most interesting and we urge that all our readers submit their views. Eventually we hope to print a résumé of the opinions expressed and then send such summary to lawmakers in all coal states. Legislation that affects an industry affects every individual engaged in that industry; the problem, therefore, is of vital importance to each and all of us.—EDITOR.

Letter No. 10—The suggestion for a frank discussion of mining laws, legislation and mine regulations, COAL AGE, p. 698, is particularly opportune at the present time. The recommendations of practical mining men are always deserving of attention; and their suggestions made with a view to improving the conditions in and around the coal mines of this country, if acted upon, must go far toward ameliorating the dangers of mining.

Not only the changing conditions in the mining of coal, but the lessons taught by recurring mine disasters compel both the revision of existing laws and the making of new ones. It was the Avondale (Penn.) disaster that first opened the eyes of mining men, in this country, to the danger of single openings in mines. The lesson taught by that disaster has resulted in the mining laws of every coal-producing state requiring at least two openings to every mine, one of which must serve as an escape shaft. The Cherry (Ill.) disaster taught the lesson of greater fire protection for mines and the fireproofing of shafts.

The purpose of mining laws is to provide the necessary protection for life and property; and when this object is attained, both miners and operators are benefited. At the present time, in Illinois, the greatest need, it seems to me, is a law that will compel operators to provide a definite quantity of air at the face of all working places. It is true that the law empowers the inspector to order the men to withdraw from the mine or any section thereof, if, in his opinion, the ventilation is such as to endanger health, and he may forbid them to again enter the mine for work until the condition is improved.

Taken as a whole, the Illinois mining law is fairly good; but, in respect to providing adequate ventilation at the working face, too much is left to the judgment of the mine manager subject to the approval of the mine inspector. If a working place is reasonably free from smoke, it is too often assumed that the air is good. It is a fact that, in many of the mines, the carbide light is used in preference to an oil lamp, simply because the circulation of air is too poor to permit of the use of oil lamps with any degree of comfort. While there are many conscientious mine managers who use the best means in their power to ventilate the mine properly, there are, unfortunately, some managers who, when a complaint is made that the air is "poor," only adopt palliative measures and strive to improve the air at the face by putting up a temporary brattice or repairing a leaky door or stopping. These are matters that should not be left to the will and judgment of the mine manager. In mines where the strictest economy is necessary, in order to reduce the cost of production and yield a profit on the coal mined, what can be expected in respect to the ventilation of the mine when the law in this regard is not specific?

One of the conditions with which coal operators of Illinois have to contend is that, owing to strong competition in the state, the selling price of coal is below the cost of production, for six to eight months of the year. The operators must then rely on cold weather to increase the demand and insure a yearly profit.

The law forbids the coal operators to combine and fix a selling price on their coal. In my opinion, the result of such a combine would guarantee to the public that the selling price of coal was just, and only what would yield a reasonable profit on the money invested. This is a matter that might well be considered, in respect to Illinois, when discussing suitable mining laws. As has already been suggested, what benefit is the Compensation Act, in Illinois, if conditions are allowed that threaten to close the mine and render the operator bankrupt? I believe the coal operators of Illinois would all agree to operate their mines under the Compensation Act if suitable protection was afforded them in the effort to maintain the price of coal.

In my opinion, it would be well if a law was enacted prohibiting the use of gasoline motors in mines. It is argued that these motors cheapen the cost of production and give greater flexibility of operation. On the other hand, it is well known that the exhaust of this class of motors pollutes the mine air and may, under possible conditions, produce a dangerous amount of carbon monoxide, the poisonous qualities of which are well known. In regard to this question, it must be remembered that conditions in a mine are quite different from those existing in a factory or other plant. While the motor is not liable to be overloaded or mistreated in other places, its misuse in the mine is a matter of common occurrence. Suppose, for a moment, there is a demand for coal and one of the carburetors of the motor is not working. Is it to be expected that the locomotive will be sidetracked until this defect can be remedied? It is safe to say that the locomotive will be used as long as it will run when the demand for coal is urgent.

Another matter deserving of attention is the political influence that is often allowed to control the appointment of members of mine-examining boards. It is unnecessary to state that every member of such a board should be able to pass any examination relating to coal mining. They should be men who possess both practical and theoretical knowledge, in respect to the mining of coal.

In regard to the examination papers being returned to the candidates, after they have been corrected by the board, I would say that the examining boards are not in-

structors, but their duty is to find out what a man knows. In this state, the candidate's papers are preserved for not less than a year, and any candidate has the right in that time to examine his papers, or to obtain a copy of the same upon the payment of a reasonable fee.

W. L. Morgan, Instructor,
Illinois Miners' and Mechanics' Institute.
East St. Louis, Ill.

Letter No. 11—In response to the request for a full discussion of points relating to mining laws, legislation and mine regulations, that appeared in a recent issue of Coal Age (Oct. 31, p. 698), I would like to submit a few comments on the statements made in the letters already written on this subject.

Referring to Letter No. 2, Coal Age, Oct. 31, p. 722, I beg to differ from Mr. Parfitt, in respect to the benefit the candidate would derive from the return of his papers by the examining board. As Mr. Parfitt has previously admitted, the papers are open to examination by the candidate, under the supervision of the Department of Mines where they are filed. In considering this question, it should be remembered that the oral examination of a candidate is of greater importance in determining his practical capability than the written examination. Consequently, the return of his papers would inform him only partially on the result of his examination.

As a further argument why these papers should not be returned to the candidate, I would suggest that examiners usually manifest much sympathy in marking the papers of candidates whose elementary education has been limited. In many cases, the examiner "reads between the lines" and gives a man credit for what he evidently meant to say rather than for what he wrote.

Notwithstanding Mine Inspector Rose's sympathy with this proposal, as expressed in Letter No. 4, Coal Age, Nov. 14, p. 799, I believe that the majority of examiners would oppose the return of candidates' papers to them, because of the fear that such a procedure would necessitate much correspondence with those who failed to pass the examination. I believe a better plan is to group the questions into proper divisions or subjects and give to each question a definite value or number of points. After the examination of the papers is completed, every candidate should be informed of the number of points he has made in each subject; as, for example, ventilation, gases, methods of working, mine laws, etc.

I quite agree with Mr. Parfitt that all members of examining boards should have the necessary individual qualifications for the position they hold, and should possess a certificate of competency or be able to present other evidence that they are so qualified. I would recommend the excellent system adopted in West Virginia, where examinations are conducted by the district mine inspectors, under the supervision of the Chief of the Department of Mines, although this system possesses the disadvantage that the work of examination takes these men, responsible for the safety of the mine, away from their duties in the field for several days and adds to their already heavy burdens.

I note, from Mr. Rose's letter, that the same system is practiced in Tennessee. I cannot, however, indorse his statement that an examining board should seek to ascertain, as far as they can by practical questions, "what the applicant knows about mining *from experience*, instead of what he has learned *from others*." In my opinion, all true education is based on experience.

In mining practice, the most successful men are undoubtedly those who possess theoretical knowledge combined with practical experience. Practical mining men are prone to discount book learning and technical knowledge; and, for this reason if for no other, there should always be required of candidates, in mining examinations, a certain amount of technical knowledge.

In Letter No. 3, Coal Age, Nov. 14, p. 798, Mr. Scholz suggests that there should be more coöperation between mine workers and their employers, in respect to the adoption and observance of suitable mining laws and mine regulations intended to safeguard the work of mining. Too often, these laws and regulations, though quite adequate if enforced, are disregarded and violated by the very persons they are intended to protect.

I cannot indorse, however, Mr. Scholz's suggestion in respect to lobbying in order to secure more intelligent and effective legislation. As Mr. Beard stated in his introductory article, Coal Age, Oct. 31, p. 698, "Too often has mine legislation been influenced if not controlled by lobbyists whose main object and purpose have been to secure the enactment of laws that will favor their own selfish ends."

It is well known that any lobbying, in legislative halls, or "junketing" around with legislators, during sessions of the legislature or at other times, on the part of employers of labor, does not generate the best of feeling among the working classes. By no possibility can this class be led to believe that such activities, on the part of employers, are for their benefit or safety.

What Mr. Scholz has said, in respect to the Workmen's Compensation Act, in Illinois, leaves one in considerable doubt in regard to his opinion of the practical operation of this law. I would assume that he would be inclined to oppose such an enactment; and, yet, his arguments present a very strong advocacy of the need of such a law as a means of protection for both the operator and the mine worker, in the hazardous operations of mining.

The practical working of the compensation law, which has now been in operation 15 months in West Virginia, has proved an inestimable boon to mine workers and their dependents. The fund, which has been contributed to by both operators and workmen, without hardship to either party or to the trade, has made ample provision for widows, orphans and injured workmen, who would have been unable, in Mr. Scholz's own words, to have "drawn blood from a turnip."

Wesvania.

————, W. Va.

Firing Shots in Mines

In the issue of Coal Age, Oct. 24, p. 665, there appeared a description of a chemical fuse lighter whose action depended on the sulphuric acid introduced into one side of the tube, eating its way through a celluloid diaphragm and reaching the combustible matter contained in the tube. By this means, the fuse to which the tube was attached became ignited. This was described as taking place about two or three hours after the tube was charged with the acid, thus giving the miners or the shotfirers ample time to withdraw from the mine before the shots were exploded.

The question was asked, Is the idea practicable? While I do not doubt but that shots could be fired with this device in the manner described, the adoption of such a method in coal mining appears to me to be not only impracticable but extremely hazardous.

We will assume that the miners or shotfirers, as the case may be, have prepared the shots and charged the chemical fuse lighter with the acid and that all the men have left the mine and gone home, with the expectation that in from two to three hours the acid will eat its way into the combustible matter and ignite the fuse and the shots will be exploded. Suppose, however, that, through some fault of the acid or celluloid a longer period than what is expected elapses before the acid reaches the combustible in any one or more of the shots so prepared. It might even happen, in such a case, that the delayed explosion would take place as the workmen were entering the mine the following day.

Or, suppose again that the place where the shot was to be fired had been examined for gas, after the shot had been prepared; but, in the interval between that time and the exploding of the shot, a fall of roof had occurred, with the result that the place became charged with gas. The firing of the shot under these conditions would endanger the entire mine and, perhaps, result in a heavy property loss.

The same result might follow the firing of two shots in the same working place, as it would frequently happen that the explosion of both of the shots would take place at practically the same time. Then, the dust and gases of the first shot would be ignited by the flame of the succeeding shot and possibly cause an explosion that would extend throughout the mine.

An instance of such an occurrence causing a fatal mine explosion is given on pp. 24-6 of Miner's Circular No. 7, issued by the Bureau of Mines and entitled "The Use and Misuse of Explosives in Coal Mining." The report states: "This explosion wrecked the entire mine, dislodged timbers on the main entries, and its force extended even to the tipple 300 ft. from the mouth of the mine;" and adds, "If other men had been in the mine they would undoubtedly have been killed."

In conclusion, I wish to say that, to avoid danger in firing shots in mines, they must be prepared, loaded and fired under the supervision of a competent shotfirer. Each place must be examined for gas, and if dust is present the place should be well watered before any shots are fired. Where two shotfirers are employed in the mine they should not be firing shots at the same time, on the same split of air.

PENNSYLVANIA MINING ENGINEER.
Uniontown, Penn.

Study Course in Coal Mining

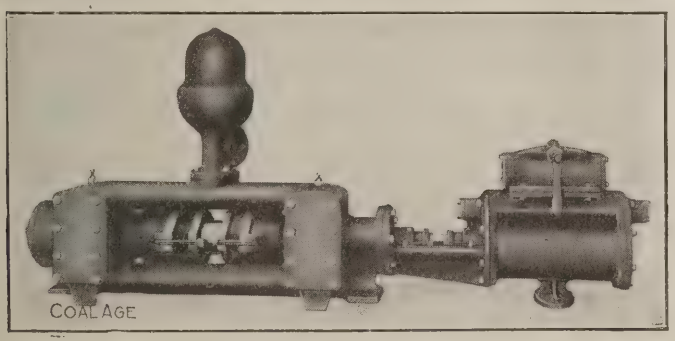
BY J. T. BEARD

The Coal Age Pocket Book

The main feature and chief advantage of the **plunger type** of pumps is the elimination of most of the wearing parts in the water-end of the pump. Owing to the fact that the plunger does not occupy the entire cross-section of the water cylinder or pump barrel, there is no wear of the pump linings, as is the case in piston pumps. The wear in the water-end of all plunger pumps is confined to the packings.

As previously stated, there are three styles of **plunger packings;** namely, outside, end-packed; outside, center-packed; and inside-packed. These have each been illustrated, in detail, on a previous page.

Plunger pumps also differ in the arrangement and number of their plungers and cylinders or pump barrels. For example, a **single-acting** plunger pump has but one plunger, working in a single barrel and is outside, end-packed. A **double-acting** plunger pump may have a single plunger, working in two separate barrels, as shown in the accompanying figure, which is an outside, center- and end-packed pump, of the Cameron regular pattern.



SIDE VIEW OF CENTER- AND END-PACKED PUMP

In other styles of this pump, the plunger is operated by means of side-rods and a crosshead connection, by which the end-packing, shown in the figure, is eliminated; and the pump is then simply a center-packed pump.

Again, two plungers, connected by side-rods are operated in two separate barrels, both plungers being end-packed. This type is, in fact, a duplex, single-acting plunger pump.

The steam-end of this pump is identical with that of the piston pump, previously described. The side view here shown makes clear the manner of tightening the stuffing-boxes, by means of the bolts, as may be required by reason of the wearing of the packing. In this style of pump and, in fact, in all center-packed pumps, there is not the same tendency of the plunger to sag that there is in an end-packed pump.

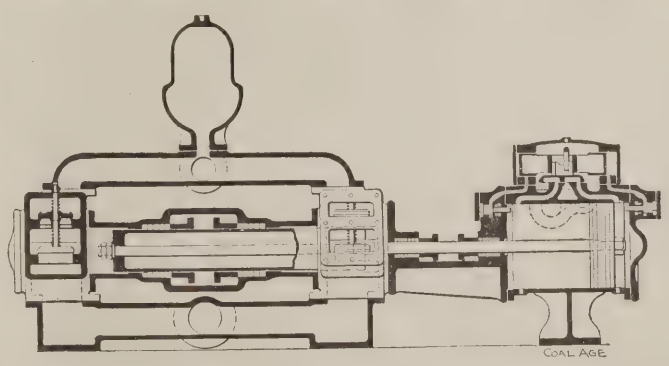
The Coal Age Pocket Book

Plunger pumps are particularly adapted to the work of unwatering mines, because of their ability to handle water containing sand or other gritty material, without the excessive wear that results in a piston pump.

Another distinct advantage that this class of pumps possesses over piston pumps is the elimination of the loss due to "slippage," which often reduces the discharge of piston pumps from 10 to 15 per cent. of that obtained in plunger pumps of the same size and operated at equal piston speed.

In this pump, the two valve chests are connected, by a pipe of ample size, with the discharge or column pipe. This connecting pipe, as shown in the figure, is surmounted, at its center, with a suitable air chamber to equalize the pressure and maintain a more uniformly constant discharge.

The figure on this page represents a complete sectional view of the pump, a side view of which appeared on the preceding page. On the right of the figure is shown the



SECTIONAL VIEW OF CENTER- AND END-PACKED PUMP

steam cylinder, surmounted by its valve chest. The water-end, on the right, consists of two separate pump barrels, in which a single plunger operates. The section shows this plunger mounted on the same rod that carries the piston, as in all direct-acting pumps.

The interiors of the two valve-chests are shown to contain, each, two poppet valves, which are held to their respective seats by springs. These valve chests are connected above and below by ample discharge and suction pipes. The section also shows the packing rings in the stuffing-boxes at one end and between the pump barrels.

The pump here shown has a stroke of 18 in. The diameter of the steam cylinder is 12 in.; while the diameter of the plunger is 6 in., which makes the size of the pump 12x6x18 in.

Inquiries of General Interest

Mixtures of Air and Mine Gases

Will you kindly explain the nature of the following mixtures of air and gases, in respect to their danger to health or as affecting the explosive condition of the mine air. These mixtures are numbered consecutively and the proportion of each gas is given in percentage.

No.	Air (O)(N)	Methane (CH_4)	Carbon Monoxide (CO)	Carbon Dioxide (CO_2)
1	85	15	..	..
2	30	70	..	trace
3	80	8	12	..
4	80	8	..	12
5	98	..	2	..
6	98	..	..	2

Please state what these mixtures of gases and air represent in actual coal-mining practice.

FRANK BERANEK.

Tarr, Penn.

We will explain, briefly, the character of these gaseous mixtures, in respect to their danger to health and safety in the mine, by reference to the numbers of the respective mixtures given above.

1. Assuming that this mixture has been formed by the addition of methane (CH_4) to pure air, it contains oxygen, 17.76 per cent.; nitrogen, 67.24 per cent.; methane, 15 per cent. While this mixture will dim a candle flame almost to extinction, the flame would not be extinguished unless the proportion of methane in the mixture reached 16.7 per cent. The given mixture can be breathed with impunity; since when no gas is present producing a toxic effect on the system, the first difficulty in breathing is experienced when the oxygen content has fallen to about 14 per cent.; and fatal effects may only be expected when the oxygen content is reduced to 10 per cent. The chief danger of this mixture, however, lies in the fact that it is not only explosive, but may be rendered more so by the possible addition of air.

2. Assuming, again, that this mixture has been produced by the addition of methane to pure air, it contains oxygen, 6.27 per cent.; nitrogen, 23.73 per cent.; methane, 70 per cent. This mixture is extinctive of flame, nonexplosive (though it may become so by the addition of air) and unbreathable, producing death by suffocation.

3. This mixture contains sufficient carbon monoxide to produce instant death if taken into the lungs. It is also inflammable and highly explosive. The introduction of a flame would cause its ignition and explosion.

4. Assuming, as before, that the mixture has been produced by the addition of methane and carbon dioxide to pure air, it contains oxygen, 16.72 per cent.; nitrogen, 63.28 per cent.; methane, 8 per cent.; carbon dioxide, 12 per cent. This mixture contains almost sufficient carbon dioxide to render it nonexplosive, that point would be reached were the proportion of carbon dioxide increased to 12.5 per cent., in the absence of other gases or dust. The given mixture is, therefore, feebly explosive. If breathed, such a mixture would not prove fatal, except after the lapse of considerable time. It would, however, produce headache and nausea; and, finally, unconsciousness if the inhalation was to be continued.

5. This mixture contains sufficient carbon monoxide to produce fatal results in a brief period of time. The mixture is not inflammable, or explosive, or extinctive of flame.

6. The percentage of carbon dioxide in this mixture is not sufficient to produce any ill effects, except a slight headache or nausea, aftter continued breathing. It is not extinctive of flame.

Color of Coal Ash

Will you kindly explain the cause of the difference in the color of the ash of different coals. Does this difference in color indicate a material or important difference in the composition of the coal and its value for fuel purposes? I have observed that while some coals give a red ash in burning, the ash of other coals is almost pure white. If the so called "red-ash" coal is now being mined, kindly state where it can be obtained.

CONSUMER.

Jersey City, N. J.

The color of coal ash is due to the presence of different impurities in the coal burned. The red color of the ash is the result of the presence of iron, in some form, in the coal. This iron occurs mostly as oxide or sulphide. The oxides of iron vary from bright red (hematite) to brown (limonite), in color. The sulphide of iron is the well known pyrite or pyrites, which may occur in segregated masses or nodules, or be disseminated in finely divided particles or layers, in the coal formations.

The "red-ash" and "white-ash" coals are anthracite. They are mined by the Lehigh Coal & Navigation Co. in the Panther Creek basin. According to Report 1, p. 180, of the Second Geological Survey of Pennsylvania, the names "red ash" and "white ash" were adopted by this company to designate certain coals mined from the Mammoth and Red Ash seams. It is stated that these names do not necessarily imply that the ash obtained from the combustion of these coals is always white or red in color; although, presumably, the general color of the ash suggested such designation.

Red-ash coal is handled by the Philadelphia & Reading and the Susquehanna Coal companies. The Sunday Creek Coal Co., of Columbus, Ohio, advertises a "white-ash coal." Owing to its superior hardness and resistance to breakage in handling, red-ash coal is generally higher priced. The average specific gravity of this coal, however, is given as 1.584, while that of white-ash coal from the Mammoth beds is 1.631. The average of these coals contains 3 per cent. of moisture and about 4 per cent. of volatile matter, the red-ash coals averaging 88 per cent. of fixed carbon and 4.4 per cent. of ash, while the white-ash coals average 84 per cent. fixed carbon and 8.2 per cent. ash.

Examination Questions

Hoisting Engineers' Examination, Held at Albia, Sept. 23 and 24, 1914

(*Selected Questions, Continued from Last Week*)

Ques.—What care should be taken of steam boilers to secure the best results, in their use?

Ans.—Boilers should be cleaned at regular intervals and carefully examined to detect any signs of weakness. The feed water should be as pure as possible and should be passed through a feed-water heater before it is allowed to enter the boiler. The water should be fed into a boiler in small quantities, at regular intervals; and care in firing is necessary to maintain an even temperature and a regular pressure. It is important to avoid any sudden changes in temperature or pressure, in boiler practice.

Ques.—What care do the various appliances of a boiler require?

Ans.—First, care must be taken that water is feeding into the boiler properly; that the feed pump is in good order and the check valves tight. The safety valve of the boiler should be tested frequently to see that it works freely and responds properly to the steam pressure. Also, the steam gage should be tested from time to time, in order to know that it registers accurately the pressure in the boiler. The water gage and try-cocks should be kept clear, so that they will show the true level of the water in the boiler. The fusible plugs should be examined frequently. It is also necessary to keep the mud drum free of sediment and the blowoff valve from leaking.

Ques.—(a) How often should a boiler be cleaned? (b) What causes scale to accumulate on the heating surface of boilers?

Ans.—(a) The frequency with which a boiler should be cleaned will depend chiefly on the purity of the water used in the boiler. In any case, a boiler should not be allowed to go longer than a month without cleaning. In general practice, this will be too long a time and better results will be obtained by shortening this interval.

(b) The accumulation of scale on the inside of the boiler is generally greatest where the plates are most intensely heated. The scale consists of the condensed impurities of the water, which have been for the most part precipitated by boiling. The sediment contained in dirty water does not ordinarily give much trouble, as it is readily blown off from the boiler or collects in the mud drum, from which it is readily removed. The principal impurities that form the hard scale that is difficult to remove from the inside of the boiler are the carbonates and sulphates of lime and magnesia. These salts are precipitated by boiling and often become firmly attached to the boiler plates and can only be removed by the use of scrapers, drag chains and other tools.

Ques.—How can we tell what pressure is on a boiler? Explain the operation.

Ans.—The pressure of steam in a boiler is indicated by a steam gage. The most common form of gage employed, in boiler practice, is a brass tube, flattened and bent in the shape of a horseshoe or part circle. One end of the tube communicates with the boiler; the other end being closed and free to move is connected by a lever and rack movement to the pointer that moves over the face of the dial. The pressure of the steam within the tube causes an outward movement of the free end of the tube, which movement is communicated to the pointer and serves to register the pressure of the steam.

Ques.—Which is the more dangerous steam gage, one that is "fast" or one that is "slow?"

Ans.—A fast steam gage is one that registers a higher pressure than the actual; while a slow steam gage is one that registers a lower pressure than what exists in the boiler. The slow gage is, therefore, more dangerous.

Ques.—Show by sketch how a shot should be undermined, and indicate the position of the charge of powder in the coal, assuming a uniform seam of coal 4 ft. 6 in. in thickness.

Ans.—The accompanying figure shows a shot placed in the coal, which has first been undermined by cutting out the bottom coal to a depth almost equal to the depth of the hole. The position of the shot midway in the seam, in this case shows that the coal breaks down easily and does not adhere to the roof.



Ques.—What precaution would you take in a mine where solid shooting is practiced and the mine is dry and dusty and generating firedamp?

Ans.—"Solid shooting" should not be permitted in a bituminous mine, under these conditions. When shooting off the solid, there is every possibility of producing a blowout shot; and in case the coal is soft and friable, much fine dust will be produced that is highly inflammable.

If solid shooting, however, is to be permitted, under the conditions named, shotfirers should be employed and all shots should be fired after the men have gone out of the mine. The shotfirers should be competent miners who should examine all holes before they are charged, in order to determine the depth of the hole and the exact position of the charge in the coal. The shotfirer should have the power to condemn and refuse to fire any hole that in his judgment is dangerous. He should determine the weight of charge to be placed in each hole, and should give careful instructions in regard to tamping.

A suitable water system should be installed throughout the mine that will make it possible to thoroughly sprinkle the working face and the sides, roof and floor of every room or entry where shots are to be fired. This watering should extend from 15 to 20 yd. back from the face of the coal. No shots should be fired in places that have not been watered. The mine foreman and his assistant should see that all fine dust and slack are loaded out and the working places kept free from all accumulations of fine coal.

Coal and Coke News

Washington, D. C.

The various reports submitted to Congress by the different departments of the government are furnishing an unusual amount of information with respect to the coal situation of the country. Probably the most important document on the subject is the report of Secretary Lane of the Interior Department, who describes the situation as to the land-leasing system for Alaska as follows:

Congress supplemented its railroad bill by the passage of another act of no less significance, a bill providing for the leasing of the great coal fields of Alaska. As this is virtually the first bill to pass Congress authorizing the leasing of any of our resources, it may be well to outline its provisions. It first provides for a survey of the coal lands of Alaska, preference to be given to the Bering River, Matanuska and Nenana fields. These fields would doubtless supply the needs of the far West for many years if made accessible. The Nenana field is some 30 miles from Tanana River and could feed the great interior, while the Matanuska is but a short distance from Cooks Inlet on the coast, and the Bering River is near Controller Bay and the city of Cordova. In the two best fields (Mantanuska and Bering River) a reservation is to be made for the government, not alone to supply the needs of our ships, but to be operated in the event that the price of coal is raised to such a figure by monopoly as to make this of public value. The surveys are to be in 40-acre blocks, and the leases are not to exceed 2560 acres, which is the average coal operation of the United States. As a coal mine under modern conditions is much more than a tunnel or a shaft, and requires a plant costing from a quarter to half a million dollars, it was necessary to make the acreage large enough to justify such an expenditure. The leases are to be awarded through competitive bidding or otherwise, under general regulations made by the Secretary of the Interior, with a minimum royalty payable to the government of 2c. a ton and an annual rental of from 25c. to $1 per acre applicable on the royalty. This last provision as to rental is to make it onerous to hold land undeveloped. The leases are to be for not more than 50 years, subject to renewal on new terms.

Strict Control of Operation

The utmost care will be taken by Congress to guard against monopolization of the fields. Railroads are not permitted to hold more of these lands than will supply their own needs. Leases may be transferred only with governmental consent. No one may be a shareholder or otherwise have an interest in more than one holding. And for violation of its general and specific prohibitions criminal penalties may be imposed. Provisions against waste and for care in the operation of the mines are required in each lease. The safety and welfare of the miners are safeguarded, and an eight-hour day for underground workers is specified. Wages shall be paid twice a month, and the company store as a compulsory base of purchase is frowned on. The miners are to be insured the fair and just weighing of the coal mined, and other measures may be provided in the leases which may be needed "for the protection of the interests of the United States, for the prevention of monopoly, and for the safeguarding of the public welfare."

Leases may be forfeited by appropriate proceedings in court for noncompliance with the provisions of the lease or of general regulations, and the lease may provide for enforcement of other appropriate remedies for breach of specified conditions therein.

To care for the strictly local and domestic fuel needs provision is made that a limited license or permit, for 10 acres and running for not more than 10 years, may be granted to any person without payment of royalty. As Alaska contains many scattered coal beds easily accessible from mines and towns, this is a provision that it is thought will make for general relief. Having provided in the manner just roughly indicated against those conditions which have arisen within the United States and which have threatened Alaska, Congress has restored the coal lands of that territory to the world's use.

Alaska Dependent on British Columbia

With reference to Alaskan coal the head of the Bureau of Mines says:

The outbreak of war in Europe of August of this year had the effect of strongly reminding the people of Alaska that they are still largely dependent upon British Columbia and other countries for the coal they consume for domestic and industrial purposes, notwithstanding the fact that the territory has practically unlimited quantities of high-grade coals awaiting development on a commercial basis. It was considered possible, with the presence of warships of some of the belligerent powers in the waters of the Pacific coast, that the supply of coal from British Columbia might be cut off, thus creating a serious condition among coal consumers in Alaska, and the situation seemed to accentuate the importance of the United States having a permanent source of coal supply in Alaska, together with a coaling station that would be accessible at all times. The importation of coal from the States and from foreign countries during the last fiscal year amounted to 93,101 tons, valued at $295,123. The importations show a slight decrease over those of the previous year, due to the more extended use of fuel oil in various industries.

Harrisburg, Penn.

If the anthracite tax law is declared unconstitutional by the Dauphin County Court it will probably be on the ground that the law is local or special legislation.

Three coal companies from the 60 appealing were picked by agreement as representing the various phases of the case. These were the Alden and the Plymouth of Luzerne County, and the St. Clair of Schuylkill County. The principal contentions of the companies were:

That special legislation is prohibited in Pennsylvania.

That local legislation is prohibited under Section 8, Article 3 of the Constitution and the Act of 1874, unless notice is published in the newspapers of the intention to introduce such local legislation. It was acknowledged that in none of the nine anthracite coal-producing counties was such a notice published in the newspapers.

The attorney general contended that as the governor had signed the bill it must be presumed that legal notice was given of the intention to present the measure, and further, that the court had no power to go behind the signature of the governor.

The coal companies asserted they are now paying a state tax on their capital stock; that of the 67 counties in Pennsylvania only nine produce anthracite; that considerable areas in these nine counties produce no coal and that these communities under the act, which provides that the state return one-half of the tax collected to the counties in which it is originated, would receive sums equal to or greater than their municipal expenditures.

In connection with the Alden and Plymouth cases it was asserted that in Luzerne County coal is mined in only 14 of the 36 townships, and that the remaining townships would receive large returns from the tax.

This is the largest tax settlement case heard in the local court in years, for it is estimated that the companies have collected upwards of $5,000,000 from the public by increasing the price of their coal. Of this sum only $19,000 has been paid into the State Treasury, and most of this under protest. If the act is decided to be unconstitutional the question of how this money can be returned to the people will be an interesting one.

If the court finds the act is unconstitutional, the companies will immediately appeal to the Supreme Court, and a decision may not be returned until late in 1915.

Counsel for the company urged that the act was special legislation, seeing that the state did not tax producers of semianthracite, semibituminous or bituminous coal. It was declared that the line of demarcation is slight between the various grades.

Changes in Department of Labor

Among the suggestions which the legislative committee of the State Federation of Labor received at its meeting here this week was one for the consolidation of the State Department of Labor and Industry and the Department of Mines. These matters were not put forward in the form of resolutions, but suggested for such action as the committee might determine.

The formation of a code of laws was also suggested regulating the safety and work of men employed in slate quarries and other operations not now protected by law. Steps to pass statutes covering such work were taken by the last legislature and a report may be made by the Chief of Mines, James E. Roderick.

There is a feeling among some of the leaders of the United Mine Workers for a reorganization of the State Department of Mines, so that the chief of the Department may have two assistants, one in the anthracite and the other in the bituminous region.

Tripp Shaft Disaster Not an Explosion

There are no new developments in the investigation of the accident at the Tripp shaft of the Diamond colliery of the Delaware & Lackawanna R.R. Co., at West Scranton, Bolinski, the only passenger on the cage out of 14 to escape death, declares there was no explosion, that the "carriage jerked and jerked and jerked and the men went down."

The coal company officials point out that the cage had

carried 9600 lb. many times every day, and that the combined weight of the 14 men, if they had weighed 200 lb. each, would be only 2800. One theory given was that the cage might have caught in the shaft, and that when the slack was taken up by the engineer, the bottom was ripped from the cage. Manager Phillips says that if this had happened there would have been marks on the buntons made by the steel strips extending from the sides around the bottom. The shaft was left in such condition following the disaster that the two carriages used in it were working as well as ever a short time following the disaster, except that the cage in which the accident took place had no bottom.

Discounting the explosion stories are the facts that the timbering of the shaft was not damaged in the least; that the flooring of the cage, while broken, does not show any of the tearing and rending that an explosion would cause; that the bodies of the men found in the shaft bottom (sump), 300 ft. below where the flooring went out of the carriage, did not show any injuries or tearing around the feet, which would be natural did the dynamite explode immediately on the cage floor; that Martin Bolinsky, the man who was saved by clinging to an iron rod, was not injured about the feet, although, if there was an explosion, it must have been almost where he stood; that no smoke poured from the mine mouth after the headman heard the noise he thought was an explosion; that several sticks of dynamite were found unexploded among the bodies of the men.

PENNSYLVANIA

Anthracite

South Bethlehem—The largest diamond drill core ever cut has just been presented to Lehigh University by H. H. Otto, division engineer of the Lehigh Valley Coal Co., of the class of 1912. It was cut in the Marcy vein, at the Maltby colliery near Wilkes-Barre, Penn. The specimen is a core of an 11-in. diamond drill and the core is 10 in. in diameter. The object of the drilling was to drain some old workings at the Maltby colliery. A barrier of 183 ft. had to be penetrated before the water, which had a head of 176 ft., could be tapped. The core shows the middle rock of the Marcy vein.

Hauto—It is estimated that the Harwood Electric Co., a subsidiary of the Lehigh Coal & Navigation Co., will lose half a million dollars, according to figures given out by the corporation, as a result of damage done by the storm that visited the Lehigh coal regions during the week of Dec. 14. Thirty seven of the steel towers were pulled down by the heavy coating of ice on the wires. Hazleton City has partially recovered from the effects of the storm, but many of the collieries which were supplied by the Harwood Electric Co. were forced to suspend operations.

Kingston—Inspection of mine timber which had been treated for experimental work is showing good results. In a certain place in one of the mines here where timber lasts only six months, the pit timbers were replaced with creosoted loblolly pine, and in between these timbers were placed others of the same kind of wood that had been peeled and seasoned. In the same locality loblolly pine sticks treated with lime were placed, so that they would be subject to the same general conditions. These timbers lasted about five years and all seem to be sound. At the end of the sixth year, however, the lime-treated sticks were decayed to such an extent that they were replaced with timber treated with creosote and chloride of zinc. The simple lime treatment which increased the life of the timber from six months to six years shows how necessary it is to care for mine timber and the economy of so doing, for the creosoted timbers are practically sound after seven years.

Pottsville—Pottsville, Scranton and Pittsburgh capitalists have purchased the Whippoorwill colliery on Broad Mountain, an operation abandoned many years ago. Work of reclaiming the mines will be started at once, as big coal deposits have been discovered.

It is also announced that the Madeira Hill colliery, on Broad Mountain, just opened by Philadelphia capitalists, will be placed in operation on Jan. 1, as will the East Bear Ridge colliery, owned by James Bros., of Shenandoah. These three new operations will give work to 3000 men.

Pittston—Thousands of dollars' worth of property was wrecked and several families made homeless on Dec. 14, by one of the most destructive mine caves that ever occurred in this region. The caving was unexpected and the property owners had no warning from the Pennsylvania Coal Co. Rumbling noises were heard early in the morning, and the first depression occurred a few hours later underneath a new double home owned by Michael Dunne, of Searle St., erected a few months ago at a cost of $5000. The settling continued all through the day, creating greater damage to the Dunne home and extending to six other houses in the vicinity.

Pittston—A tunnel driven through solid rock, at some places penetrating bodies of quicksand, and which has been in course of construction by the Pennsylvania Coal Co. for the past eight years, was completed recently. The tunnel is to be used exclusively for the draining of collieries in the vicinity of Pittston.

ALABAMA

Birmingham—The order for 175,000 tons of coal which is given annually to an Alabama coal operator by the New Orleans street railways went to the Sloss-Sheffield Steel & Iron Co. this year.

The American Coöperative Coal Mining Co. has filed a petition in voluntary bankruptcy, liabilities amounting to $36,770.37; assets, $45,187.40. E. H. Dryer, referee in bankruptcy, has appointed W. H. Bonham, of Collins & Co., receiver.

KENTUCKY

Barbourville—Nine Pennsylvania coal-mine operators were members of a party which has just made an inspection trip of holdings in the Clay County coal field where, it is said, the intention is to add another boundary of 12,000 acres to the original holding of 20,000 acres. In this connection plans for a railroad to run from here into Clay County are being discussed with renewed interest. Heavy investments made in this section indicate that a railroad is not far in the future.

Hazard—The Haley Coal Co., of which C. B. Slemp, congressman of the Ninth Virginia District, is president, and the Virginia Coal & Coke Co. will each make developments of its coal property on the new First Creek Branch of the Lexington & Eastern immediately below here. It is the purpose of both companies to be ready to begin shipping coal by Apr. 1, immediately upon the completion of the First Creek Branch road. The Perry County coal fields now present a spirit of increased activity, and the new year will show great prosperity throughout.

The Warner Coal & Coke Co., with headquarters at Columbus, Ohio, has leased a large area of coal lands on First Creek in the Perry County field and will soon begin the initial work looking to its development. By the first of the year, the development will be well under way. The company will ship over the First Creek Branch of the Lexington & Eastern R.R. It expects to have a daily capacity of about 12,000 tons.

Whitesburg—Orders aggregating over 90,000,000 tons of coal—perhaps the largest coal order ever placed in this country—have just been secured by the Consolidation Coal Co. in the Jenkins-McRoberts-Burdine-Dunham coal field, and a number of miners will be put to work at once. Much of this coal will go via the Carolina, Clinchfield & Ohio new line through "The Breaks" via Dante, Va., and so on to the South Atlantic ports for export to foreign markets.

OHIO

Cincinnati—The report of Capt. Charles J. Menges, trustee in bankruptcy of the Consolidated Coal & Mining Co., which is to be filed shortly in the United States District Court, will show a distribution to creditors of the company of about 5 per cent. of their claims, assets amounting to about $12,000 and liabilities to $72,000. The only assets of the company were the retail delivery and river equipment. The company's lease on the property at Zaleski, Ohio, operated by it under the name of the Cardiff Coal Co., was found by the trustee to be worthless, on account of arrearages on the payment of royalties and other dues.

Columbus—The Detroit, Toledo & Ironton Ry. Co. has requested the Ohio Public Utilities Commission to rescind its order, made three years ago, reducing coal rates on the Hocking Valley R.R. between Nelsonville and Toledo, on the ground that this competition made it also necessary for the petitioning road to reduce its rates between Wellston and Jackson and points in northern Ohio and Michigan to an unprofitable extent.

Bellaire—Belmont County coal mines, now closed by the strike, are likely to be operated on the profit-sharing plan. One hundred former employees of the Pittsburgh-Belmont Coal Co., whose mine is at Neff, have requested that their former employers permit them to take stock and operate the mine under lease on the coöperative plan. A similar plan has been made by the employees of the Schick mine, and the unions in other parts of the country are expected to make like proposals. The operators have the propositions under consideration, and as it offers a solution for the deadlock which has existed since Apr. 1, it is thought their answer will be favorable.

ILLINOIS

Chicago—Five large coal mines in Montgomery County, which have been under lease to the Peabody Coal Co., have been taken over by receivers appointed by Judge Carpenter in the U. S. District Court. The receivers are Francis S. Peabody, of Hinsdale, Ill.; Jackson K. Dering, of Lake Villa, Ill.; and Jabez Wooley, of Evansville, Ind. The mines of which they will assume charge are the Peabody No. 10 Mine at Nokomis, two large mines at Witt, the Kortcamp and the Taylor Springs mines near Hillsboro. Seven Indiana mines are also included in the receivership. All twelve properties have been owned or worked under lease by the Chicago & Eastern Illinois R.R., and go into receivership through orders of the court on account of the present financial condition of the railroad company. It is stated that the receivership will not interfere with the operation of the mines.

Chicago—A number of Indiana and Illinois operators, headed by C. M. Moderwell, president, Illinois Coal Operators' Association, and F. C. Honnold, secretary of that association, have placed before Secretary Lane, of the Interior Department, a statement of the appalling conditions found in the coal industry of the States of Illinois and Indiana at the present time. The salient points of this appeal are the inability of the operators to coöperate, because they do interstate business and are amenable to the anti-trust laws, and that if they could combine, they could simplify their selling and operating methods, create many economies, and prevent the present wasteful methods of mining. Coöperation would not only greatly benefit the workmen and investors in coal enterprises, but would mean the establishment of other industries connected with the byproducts of coal.

Chicago—J. B. Jones, coal operator, who recently bought out the Sunday Creek Co. in the proceedings undertaken by the government for breaking up the Eastern Ohio and West Virginia railroad combine, has applied to the Ohio Utilities Commission for leave to place a new mortgage for $3,934,000 upon the properties of the Sunday Creek Co.

Mount Vernon—The largest coal-land deal ever made in this vicinity has been concluded in the sale of 10,000 acres south of here. The purchasers represent New York and Pennsylvania capital, and the deal was made by A. C. Snively, of Pittsburgh, Penn., with George W. Trelkeld and W. H. Green, of Mount Vernon. It is the intention of the purchasers to sink a shaft on the line of the Chicago & Eastern Illinois R.R., probably near Ina.

COLORADO

Pueblo—The Pueblo Savings & Trust Co. has filed a petition in the District Court, asking that a trust deed and mortgage held by them against the Colorado Central Coal & Mining Co., of Fremont County, be foreclosed, and that a receiver be appointed to conduct the affairs of the company The trust deed secures a bond issue of $300,000.

ARKANSAS

Russellville—The lease and property of the Ideal Anthracite Coal Co., operating one of the largest coal mines in this section, has been ordered sold to satisfy a judgment in the Pope Circuit Court for damages of $16,500 for injuries received by W. F. McBride, a workman in the mines.

FOREIGN NEWS

London, Eng.—A dispatch from Stockholm, Sweden, says that the Swedish State railways have invited tenders from America for 130,000 tons of coal, to be delivered from January to March, 1915. This is the first time that American coal has been allowed to compete for Swedish State requirements.

Sydney, N. S.—The Dominion Coal Co. is grappling with the problem of securing additional markets for its output. It has been found practically impossible to compete with American operators for the South American trade, in view of the advantages enjoyed by the latter in the matter of transportation, and the war has cut the company off from a possible market in Norway and Sweden. The company has an overproduction of slack, but the blowing in of an additional furnace by the Dominion Steel Co. will enable them to dispose of a considerable amount of the surplus. The output for November was 297,407 tons, a decrease of 110,000 tons as compared with November of last year.

Tokio, Japan—An explosion occurred on Dec. 15 in a coal mine in Fukuoka, 65 miles north of Nagasaki, imprisoning 800 laborers in the workings. Present advices do not state the number killed or injured.

OBITUARY

George Wettengel, 90 years old, a veteran coal operator and a resident of Pittsburgh for 73 years, died at his home, 805 Kerr Ave., Dec. 11.

Henry Horn, Sr., one of the pioneer coal operators of southern Illinois, and of Perry County in particular, died at his home, on Dec. 10, at the age of 83 years. The Horn Coal Co. was one of the largest producers in the state a decade ago, but practically all of the Horn mines have been worked out and abandoned years ago. In addition to coal operating, Mr. Horn was engaged in the banking business and was president of the Horn Bank. In addition to mine holdings in this county, he was also interested in one of the mines at West Frankfort, Ill.

Daniel Francis Connor, general sales agent of Whitney & Kemmerer, died at his home, 255 West 90th St., New York City, on Dec. 10. It was not generally known in the trade that Mr. Connor had been seriously ill, and his death therefore came as a shock and complete surprise. He died of Bright's disease after being confined to the house only a few weeks.

Mr. Connor was a distinct character in the coal trade. As a young man, he was for a short time connected with the retail trade in Boston under the firm name of Phillips & Connor. At an early age, however, he became associated with the firm of Whitney & Kemmerer in New York, and after a short time was transferred to their Boston office, but, in 1896, upon the death of Albert Darling, he returned to New York to assume charge of the business in that city. By his aggressiveness and knowledge of the business he soon forged ahead into a position of prominence in the trade, and was later admitted as a member of the firm. His genial disposition and strict adherence to principles of business integrity formed for him a wide circle of loyal friends.



In addition to being a member of the firm of Whitney & Kemmerer, Mr. Connor was a director in the Coal & Iron National Bank, Three-In-One Oil Co. and other corporations. He was a member of the Columbia Yacht, Meridian and Railroad Clubs. Mr. Connor is survived by his wife and one daughter.

The funeral was held Dec. 12 from the Church of St. Gregory the Great and was largely attended by the prominent men of the coal trade who gathered there to pay their last respects. The interment was in Woodlawn Cemetery.

PERSONALS

A. R. Beisel, general superintendent of the U. S. Coal & Oil Co. at Holden, W. Va., has been transferred to Cincinnati, to have charge of the Huntington and Cincinnati coal docks.

Carl Scholz, of Chicago, was reëlected president of the American Mining Congress; Harry L. Day, Wallace, Idaho, M. S. Kemmerer, New York, Walter Douglas, Bisbee, were chosen as vice-presidents; and James F. Callbreath, of Denver, was reëlected secretary.

B. F. Hoffacker, chief assistant to the late John W. Boileau, of Pittsburgh, has taken over Mr. Boileau's office. During the period of Mr. Hoffacker's connection with Mr. Boileau he acquired a wide and varied knowledge of coal properties in Pennsylvania, Ohio, West Virginia and Kentucky.

E. H. Carr, general manager of stores for the LaFollette Coal, Iron & Ry. Co., of LaFollette, Tenn., was in Cincinnati recently for the purpose of buying a large quantity of goods of all sorts for the company's commissaries. Mr. Carr commented upon the bad condition of the iron business in his section and the South generally, stating that the company's furnaces are shut down for lack of business. He said, however, that the coal business had never been better, the volume of the movement being large and prices good.

TRADE CATALOGS

Golden-Anderson Valve Specialty Co., Fulton Bldg., Pittsburgh, Penn. Leaflet of 8 pages, 9x12 in.; illustrated.

Westinghouse Electric & Manufacturing Co. (Industrial and Power Department), East Pittsburgh, Penn. Bulletin No. 3002-A. Central station power in coal mines. Illustrated, 16 pp., 6x9 in.

Mannesmann Light Co. of America, Inc., 331 Fourth Ave., New York. Catalog. "Manlite" electric safety cap lamp. Illustrated, 20 pp., 6x10 in.

Siebe, Gorman & Co., Ltd., Westminster Bridge Road, London, Eng., H. N. Elmer, 1140 Monadnock Block, Chicago, Ill., agent for North America. "Smoke Helmets, Self-Contained Breathing Apparatus, Resuscitating Apparatus, etc." Fifty-nine pages, 8½x11 in.; illustrated.

CONSTRUCTION NEWS

Scranton, Penn.—Kingsley & Wescott have been awarded the contract to erect a breaker in Peckville for the Mid Valley Coal Co. George H. Campbell is president of this new company.

Hazleton, Penn.—After having been in the courts for years, the coal rights at Pond Creek have been sold by the owners to a New York syndicate, which will build a new breaker and develop the tract on a big scale.

Whitesburg, Ky.—The Louisville & Nashville R.R. Co. is reported to have let a contract for construction of a five-mile branch road, to run from the main line of the Lexington & Eastern R.R. at Typo to the coal properties of the Haley Coal Co. and the Virginia Coal & Coke Co. Langhorne & Langhorne, of Richmond, Va., are said to have been awarded the contract, and will begin work at once.

Louisville & Nashville engineers are rapidly locating the Rockhouse Creek branch of the Lexington & Eastern R.R. from Blackey, the new town, up Rockhouse Creek into the rich coal-land holdings of the Mineral Development Co., the Swift Coal & Timber Co. and the Rockhouse Realty Co., all three of which plan development of their property, the work to begin the first of the year. It is expected that a contract is to be let at once for the construction of this important branch, especially from a coal and timber standpoint.

NEW INCORPORATIONS

Peoria, Ill.—The McMasters Coal Sales Co. has been incorporated here, capital $2500, by A. T. McMasters, D. A. Covey and H. C. Seward.

Tuscaloosa, Ala.—Riverside Coal Co., capital $162,000, incorporated by John S. Riegel, of New York, R. K. Miller, of Brownsville, N. Y., and others.

Oklahoma City, Okla.—The Capitol Coal Mining Co. has been incorporated here, with a capital of $12,000, by G. H. Fleece, R. S. Nelson and W. S. Nelson.

Cincinnati, Ohio—The Virginia Fuel Co. is being organized here for the purpose of selling the output of the Long Flame Coal Co., of Stow, W. Va., with mines on Buffalo Creek, Logan County, W. Va. When fully organized, W. J. Pritchard, of Bramwell, W. Va., will be president, and Thomas J. Burke, formerly with the Glen Alum Fuel Co., secretary-treasurer.

INDUSTRIAL NEWS

Walamun, Alta., Can.—The Walamun Power & Coal Co. has opened up a 25-ft. bed of coal of superior quality and will shortly begin shipping.

Parsons, Penn.—Thirty acres of land in Wilkes-Barre and Parsons were transferred by the Delaware & Hudson Co. to the Northern Coal & Iron Co. in a deal made known Dec. 15.

Rington, Penn.—Bennett & Randall, contractors, have completed the great No. 5 reservoir to supply water for the Girard collieries. The capacity is 28,000,000 gal. The work was commenced in May, 1913.

Shamokin, Penn.—The coal house of the Cameron breaker of the Susquehanna Coal Co. was destroyed by fire on Dec. 13. It is believed to have been ignited by sparks from a freight-train locomotive. The loss is estimated at $5000.

Pittston, Penn.—Fire destroyed the E. W. Wing breaker and washery at Port Griffith, near here, on the morning of Dec. 11. The plant was owned and operated by the Pennsylvania Coal Co. The blaze entailed a loss of over $800,000 and put 2500 men and boys out of work.

Jackson, Ohio—The Detroit, Toledo & Ironton Ry. Co. has placed an embargo on all shipments of coal from West Virginia over the Chesapeake & Ohio R.R. and the Norfolk & Western R.R. This was done because of congestion at the transfer points, due to lack of equipment of the Detroit, Toledo & Ironton.

Philadelphia, Penn.—The Old Lick Run Coal & Coke Co. of this city has accepted an order for 250,000 tons of coal for delivery to South American ports, subject to the outcome of a conference to be held in London, looking to a satisfactory adjustment of credits for American coal exports in the South American markets.

Cincinnati, Ohio—The H. T. Hackney Coal Co., operating mines near Knoxville, Tenn., has changed its corporate name to the Superior Coal Co., a change in control of the company being responsible for the new name. It is announced, however, that no change in mining connections or in the selling branch here, in charge of H. L. Smith, will be made.

West Liberty, Ky.—The largest cannel coal territory in the world has been opened up by the Morehead & Norfolk R.R., which has just completed a tunnel through the mountains, intersecting the waters of Elk Fort and Straight Creek. The Continental Coal, Land & Lumber Co. has purchased a large part of this area and will begin development operations at once.

Hazard, Ky.—R. T. Hoskins and S. H. Means, of Bluefield, W. Va., have leased a good boundary of coal lands on Buffalo Creek, immediately above here, and announce its early development, the initial work to begin Jan. 1. A contract for the building of 250 houses has been let, and simultaneously with this work the mines will be opened. At least 300 men will be given work at the start.

Shickshinny, Penn.—Because two electricians' helpers were discharged when they refused to do the work of master workmen, 1200 employees at the Moconaqua colliery of the West End Coal Co. went on strike Dec. 13, and the colliery will be shut down until the grievance can be adjusted. The colliery employees contend that the two helpers were forced to perform work that requires a master electrician and that the apprentices were right in refusing.

Washington, D. C.—Formal announcement of successful naval tests of coal from government-owned Matanuska fields in Alaska was made Dec. 14, by Secretary Daniels, before the naval committee of the House. Trials by the cruiser "Maryland," Mr. Daniels said, had determined that the Matanuska coal was as good as any to be found and pointed the way to an adequate supply of fuel for the Pacific coast as soon as transportation facilities are available.

Lexington, Ky.—Charles Swetner, vice-president of the East Jellico Coal Co., has announced that his company has contracted for sale to the Russian government of 50,000 tons of coal to be delivered at Odessa, on the Black Sea. The company, which has mines at Shaffer, Ky., and Bluefields, W. Va., will ship from Bluefields. Mr. Swetner said that he did not think this coal would be contraband, as it was to be used for commercial and domestic purposes.

Hemphill, Ky.—White L. Moss, M. J. Moss and others, of Pineville, Ky., have just leased a large coal-land tract on the Yount's Fork branch of the Lexington & Eastern R.R. near here, from K. S. Potter, and make the announcement that development of the property will be begun soon after the first of the new year. White L. Moss will be general manager. The company will have a daily output of about 1200 tons from the beginning, and the plant is to be electrically equipped.

Lansford, Penn.—The Lehigh Coal & Navigation Co. has been experimenting with a new device manufactured by the American Concentrator Co., that automatically reduces the quantity of coal in the slate discharge. This apparatus has been in operation on a Joplin jig at the Greenwood washery for over a month, with marked success, and will be attached to the other jigs in the washery as well. Before the device was adopted the jig-runner was forced to watch the discharge continually and put his hand in the water to ascertain the height of the slate. This was trying, especially in cold weather. With this apparatus the action is entirely automatic.

Coal Trade Reviews

General Review

Cold weather creates a sharp advance in anthracite though the wholesale market continues heavy. Bituminous operators still pushing vigorously for business. What few changes there are seem to be of a constructive nature.

The first severe cold snap of the season appeared at the beginning of the current week, creating great activity in retail circles the effects of which were felt in the wholesale business though mining operations have not been increased as yet. The change has come just in time to avoid a severe slump in the market, and even now it will take some little time to clean up the excessive accumulations and put the trade on a firm basis. The Lake movement to the Northwest has been fully 20% less than last year, but the upper Lake ports are well supplied, partly because of the heavy stocks carried over from last season. The mines continued on curtailed running schedules this week, but full time operations will probably go into effect next week.

The heavy storms of last week, resulting in the complete loss of some vessels and long delays to all the others, has created a temporary stringency among bituminous consumers dependent upon regular and continuous shipments, which has afforded an opportunity for the agencies to urge additional tonnages upon buyers. However, the technical position of the market continues on the same unsatisfactory basis with operators vigorously pushing for business. While occasional plants are working full time on war orders, it cannot be denied that the New England trade as a whole is doing scarcely better than two-thirds the normal business. Ocean frieghts on export shipments continue at the same high level, or higher, with the result that there is still less being done in this direction though rates are somewhat easier to the West Indian trade where return cargoes of sugar will soon be available.

Considering the adverse effects of the final and complete elimination of the Lake business, operations in the Pittsburgh district continue relatively strong, but there is still an absence of inquiry on new contracts, and the circular is not well defined. There seems to be less disposition to buy ahead than in former years, but what little change there is, seems to be of a constructive nature. It is generally agreed that most concerns are running on light stocks.

The colder weather has created a better tone in Ohio, and the producers are showing less tendency to crowd the market at the prevailing low prices. Expiring contracts as a rule, are not being renewed, buyers covering their immediate requirements in the spot market, the tendency being to hold off until after the first of the year on any new business. In the Southern markets the domestic demand seems somewhat better at the moment, though prices are substantially under the circular as compared with steam coal which is holding close to the regular schedule; collections are bad.

In the Middle West the colder weather has started the most important movement of the year, and shows indications of a still more active demand for the domestic grades in the near future. Screenings continue to lead the market. With winter weather conditions now in effect there will be a strong, healthy undertone through the market, but negotiations will generally be delayed until after the first of the year.

ATLANTIC SEABOARD

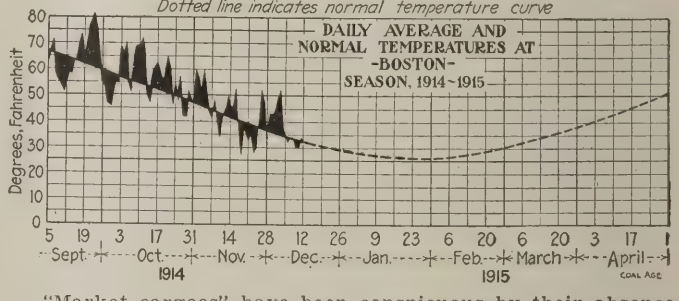
BOSTON

A slight spot demand for Pocahontas and New River, but f.o.b. prices unchanged. No let-up in anxiety to move coal. Pennsylvania grades still meet with only scattering demand. Slightly better call for anthracite, although independents still make concessions on slow sizes.

Bituminous—There has been some interest this week in spot coal on the part of buyers, but it has been due to the weather conditions and the slow movement of transportation along the coast. Cargoes have been held up by fog and storm for ten days or a fortnight in some cases, and some few of the consumers, dependent on an uninterrupted supply, have been pinched for coal. If general market conditions were not so dull and flat this would hardly be noticed but it is eagerly used by some of the shippers to induce contractors to accept deliveries a little faster.

The weather is now more seasonable; the Kennebec River has frozen over, and the trade is beginning to settle down to winter conditions, even though accumulations at the Hampton Roads terminals are as large as ever. No contracts of any moment have been placed since last report and there is nothing new on prices; $2.85 continues the nominal basis, but such sales as are made are well down to $2.70 or less.

Pocahontas and New River shippers are vigorously canvassing for business, spot and future, but it will be several months before New England buyers are interested unless there is a marked change in industrial conditions. Scattered plants, mostly textile and shoe, have large foreign orders that keep them running at full capacity but by far the larger number of mills and factories are on two-thirds time. In the spring these interests contracted for a normal tonnage of coal and hence it is that stocks everywhere are large.



"Market cargoes" have been conspicuous by their absence during this after-storm period and those now arriving will probably command slightly higher prices. It depends, however, on the volume of coal whether on-car prices at Providence and Boston will show a material advance. Portland was actually short of steam coal this week until an over-due steamer arrived.

The steamer "Carolyn," lately a coastwise collier, was chartered to take cotton from Savannah to Bremen, Germany.

The storm interfered with receipts of Georges Creek in this territory and it will probably be several weeks before the shippers catch up with their orders.

The better Pennsylvania grades continue only in light demand. Prices are at a minimum level, with operators holding their output down to what the market will absorb. All-rail the movement is slightly better but at Tidewater the demand is still only scattering.

Anthracite—There has been a little start in the local demand for anthracite, but it is of a hand-to-mouth character. The retail dealers feel it is easy to get coal forward on short notice and they are not trying to be forehanded. The shipping companies are able to load all sizes promptly, so much so in fact, that independents are offering egg and chestnut at 25@50c. below the circular.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.45	$1.15@1.55	$1.67@1.77	
Philadelphia*	2.10@2.70	2.40@2.80	2.92@3.02	
New York*	2.40@3.05	2.70@3.15	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.50@2.75
Boston†	.....	.....	.....	3.48@3.78
Providence†	.....	.....	.....	3.43@3.73

* F.o.b. †On cars.

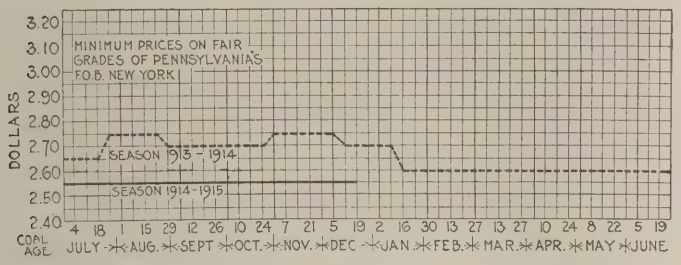
NEW YORK

Bituminous buyers still indifferent. Some preliminary negotiations on new contracts. Severe cold weather checks the decline in anthracite. Retail trade active.

Bituminous—Buyers continue indifferent and the trade is still awaiting some new developments, such as a general reawakening of industrial activity. The usual slowing up that always marks the holiday period is already being felt and no great activity is anticipated now until after the first of the year. The bunkering trade does not seem so heavy at the

moment, and mine operations continue on about the same basis, that is, 60 to 65% capacity.

The embargo put into effect at South Amboy last week was raised on Thursday of the same week, but with the appearance of severe cold weather it is not unlikely that it will be reëstablished. When the embargo was originally declared, it is reported that all of the sidings on the Pennsylvania R.R. were practically choked up with coal, most of which was said to belong to the Berwind-White Co. While the embargo was essentially due to the delayed water movement, due to the heavy storms, it was probably somewhat aggravated by the reduction of the train crews on the railroads, which is in line with their general curtailment policies.



Negotiations on new contracts are not yet under way, but tentative figures are being made at the same level as last year; it seems doubtful at present if these will hold, and it is probable that concessions of 5 to 10c. per ton may be found necessary. A few cargoes of demurrage coal can occasionally be picked up at low figures, but as a rule this has been well cleaned up and the nominal market continues essentially on the same basis, as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The first really severe weather of the winter appeared the early part of the current week and undoubtedly saved the anthracite market from a more or less complete demoralization. So far the effect has not extended beyond retail circles, but there is great activity in that branch and dealers are particularly well pleased that the buying movement was started before the snows made deliveries slow and expensive. It is not to be expected that the change will affect mine operations immediately, but the importance of the weather on the anthracite market is generally recognized by all, and the trade is watching temperature conditions with a critical eye.

There is no change of importance noted in the wholesale situation as yet. Reductions are still necessary to move egg coal, while stove is plentiful in all directions and can now be obtained at 10c. under the circular. Nut and chestnut are about the only sizes in any demand at all at the present time. The steam grades continue in the same rut as for the past several weeks. Mine operations were still curtailed during the current week, but a continuance of the low temperatures will soon necessitate full-time schedules.

We continue the market quotations on the same basis as last week, with the exception of stove coal, which is 10c. lower, as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.00@5.35	5.30	4.80@5.30
Stove	5.35	5.25@5.35	5.30	5.20@5.30
Chestnut	5.60	5.45@5.60	5.55	5.40@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.50@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.35@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

BUFFALO

Bituminous gaining slowly. Slack doing better than sizes. Weather too mild for an active anthracite trade. Lake season ended.

Bituminous—What little change there is in the situation seems to be in the direction of an improvement. Slack is selling freely and promises to be strong, in the near future; there is less surplus than usual which will be noticed as soon as the Lake business is out of the way and the trade settles down for winter business.

Canada, which has taken little coal for the past year, will probably start up soon, as they have large orders for goods for the British army; our factories are also feeling a decided improvement in the same direction and it looks as if the industrial depression might soon be over. There seems to have been less disposition to buy ahead than for some time; it is also well known that the railroads have light stocks everywhere and should they start buying there would be a lively rush for coal.

There are some good contracts offering now and the report is that quite as good prices are in prospect as were obtained a year ago. Current prices are slightly stronger, on the basis of $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. Only best grades bring these prices, but the market is much less demoralized than it was during the fall.

Anthracite—The market is quiet, but with the return of winter weather the demand is stronger and the trade will soon show increasing activity. The surplus of egg coal continues, but the demand for stove and chestnut is not so strong as in former years.

The Lake season closed with a total shipment of 4,286,226 net tons. The amount for the previous season was 5,133,696 tons, which was the largest on record. As a rule the shippers were satisfied with the amount sent forward, most of them closing down before the Lake fleet was all out of the market. On account of the excess of egg some of the companies have taken considerable tonnage for immediate loading to hold during the winter. Three or four cargoes are already loaded.

PHILADELPHIA

Cold snap causes additional demand for coal. Collieries operating more freely. Bituminous about the same as last week, although there seems to be a better feeling in the trade.

Anthracite—The cold snap the early part of the current week caused an increased demand for coal from the retailers, which was naturally reflected in the requisitions on the wholesalers. Operations were much curtailed last week, some companies suspending two or three days, and it will require more than a week of cold weather to place the trade on a normal basis. All the dealers seem to have ample stocks, and they are rather chary about selling to everyone that comes along.

There is no doubt that the industrial depression has had an unusual effect on the demand for coal. Dealers are sometimes pressed with requests for coal, but when the question of credits comes up, the order is in many instances turned down; credits have been closely scrutinized during the last year or two, as many of the dealers have suffered heavy losses. Prices at retail still continue at $7 for egg, $7.25 for stove and $7.50 for nut, notwithstanding the implied threat on the part of the retailers to advance quotations 25c. all along the line. Pea coal retails at $5.50 per ton.

Prices at Tidewater remain about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	4.75@4.85
Stove	5.00	5.10
Chestnut	5.25	5.25

Bituminous—The cold weather is likely to cause a temporary improvement in the demand for soft coal, but the general apathetic condition of the trade still continues. Here and there better reports are heard, but, taking the situation as a whole, no improvement is noted.

BALTIMORE

Bituminous still on unsatisfactory basis. Colder weather stimulates some interest. Anthracite livens up a bit.

Snow, sleet and freezing weather in many sections of Maryland, West Virginia and Pennsylvania have affected the situation materially. Much of the coal arriving at tide was weather bound, and the rail movement was more intermittent also, though there was no scarcity of fuel at any time.

West Virginia fuels are offering at from 75 to 90c. The call for three-quarter gas has continued particularly poor. Pennsylvania low-grade coals were offered freely around 90c. to $1, with medium to best grade at from $1.10 to $1.35. Western Maryland steam coals are in poor demand and were quoted at the mines around 85c.

Local dealers report a better demand for hard coal, the market being regarded as a strictly weather affair. Steam grades are still decidedly lacking in strength.

A marked increase in the number of export charters has given hopes that the December total for foreign movement might be considerably better than has been expected. Coastwise shipments, except in company-owned or long-term chartered vessels, remained dull and featureless.

Contract renewals that come into the market at this time are being taken up generally on about the same basis as last season. There may be some cutting in larger amounts, but the trade as a whole is standing firm behind its former figures despite the depressed state of the market.

HAMPTON ROADS

Demand continues light on all grades. Heavy weather has interfered seriously with coastwise movement.

Dumpings at Tidewater are hardly coming up to expectations. The severe storms have interfered to some extent with all classes of vessels. Steamers loaded for Northern

ports last week should be back for new cargoes now but have been delayed in passage both ways; this has, of course, caused some falling off in dumpings at the various piers, and to date the total tonnage at all piers is probably less than last month. Coastwise shipments, as usual, have gone principally to New England ports although there has been a small movement to Charleston and Jacksonville.

Circular prices are being maintained even though the demand on all grades is light. The accumulation of cars in the railroad yards is still above normal and while a few shippers are short of coal, others have a large surplus. The accumulations are mostly due to the weather conditions, and it is expected that this will clear up shortly.

Clearances during the interval, Dec. 8 to 11, were as follows:

Vessel	Destination	Vessel	Destination
Harewood	Genoa	Posteiro	Pernambuco
Finn	Gibraltar for orders	Stephen	Para and Manos
Atlantide	Porti Ferrajo, Italy.	Tibagy	Rio de Janeiro and Pernambuco
Hermod	Canal Zone	Fanny	Buenos Aires
Bjorn	Santiago		

OCEAN FREIGHTS

Rates continue advancing and American operators are practically excluded from foreign markets. West Indian situation easing up.

The freight market continues to advance. Owners seem to be able to secure about any rates they ask on grain, cotton, general cargo and time charter trades. There is little business in export coal, as Americans find it difficult to compete with Cardiff at the present differential in rates.

Two large sailing vessels have been chartered for coal (one from Norfolk and the other from Philadelphia) to Rio at $5.50 U. S. gold per ton. Steamers can be secured at fairly favorable figures for Cuban and West Indian trades, as these cargoes combine with Cuban sugar home, which will soon commence to move.

To	Rate	To	Rate	To	Rate
Havana	$1.70@1.80	Kingston†	$1.85@2.00	Tampico	$2.25*
Cardenas††	1.90@2.10	Curacao	1.75	Rio	5.52@6.00
Cienfuegos	2.00@2.25	Santiago	2.00@2.10	Buenos Ayres**	5.40@6.00
Port of Spain	2.25@2.50	Guantanamo	2.00@2.10	Mediterranean	7.20
St. Lucia	2.25@2.50	Demerara	3.00		
St. Thomas	1.80@2.00	Bermuda	2.00@2.10		
Barbados	2.25@2.50	Vera Cruz	2.25*		

*About. †Small boats to Kingston $2.00@2.10. **Or La Plata. ††Or Sagua.
W. W. Battie & Co.'s Coal Trade Freight Report.

COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Haugarland	Norwegian	Virginia	Italy	2718	
Ortrud (bark)	Italian	Virginia	Italy	1402	
Edith		Philadelphia	Charleston	1051	
Wm. E. Downes		Baltimore	Mayport	629	
Oceania	Italian	Philadelphia	Italy	2717	
Primo	Italian	Philadelphia	Italy	2245	
Timandra (ship)		Norfolk	Rio Janeiro	1487	$5.50
Francis Hanify		Atlantic Range	San Francisco	1084	4.95
Olson & Mahoney		Atlantic Range	San Francisco	799	4.74
William C. May		Philadelphia	Jucar	607	2.00

Note—Steamers are indicated by **bold face** type, all others being schooners.

OHIO VALLEY

PITTSBURGH

Operations continue at under 40% capacity, with demand no better except in domestic, which has been favorably affected by a cold snap. Prices very irregular.

The general demand for coal has reflected no improvement to speak of, and mine operations continue very light, averaging less than 40% of capacity. Considering, however, that the Pittsburgh district always suffers a severe curtailment after the close of the Lake shipping season, even when general demand is good, the condition is not as distressing as might otherwise be assumed. Railroad demand is probably not much over 60% of normal, while demand from manufacturers, almost wholly against contracts, does not seem to be more than 40% of normal. Domestic demand has experienced a further improvement this week, there having been a heavy snowfall Sunday, accompanied by a drop in the thermometer to the twenties while by Tuesday morning the zero point was touched.

Prices continue irregular for free coal, and there being no inquiry to speak of for contract coal the operators have no fixed schedule. Slack is fairly firm at 80c., but otherwise the following quotations represent little more than the level from which cutting begins, though some operators are holding firmly to these or higher prices, and booking correspondingly little business: Slack, 90c.; nut and slack, $1; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district. The prices on screened coal are to consumers, dealers being usually given a concession of 10c.

COLUMBUS

Colder weather again stimulates the domestic trade and a better volume of business is expected. Demand for small sizes is increasing. Steam trade continues dull.

The lower temperatures have had a stimulating effect on the local trade. While the increased volume of business is slight, it has given a decidedly better tone to the market. The domestic trade was affected more than any other department, the steam business still being dull and there is little hopes for immediate improvement.

Prices are no better and it will require several weeks of the increased business to have any effect upon quotations. Prices still continue a little under the circular which is still in force. The small sizes are the only ones showing an advancing tendency, nut, pea and slack and coarse slack all being stronger.

The steam trade is dull in every way and there is little hope for improvement in the immediate future. Manufacturing has not been greatly affected by the large number of war orders which are said to have been placed here. Railroads are not taking any large amount of coal. Buying is still being done on the open market where contracts have expired.

Dealers' stocks are not large as a rule, although there are a few exceptions. Collections are still bad which is affecting orders from the dealers. Prices in retail circles are fairly strong despite the weakness in other lines.

Production in Ohio fields has been on the following basis: Hocking Valley, 60% normal; Pomeroy Bend, 75@80%; Crooksville, Cambridge, and Jackson, 60% of the average.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.55	$1.65	
Inch and a quarter	1.50	1.55	$1.40
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.10	1.15	1.10
Nut, pea and slack	0.60	0.60	0.55
Coarse slack	0.50	0.50	0.45

TOLEDO

Toledo trade brisk and prices firm. Orders coming in better and the trade more hopeful.

The weather conditions have greatly stimulated the domestic trade and dealers are much more hopeful. Orders are coming in well and prices are holding firm. There is practically no coal on track. The docks are cleaned up also, being left in better shape than is customary. The Lake shipping is now over for the season. Orders are coming in well both for domestic and steam coal and dealers are optimistic over the outlook.

CLEVELAND

The retail trade active due to the colder weather. The effects not yet felt by jobbers and operators. The market firm, but not active.

Slack is being held at 5c. above last week's prices in most instances, but coarse coal is selling at anything it will bring; this is due to West Virginia No. 8 operators selling three-quarter coal on consignment. This coal has been coming into the market when it was the weakest and though only 15 to 20 cars arrive at one time, it has kept other fuels at below cost. Some of this No. 8 has been sold in competition with mine-run.

The tone of the slack market is shown in the prices asked for Hocking. Ohio slacks are firm at $1.65@1.70 on track here while Fairmount is being sent to other markets and Pennsylvania coals are too high priced to compete here. Youghiogheny is being sold at 80 and 85c. at the mines.

No more coal will be loaded into vessels for delivery this season. The steamers "Rees," "Yosemite," "Sonora," "Capt. Thomas Wilson," "H. W. Oliver," and the "W. H. Wolf," left Lake Erie ports for Milwaukee on Friday and Saturday of last week. The "Wolf" was a week late in reporting for her cargo at Cleveland and the "Rees" was two days ahead of her schedule at Lorain. A block of 500,000 tons of soft coal, for delivery at Superior next season, was placed with a local vessel company last week at 30c., the same rate that prevailed this season.

Prices for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.35	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.35	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1½ in.	.....	$2.40	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$1.95@2.00	$1.95@2.00
Mine run	2.55	2.25	1.95	1.85@1.90	1.90
Slack	2.40	1.80@1.85	1.70@1.75	1.85@1.90	1.80

CINCINNATI

A week of colder weather has improved the demand and better prices are in evidence. Contracting continues slow, but the tone of the market is more favorable, and operators are less inclined to push for business.

Real winter weather, with considerable snow for the first time this season, has created some activity in the trade, particularly the domestic market. Retailers are buying more readily, although not in large quantities. Prospects seem good for better prices and operators are less inclined to crowd sales at current figures.

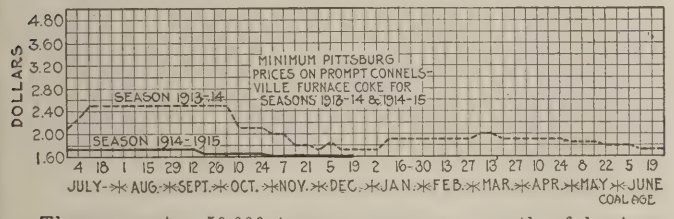
Contrary to expectations, there has been comparatively little buying on contract, because of the continued dullness in most industrial lines. The tendency is to wait for new developments until after the first of the year. Improvement is noticeable in the iron and steel trades, indicating that conditions may be better shortly. A large volume of river coal is expected in this market shortly, which will give considerable relief to handlers of this grade, whose supplies are almost exhausted.

COKE

CONNELLSVILLE

Furnace coke contracting under way, with about 100,000 tons a month closed, 50,000 to 75,000 tons under inquiry, and 50,000 tons or more not heard from. Prices steady and unchanged. Production and shipments partially recovered from the holiday week.

Contracting for furnace coke for next year's requirements has continued active. In last report the contracts closed were summarized as involving 50,000 tons a month, and since then additional contracts have been closed making the total 90,000 to 100,000 tons a month, first-half contracts predominating, full year contracts coming next, with two contracts closed for two years and one for a quarter only. About two-thirds of the business has been at flat prices, particularly that most lately closed, at $1.65 to $1.70 for the quarter, about $1.70 for the half-year, and in exceptional instances at $1.75 for the second-half. In one case $1.65 was done for first-half and $1.75 for second-half, but this is considered exceptionally low. Inquiry now out totals 50,000 to 75,000 tons, and most of this business is likely to be closed shortly.



There remains 50,000 tons or more per month of business now being filled on contracts, expiring at the close of this month with consumers who have not put out fresh contracts, while there is of course a much larger quantity of possible consumption involved in furnaces now idle that may resume next year, but cannot contract for their possible requirements now. The operators would not think of selling at present prices to a furnace that would only resume in case conditions improved. Foundry coke is very quiet. The annual contracts generally run from July 1 to June 30. We quote: Prompt furnace, $1.60; contract furnace, first-quarter, $1.65@1.70; first-half, $1.70; prompt foundry, $2@2.20; contract foundry (nominal and for best grades), $2.35@2.50, per net ton at ovens.

The "Courier" reports the production in the Connellville and lower Connellsville region in the week ended Dec. 5, at 195,575 tons, an increase of 16,136 tons, and shipments at 196,157 tons, an increase of 19,408 tons. These increases, however, merely represent a partial return to the rate obtaining prior to the previous week, when the Thanksgiving Day holiday cut into production and shipments.

BUFFALO

The demand for coke has not improved and there is no stir in prices. If the reports of orders for steel manufactures from Europe continue there will be an increase of demand after a little, but such reports usually need confirmation. It is felt that the up turn cannot be far away and some of the idle smelting furnaces here are starting up. Coke prices are still based on $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

BIRMINGHAM

There is absolutely nothing new in the coke market.

CHICAGO

The coke trade has improved. A number of contracts have been renewed, and large shipments are being made on old engagements. Byproduct coke is about the same, being influenced by the domestic trade demand. Current quotations are as follows: Byproduct, $4.75@4.95; Connellsville, $4.75@$5; Wise County 72-hr. (select), $5; gas coke, $4.50@4.75; furnace coke, $4.50@4.75.

ST. LOUIS

There is practically nothing doing on foundry coke, and not much anticipated until the railroads begin to get in the market for supplies. A small amount of byproduct coke is coming in, chiefly for domestic purposes, and the local gas house coke is moving slow; some of the latter is being shipped out of the city, but not to any extent.

THE STEEL INDUSTRY

Slowing down over year end but some buying ahead. Expectations of a wage cut.

Buying of finished steel for the first quarter of 1915 has increased somewhat, but it is evident that December will not put on the books the volume of new business needed for a strong revival of mill operations after Jan. 1. The last two weeks of the year, from all signs, will take their usual quiet course.

The possibility of wage and salary reductions at the beginning of the year is again having attention, since it became known that no stock offerings to employees will be made by the Steel Corporation, and with the expectation that there will be no bonus distribution. Counting against wage reductions are the improvement in financial and security markets and the better railroad buying looked for after the generally predicted advance in Eastern freight rates. On the other side are the poor balance sheets of the year and the indications that profitable iron and steel prices are some months distant.—"The Iron Age."

SOUTHERN

BIRMINGHAM

Steam and lump grades continue quiet. Blacksmith coal improving.

The past week has shown little change in the lump coal market, though the movement may be slightly better. Steam coal is in some better demand, but the increase can hardly be noted. Prices on lump coal are about 50c. under the schedule, while steam coal is only slightly under the regular circular. Blacksmith coal is increasing in tonnage, with prices the same. The furnaces report a heavy sale of pig-iron covering the first half of 1915.

LOUISVILLE

Steam market shows some improvement and there is none on demurrage. Domestics continue heavy and collections are slow.

An improvement in the steam coal market is the most notable event in the Kentucky field this week. For the first time in a long period there is little or no steam coal on demurrage and orders are more plentiful. The domestic market has not shown a great deal of improvement in spite of the cold weather.

Though a large proportion of the eastern Kentucky mines are closed down, others are running better than the western Kentucky operations, which are doing only about two days a week. Highest grade block coals are bringing from $1.75 to $1.90 f.o.b. mines, with prices ranging downward on all other grades. High grade nut and slack commands from 50 to 60c. and the poorer grades from 25 to 40c. f.o.b. mines.

MIDDLE WESTERN

CHICAGO

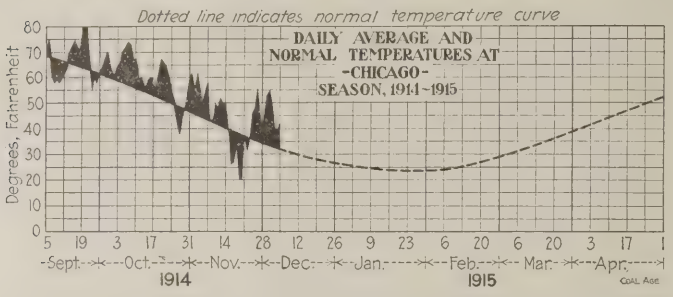
Seasonable weather lends encouragement, but prices for domestic coals are irregular. Householders buying only sufficient for immediate needs. Screenings strong. Anthracite steady.

Colder weather has again appeared and indications point to a more active demand for domestic sizes. The tendency in screenings is still upward, and prices have reached the highest level for several months past; some screenings have been sold at 80c., and the average price has been around 70c.

It is freely predicted that a continuation of present conditions will see screenings averaging from 80c. to 85c. per ton in a short time; this is due to the increased demand and the curtailment of output.

The improvement in domestic demand is slight, although the cold weather has increased the buying. Householders continue to purchase only current requirements, which has had its effect on the retail yards. The Central West is now covered with snow, and it only needs the continuation of wintry weather to give a healthy tone to domestic and coarse sizes.

In anthracite there has been a shortage of chestnut coal in this market which has been overcome the last few days by increased shipments. The demand for stove and egg is about equal to the receipts; prices are holding steady at circular quotations.



The Sullivan County and Clinton district mines in Indiana are shipping most of their domestic coals to the local trade at fair prices, and are disposing of their screenings at an increase of 5c. to 10c. per ton over the prices of last week.

In Franklin County there has been a recession in prices except for screenings, and very few of the operators are receiving circular figures for domestic coal. The variation in prices is wide, and shipments of coarse coal have been accumulating at the mines awaiting disposition.

Smokeless lump and egg is in good demand, but there is practically no call for mine-run.

Little activity is shown in splint coals, and prices average 25c. to 35c. below the list.

A slight improvement is reported in prices for Hocking coals owing to the decreased production; demurrage coal has all been absorbed.

Carterville grades are steady, and operators in that field are making an absolute minimum of $1.60 for No. 1 washed coal, while most of the sales are at $1.75.

In the Springfield district the mines have been operating steadily and screenings are particularly strong. Some of the mines in this district are shipping egg and nut coal to the steam trade at the same price prevailing for steam lump fuel.

been a little short of hopper cars. Mine-run coal is still selling low, at $1 to $1.10 in the open market.

Retail prices continue unchanged from the mid-September schedule which is less than the usual winter level. There is apparently some disposition to force sales. One of the local companies had a bargain day, Monday, by offering 2000 tons of best Indiana lump at $2.50, the general price being $3.25. This undersold by 25c. a ton, the furniture installment house that is offering it to its customers and "friends."

ST. LOUIS

Colder weather has started some coal moving and the situation is slightly better. Screenings slowing up. Conditions expected to be quiet till after the first of the year.

There has been a slight improvement as a result of a few days of cold weather, the first this season. It did not last long enough, nor was it sufficiently severe to create a demand that would start domestic sizes upward, but it stimulated interest to such an extent that some coal began to move. It also stopped the advance in the screenings market. All sizes from No. 3 down are in good demand from all fields. The washed market is improved on the larger sizes, but otherwise conditions are much the same.

Anthracite is still slow. Winter weather is expected from now on, and this will help the market to assume a steadier tone. No great rush is anticipated before the first of the year, as the holiday season is always slow.

The prevailing wholesale prices are:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.25	$0.95@1.10	$1.20
3-in. lump	.....	....	1.30@1.40	....	.....
6-in. lump	$1.25@1.60	....	1.40@1.50	1.20@1.25	1.40
Lump and egg	1.85@2.15	$2.25	.....	....	1.35
No. 1 nut	1.20@1.40	....	.....	0.90@1.00	.....
Screenings	0.50@0.55	....	0.80@0.85	0.50@0.60	0.20
Mine-run	1.00@1.10	....	.....	0.85@0.90	.....
No. 1 washed nut	1.50@1.60	2.00	1.60	....	.....
No. 2 washed nut	1.30@1.40	....	1.45	....	.....
No. 3 washed nut	1.15@1.25	....	.....	....	.....
No. 4 washed nut	1.10@1.15	....	.....	....	.....
No. 5 washed nut	0.50@0.60	....	.....	....	.....

KANSAS CITY

Colder weather has increased the consumption. Prospects that Jan. 1 will see prices advanced.

The first real winter weather of the season has appeared and the dealers are at last commencing to move the coal stocked in September. A slight scarcity of slack is noted, due to the increased consumption, combined with the small production of block coal and the consequent short supply of slack. Illinois coal is still off; many dealers have cars standing on track, but these will probably be moved under present winter conditions. Kansas and Missouri coals are rapidly stiffening up and salesmen have been notified to expect a change in prices at any time; Oct. 1 price lists are still in force.

PRICE QUOTATIONS IN THE CHICAGO MARKET

	Franklin Co.	Springfield	Harrisburg	Sullivan	Clinton	Carterville	Green Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump	$1.50@1.75	$1.50	$1.50@1.75	.....	$1.50@1.60	$1.50@1.75	.....	$1.50@1.75	.....	.....	.....
4-in lump	.....	.....	.....	$1.50@1.60	.....	.....	$1.50@1.35	.....	.....	.....	.....
Steam lump	.....	.....	.....	.....	1.15@1.20	.....	.....	.....	.....	.....	.....
2½-in. lump	.....	.....	.....	1.50	.....	.....	1.30@1.40	.....	.....	.....	.....
1¼-in. lump	.....	.....	.....	1.20@1.35	.....	.....	.....	.....	.....	.....	$1.40@1.50
Lump and egg	.....	.....	.....	.....	.....	.....	.....	.....	$2.25	$2.25	.....
Mine-run	1.15@1.25	.....	1.20@1.30	.....	1.10	.....	1.10	.....	1.25@1.40	1.25@1.40	1.25
Egg	1.40@1.50	.....	1.50@1.75	.....	1.50	.....	.....	1.35@1.50	.....	.....	.....
No. 1 washed	.....	.....	.....	.....	.....	1.50@1.75	.....	.....	.....	.....	.....
No. 2 washed	.....	.....	.....	.....	.....	1.25@1.35	.....	.....	.....	.....	.....
6x3-in. egg	.....	1.35	.....	.....	.....	1.40@1.50	.....	.....	.....	.....	.....
Nut	.....	1.30	.....	.....	.....	.....	.....	.....	.....	.....	.....
No. 1 nut	1.35@1.50	.....	1.40@1.75	.....	.....	.....	.....	.....	.....	.....	.....
No. 2 nut	1.25@1.40	.....	1.35	.....	.....	.....	.....	.....	.....	.....	.....
Screenings	0.70@0.80	0.65@0.75	0.75@0.80	0.70@0.80	0.70@0.80	.....	.....	.....	.....	.....	.....

INDIANAPOLIS

Colder weather and slightly increased factory operations have helped both the domestic and steam coal movement. Slack selling at about normal prices. Mines making better running time.

There has been a week of temperature below freezing which has stimulated the movement of domestic lump and there are also indications of industrial improvement, especially at Chicago. The colder weather has increased the consumption of steam grades about 10%. The mining companies have no trouble to dispose of their surplus screenings on the open market at 75c., which is about a normal price for December.

Operations at the mines are fair, one company working four of its mines on full time and the other three four days a week. Still the operators contend that the trade is dull in spite of the fact that all the mines in the state are probably making an average of four days a week. The railroad facilities are generally satisfactory, although some companies have

SAN FRANCISCO

Foreign shipments being resumed now that the German fleet has been disposed of. Colder weather stimulating local business.

Shipping is now picking up, with the announcement of the annihilation of most of the remaining German squadron which has menaced shipments of coal to this country for several months. On several occasions they held up vessels and took off what coal they needed as was the case with the steamer "Sacramento," flying the American flag. Many of the South Sea Island towns were shelled and destroyed by this fleet. Several of the sea-fighters were in this harbor at various times to take on supplies, making use of the 24-hr. privilege.

Weather the past two weeks has been very cold and there has been an increased demand for domestic and steam coal. Dealers throughout the city are sanguine of steady business for several months to come. Quotations still remain normal, the latest quotations being $6.50 for steam coal and $7.50 for domestic.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable, in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

Contract No. 22—Philadelphia—The date for receiving bids on this contract (pp. 933, 972) has been extended until Dec. 21. Address Director of Supplies, Room 312, City Hall, Philadelphia, Penn.

Contract No. 26—St. Louis, Mo.—Sealed proposals are requested at the United States Engineer's office for furnishing 30,000 tons of coal (see p. 972). All bids must be in by 11 a.m., Dec. 23, 1914. Address B. McD. Townsend, Colonel of Engineers, United States Engineer's Office, Custom House, St. Louis, Mo.

Contract No. 28—Brooklyn, N. Y.—Bids will be received by L. H. Pounds, president, Borough of Broklyn, until 11 a.m., Dec. 23, for furnishing and delivering coal as follows: (1) 9,678,000 lb. of anthracite coal to the various public buildings, baths, courts and comfort stations, Borough of Brooklyn, under Schedule No. 1; (2) 8,586,000 lb. of anthracite coal to the various public buildings, etc., Borough of Brooklyn, under Schedule No. 2; (3) 3,692,000 lb. anthracite coal to the various public buildings, etc., Borough of Brooklyn, under Schedule No. 3. The security required will be 30% of the total bid, and the contract will run till Dec. 31, 1915. Blank forms and further information can be obtained at the office of the Bureau of Public Buildings and Offices, Room 1003, No. 50 Court St., Borough of Brooklyn.

Contract No. 29—Brooklyn—Bids will be received by the Department of Parks until 3 p.m., Dec. 23, for furnishing and delivering coal. The amount of security required will be 30% of the amount for which the contract is awarded, and deliveries will be made until June 30, 1915. Address, Department of Parks, Borough of Brooklyn, or the Department of Parks, Municipal Building, Borough of Manhattan.

Contract No. 30—New York—Bids will be received by the Park Board, Department of Parks, until 3 p.m., Dec. 23, for furnishing and delivering 2,000,000 lb. of anthracite pea coal, No. 1, for the botanical gardens, Borough of Bronx. The amount of security required will be 30% of the total amount for which the contract is awarded and will run over 120 calendar days. Blank forms and other information may be obtained at the office of the Department of Parks, Municipal Building, Manhattan.

Contract No. 31—New York—Bids will be received by the Department of Parks until 3 p.m., Dec. 21, for furnishing and delivering 600,000 lb. of egg coal, No. 1, for the parks in the Borough of Bronx. Deliveries will run over 120 days, and the amount of security required will be 30% of the total amount for which the contract is awarded. Blank forms and other information may be obtained at the office of the Department of Parks, Municipal Building, Manhattan.

Contract No. 32—New York—Sealed bids will be received by the Department of Water Supply, Borough of Manhattan, until 2 p.m., Dec. 21, for furnishing, delivering, storing and trimming coal in the Borough of Queens. The security required will be 30% of the total amount for which the contract is awarded, and deliveries are to be completed June 1, 1915. Address William Williams, commissioner, Department of Water Supply, Gas and Electricity, Room 2351, Municipal Building, Manhattan.

Contract No. 33—Yonkers, N. Y.—The Board of Public Works desires bids for supplying 300 gross tons of steam coal and 60 tons of nut coal, to be delivered at the bath houses; 250 tons of Scranton pea coal to the crematory; 280 tons of egg coal and 10 tons of steam coal to the City Hall Building. Address T. A. Brogan, City Clerk, City Hall Building, Yonkers, N. Y.

Contract No. 34—Newark, N. J.—The Board of Street and Water Commissioners is in the market for 800 gross tons of buckwheat coal. M. R. Sherrerd is Chief Engineer.

CONTRACTS LET

Contract No. 11—Portland, Maine—This contract, which provides for furnishing 30,000 tons of coal to the Portland Gas Light Co. between Mar. 1, 1915, and Mar. 1, 1916 (pp. 814, 854, 892), has been let to the Westmoreland Coal Co. Address Burton Smart, Treasurer, Portland Gas Light Co., Portland, Maine.

Contract No. 18—Brooklyn—This contract (pp. 972, 933, 854) has been awarded to the Bacon Coal Co., at $2.24 per 1000 lb. Address Bureau of Public Buildings and Offices, Borough of Brooklyn, Room 1003, No. 50 Court St.

Contract No. 19—New York—This contract (pp. 972, 892) has been awarded to Gavin-Rowe, at $63,447. Address Auditor, Room 2141, Municipal Building, Borough of Manhattan.

FOREIGN MARKETS

GREAT BRITAIN

Dec. 4—There is no improvement in the general state of the steam coal trade. Owing to the stormy weather, tonnage arrivals are few, and in consequence pit stoppages are more numerous. Buyers in a position to take immediate delivery can obtain substantial concessions, but there are few able to take advantage of the opportunity. For forward loading, values are upheld. Quotations are approximately as follows:

Best Welsh steam	$4.80@5.28	Best Monmouthshires	$3.96@4.02
Best seconds	4.32@4.56	Seconds	3.78@3.84
Seconds	4.08@4.20	Best Cardiff smalls	2.52@2.64
Best dry coals	4.32@4.56	Cargo smalls	1.44@1.80

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage and for cash payment.

Freights—Chartering is fairly active but tonnage is scarce. Rates are aproximately as follows:

Gibraltar	$3.00	Venice, Ancona	$4.92	Singapore	$5.28
Malta	3.24	Alexandria	4.56	Las Palmas	2.76
Marseille	4.06	Port Said	4.80	St. Vincent	3.00
Algiers	4.29	Aden	5.04	Rio Janeiro	4.20
Genoa, Savona	3.90	Colombo	5.16	Monte Video	3.96
Naples	3.72	Sabang	5.04	River Plate	4.08

ITALY

Consolidation Co. has a large contract. Operators must arrange to quote c.i.f. prices.

Naples, Nov. 25—Large quantities of coal have been shipped during the past three months to Italy for use of the Italian Railway and Navy. The Consolidation Coal Co. has closed an important contract as it was able to offer the Italian Railways c.i.f. prices.

A very large business could be secured if American shippers were able to offer coals c.i.f. to the various Italian ports, and the quality naturally must be suitable as regards analysis, which should be as nearly as possible to the following: Volatile not to exceed 20%; sulphur, 1.10%; ash, 5%; moisture, 1%; calories, 7800 (Thomson).

GERMANY

Transportation facilities much deranged by military operations and a coal shortage is developing at some points. Situation particularly acute in Austria.

Upper Silesia—The demand is heavy, exceeding the supply, owing to the lack of cars, chiefly. Transportation to Vienna and the south has been broken, repeatedly. In 1913 over nine million tons of English coal were shipped to Germany, of which two and a half million tons went to ports on the Baltic. This coal was mostly for household use, and was consumed in the cities of northern Germany. How to meet this deficiency is, now, a matter of great concern.

Northwestern Bohemia—Although the pits have more orders than can be filled, the deficiencies in transportation are making it difficult to handle even the smaller production, which is but a little more than half the normal. The pits in Russian Poland which touch this district are in possession of Germany now, and are being operated under German administration.

Berlin—The shortage in household sizes is keenly felt. In 1913, Berlin consumed 1,654,466 metric tons of English coals. Although it would be easy to fill this tonnage from German mines under usual conditions, the problem has become a serious one with the reduced output from the pits, and worst of all, the car shortage. The military operations in the East have hindered the mines from shipping even the lessened production.

Vienna—The municipal authorities have had repeated conferences concerning the winter coal supply. The situation appears to be more acute here than at other centers. The shortage is due in a great measure to the small receipts from Upper Silesia.

Financial Department

The Rocky Mountain Fuel Co.

President D. W. Brown reports for the year ended June 30, 1914, as follows:

The number of tons of coal mined this year aggregated 924,000 tons. The coal handled on brokerage and through retail department aggregated 317,494 tons. The gross earnings were $2,210,322 and the net earnings were $328,743. The combined net earnings for last three years amounted to $1,161,662, or a yearly average of $387,221. The existing strike, although very serious, has not reduced net earnings to the extent generally expected. Normally there had existed a strike in the northern fields for a period of more than four years and the calling of strike in southern field on Sept. 23, 1913, had very little effect in the northern district, and your company was, therefore, able to procure the necessary men to produce a nearly normal tonnage.

INCOME ACCOUNT

Gross earnings, $2,210,322; operating expenses, $1,742,415; general expenses, $139,164; balance, net earnings	$328,743
Accrued interest, $184,140; other items, $63,075; total	247,215
Balance, surplus for year	$81,528

Total accumulated surplus June 30, 1914, $326,941.

BALANCE SHEET JUNE 30, 1914

Assets—Property, equipment, etc.	$12,195,615
Deferred obligations from subscribers for bonds and stock of company, $702,992; less deferred payments on property acquired, $700,000; balance	2,992
Cash, $59,263; accounts and notes receivable, $661,577; total	720,840
Items paid in advance, $12,719; material and supplies, $121,693; total	134,412
Liabilities—Common stock, $4,000,000; preferred stock, $4,000,000; first and refunding bonds, $3,948,400; total	11,948,400
Accounts and notes payable, $619,340; pay checks and pay-roll items, $56,480; total	675,820
Interest accrued, $49,081; taxes and other items accrued, $53,616; total	102,697
Surplus	326,941

Lehigh Valley Coal Co.

Vice-President and General Manager F. M. Chase reports for the fiscal year ended June 30, 1914, as follows:

Results—The total net income, after deducting charges for royalties, sinking funds, depreciation and interest, amounted to $564,859, a decrease of $906,415. This shrinkage is due almost entirely to the restricted demand for anthracite coal as a result of the mild winter. This not only reduced the profits by reason of the smaller volume of business done, but also added materially to the cost per ton of mining such coal as was shipped.

The production of anthracite coal from the lands owned and leased by the company, including that mined by tenants, was 7,877,390 gross tons, a decrease of 982,642 tons. The percentage of sizes above pea produced by our mining operations was 66.46%, a decrease of 2.22%. The Snow Shoe lands in Centre County, Penn., produced 252,731 gross tons of bituminous coal, a decrease of 97,373 tons.

Additions, Etc.—Additions and betterments cost $344,785. The new breaker at Franklin colliery has been put in successful operation. Developments have been continued in order to place the Park colliery on a better operating basis; the unwatering of the old workings at the western end of the property, so that mining can be undertaken in that territory, is under way. Extensive renewals and improvements have been made to Centralia breaker. The new washery at Springdale for the purpose of reworking the culm banks on the Delano lands is now in operation. The shaft at Blackwood colliery has been sunk so that mining can be conducted on a lower level, and, upon the completion of the necessary tunnels and gangways, operating conditions at that colliery will be improved. At all collieries considerable sums have been expended to reduce the fire risks. Prospecting on the Snow Shoe property has demonstrated that there is sufficient coal in the lower or "A" vein to warrant the construction of a plant to mine same, and the necessary construction work is now under way.

Leases—The leases with the Girard Estate at the Packer and Continental collieries expired by limitation Dec. 31, 1913, but were renewed for a further period of 15 years at higher rates of royalty. As soon as the new leases were executed, the construction of a new steel fireproof breaker was undertaken at Packer No. 5 colliery and extensive alterations and betterments at Packer No. 4. Many important underground developments and mining improvements are also being prosecuted. These expenditures will place these operations on a most economical basis, as was necessary because of the high rates of royalty.

New Office Building—The general offices located in rented quarters in Wilkes-Barre have of late years been very inadequate. The company has, therefore, erected a modern office building, of fireproof construction, on North River St., Wilkes-Barre, with sufficient space for both present and future requirements.

Taxes—Our tax assessments have increased heavily in recent years. The taxes for the late year were about 25% greater than in 1912-13. This does not include the special state tax of 2½% of the value of the coal mined. The question of the constitutionality of the law imposing this tax is now before the courts for determination.

Financial—No new capital obligations have been issued and short-term notes given for the purchase of property in prior years have been reduced by $100,000. Sinking fund payments amounted to $111,136. Current assets are $2,543,103 in excess of current liabilities.

PROFIT AND LOSS ACCOUNT FOR YEARS ENDING JUNE 30

	1913-14	1912-13	1911-12	1910-11
Total surplus beginning year	$3,714,239	$3,486,637	$4,864,200	$3,393,443
Net income for year	564,859	1,471,275	1,162,241	1,512,844
Improvements Jan. 1, 1909, to June 30, 1912, originally deducted from income	.....	1,407,917	.....	.....
Total	$4,279,098	$6,365,829	$6,026,441	$4,906,287
Deduct—				
Depreciation of improvements, Jan. 1, 1909, to June 30, 1912	.....	$2,566,240	.....	.....
Appropriations for insurance fund	.....	50,000	.....	.....
Miscellaneous adjustments	$53,413	35,349	$10,924	$42,087
Interest on certificates of indebtedness accrued prior to June 30, 1911	.....	.....	2,528,880	.....
Total	$53,413	$2,651,590	$2,539,804	$42,087
Total surplus end year	$4,225,685	$3,714,239	$3,486,637	$4,864,200

CONDENSED GENERAL BALANCE SHEET JUNE 30

Assets	1914	1913
Property and plant	$24,580,588	$23,700,498
Securities owned	200,000	200,000
Sinking fund with trustees	2,758,523	2,497,031
Advances for coal-mining rights	4,479,461	4,494,778
Insurance fund	122,189	110,547
Cash	2,302,051	1,801,270
Materials and supplies	323,054	424,102
Bills receivable	4,340	4,000
Due from individuals and companies	2,421,815	2,256,713
Insurance and other deferred assets	156,822	72,080
Total	$37,348,843	$35,561,019

Liabilities	1914	1913
Capital stock	$1,965,000	$1,965,000
Funded debt	20,296,000	20,296,000
Audited vouchers	845,650	796,995
Wages due and unpaid	533,847	618,101
Due individuals and companies	22,392	42,244
Royalties on coal mined, due lessors	68,907	62,431
Interest on funded debt due and accrued	413,900	413,900
Deferred real estate payments	700,000	800,000
Miscellaneous	832,389	349,142
Depreciation and other reserve	7,445,073	6,502,966
Profit and loss	4,225,685	3,714,239
Total	$37,348,843	$35,561,019

Note—For previous annual report of this company see Vol. 4, p. 882.

ILLINOIS
29 DEC 1914

COAL AGE

Vol. 6 NEW YORK, DECEMBER 26, 1914 No. 26

Let's Look Forward

Written expressly for COAL AGE
By BERTON BRALEY.

NOW that the old year's almost thru,
Let's start in rightly on the New
With cheerful hearts and faces,
Let's wipe the Old Year from the slate,
With all its woe and war and hate
And all their evil traces;
Let's lift our eyes and gaze ahead
Away from all the past that's dead,
Away from last year's sorrow,
Let us be wise enough to say
"We have forgotten Yesterday,
We're gazing toward Tomorrow."

It's bitter hard to keep your cheer
When through a long and cruel year
You've nearly starved at mining,
When food is high and work is slack
And clouds of gloom are grim and black
And show no silver lining;
And yet these woes of yours and mine
Will not be lighter if we whine,
Grief is a heavy fetter,
So, though things may be looking glum,
Let's smile and take them as they come
And try to make them better!

Let us take heart in spite of dearth,
In spite of war that shakes the earth
It cannot last forever,
With fortitude that will not cease
Let us seek brotherhood and peace
By brave and high endeavor;
Let us resolve that this shall be
A year of progress fine and free,
A good, a kind, a true year,
Let us forget the past that's dead
Lift up our eyes and look ahead
To greet

A Happy New Year!

A Message for 1915

By George Stockdale

AFTER you have addressed your last New Year's card, sit down and address a few resolutions to yourself, but this time don't close the incident with a wish. All your life long you have been hoping that good luck would watch out for you; turn about in 1915 and try to advance yourself; Providence has a bad memory for those who do not help themselves. Fortune does not canvass from door to door—you can be or have as much as your equal if you will labor as hard and manage as well.

There are no limits to the possibility of human will; however, desire is not a creative force. Hope is only an architect—you must build as well as plan. Those who have accomplished the most are not necessarily superior human beings. Man does not perform miracles—he merely achieves practical results through earnest application.

In every community there are a few persons who think clearly, cling to their determinations and persist in their efforts to rise. The tools for success are standard. They belong to rich and poor alike. No sound and whole body enters this world possessed of faculties which Nature did not bestow upon all humanity.

The majority of people make no genuine effort to utilize their advantages to the utmost. They fail to do justice to their natural gifts. They have not even examined their human machine shop. Back of each forehead there is an equipment of lathes, drills, engines and dynamos, which, when properly applied, can perform any task.

Opportunity Still Beckons Us

TIME and again we have complained of lack of chances, when all the while Opportunity has been signaling us, smiling, calling and crooking her finger in our direction every hour of the day. How often have we remarked to our friends that we have thought of a device, an improvement, an enterprise, or an idea, which rendered another man famous or affluent.

We are not handicapped except by our lack of initiative—we aim too low, and tire too easily—our ambitions are commonplace—we lack daring and doggedness.

The common answer to all this is: "My education was neglected; I have been held back by my responsibilities; the openings in the town where I live are very few." Excuses, every one of them. Education is only training, and everybody who can be benefited by a common-school education has a mine of knowledge which can be developed by self-training.

Prosperity doesn't belong in any one spot. It doesn't require a certain soil nor a special climate—it finds fertile ground everywhere. You must uncover your talents before your neighbors can discover them. Form the acquaintance of your latent self. There's a superior being lurking within almost every commonplace human, unable to assert its individuality because its other self won't give it a hearing.

Remove Self-Imposed Limits

DURING the last 12 months you have probably not made one earnest attempt to drag your bigger personality out of its concealment. You accepted conditions as you found them—not that you were not aware that a hundred changes could be made in the very mine where you now work. Time and again you have remarked that some fellow ought to take hold of things and put some spirit into the work. *You* are the man—it is not necessary to look further.

Simply execute the very ideas that you are leaving for an unknown to develop. Nobody can limit your future if you remove your self-imposed limits. Possibilities become probabilities as soon as they are seriously attempted.

Openings do not come ready-made—capability can assert itself in a small mine as quickly as in a large one. Believe in yourself and equip your body and brain to fulfill your aspirations. Live sanely, think fearlessly, and then set about finding a road for your ambition. You can surely survey it; within your own heart persistence and courage will guide to all goals.

No man is greater than his resolutions. Success, like charity, must begin at home. Success does not help those who do not help themselves. The world neither elects nor selects its leaders. It acknowledges their superiority only after the individual has forced his fellows to recognize his strength.

So here's hoping that 1915 brings you to yourself.

A Happy New Year, Mister Bankboss!

By Wesvania

Say, Mister Bankboss, let me salute yer. Me and my buddies has been talking about yer, 'cos we've noticed yer've been terribly glumpy lately, and we sure would like to see yer cheer up a bit.

The place doesn't seem like the same, when yer're looking down yer nose.

We all have a warm feeling for yer, in spite of the little "differings" we have had at various times.

Yer're terrible hard to move at times, and we know that "wild horses" couldn't move yer till yer ready, but all the same, we've seen yer get a battling, hustling swing on, when the real call came!

Yer've got a mighty thick hide too, but we know that yer've a warm heart within yer, fer didn't yer look after Dick Jones' family for a whole month when he was so sick last spring?

And we all know about yer sending out them grocery parcels to some of our poor folks in the camp, when we had that slack run last summer.

Then, by Jinks, we knows yer're nervy, 'cos we minds when we had that big fire in Tom Camp's room, how yer "crep" in on yer hands and knees among all that smoke and heat, and "drug" Tom out to the fresh air.

Say! has the Big Boss been nagging again? We knows yer has a weary time with them office fellers, when things are not going chirpy inside!

Or, maybe, it's that trouble that yer've got at home with yer sick wife and boy, that's worrying yer so much and making yer look so glumpy!

So my buddies says to me, says they, "Let's give the Old Man a bit heartnin' up this New Year—maybe he'll 'preciate it."

So we want's to tell yer, Boss, that we sure would like to see yer cheer up and be more like yer old self again.

We've had lots of tough fights with yer, and we minds how yer "rared round" when we wouldn't "chip in" on that tonnage price yer offered us in the Third East pillars.

And also how yer raised "Cain" with us all when we had that "spat" about the wet places in the Fourth North.

Still we all stand for yer being fair and square—straight up and down—when it comes to making a bargain and keeping it; as well as how yer've given us the "pull" lots of times even when we didn't deserve it.

So cheer up, old feller! *Nix desperashun!!* Let's see that old-time twinkle in yer eye again, and hear that breezy "Howdy" of yours, when we comes up to the shanty of a mornin'.

Give us a handshake, stick out yer chest, straighten up yer back, and shake off that office phantom; then we'll all take a hop, and help yer on with them new resolutions and new efforts which we know yer'll be making this New Year.

Times are hard and things do have a nack of going the wrong way lots of times, but let's throw off our glumpy feelings, and we'll all pull together and help yer to make this the best year we've ever had together.

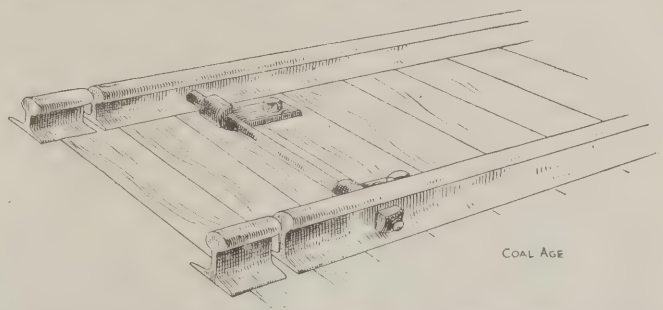
So, Buck up, Boss! and we'll make some of our neighbor chaps look small as Jack Rabbits when they hear tell of the old crew, screwing up the strings of the old mine till she's ringing a better tune than she ever did in her best days.

And if we can be of any further help to yer, why, don't forget to give us the call; so I must now conclude by wishing yer, once again: "A Happy New Year, Mister Bankboss"!

A Remedy for Slipping Rails

By Geo N. Lantz*

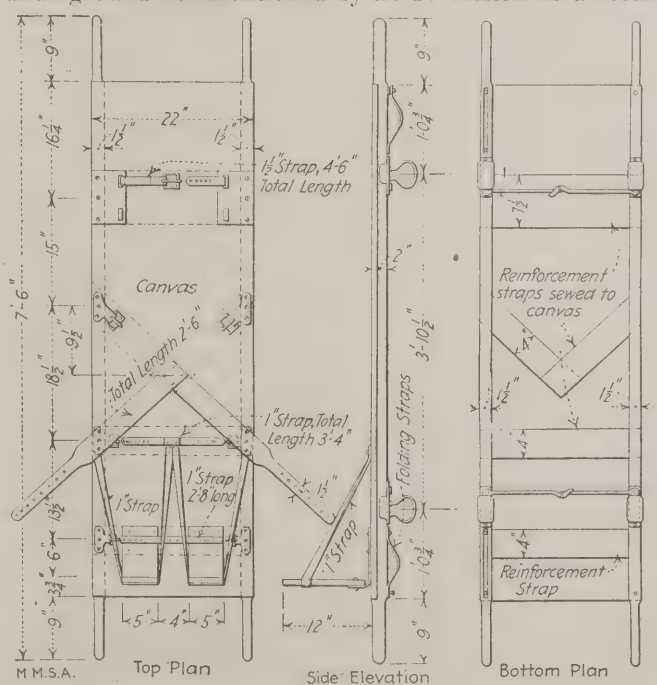
Mining men often experience some difficulty when the rails of the track on the tipple floor slip forward against the dump-rails, or the rails on the scales creep. The accompanying sketch illustrates a remedy for this difficulty.



Run a stiff iron rod through both rails and bolt securely. By means of iron plates—one end curved to fit over the rod and the other end bolted to the tipple floor—the rails may be held in place. The curved plates should be placed as near as possible to the rail, without interfering with the flange of the car-wheel. They may be placed at intervals, if desired, but one set of holders will usually be found sufficient.

Underground Stretcher

The accompanying illustration shows a stretcher for underground use mentioned by B. F. Tillson in a recent



Bulletin of the Mining & Metallurgical Society of America, as employed at the Franklin Furnace mine of the New Jersey Zinc Co.

*New Straitsville, Ohio.

A Visit to European Mines

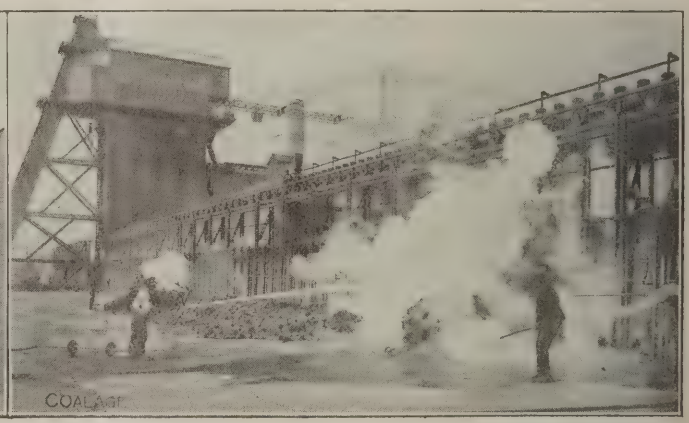
By Samuel Dean*

SYNOPSIS—Observations at the mines of Germany, France and Belgium. The Germans excel in the matter of systematic planning. Their educational scheme is quite remarkable. It costs about $15,000 to train a modern German mining engineer. Mining methods in Belgium. In the mines of this latter country, $2 per day is big earnings.

All the officials in German factories and mines are "educated." The government of Germany places scientific knowledge, to a certain extent, above militarism. If the young German can produce a certificate showing that he has attained a certain standard of scientific knowledge, or, in other words, passed a severe examination, he is allowed to cut a year off his term of active service. This brings the cavalry term down to two years and the infantry term down to one year. Young men in Germany put forth tremendous efforts to obtain the certificates which shorten their terms of service in the army.



Colliery No. 11 at Lens, France



"Koppers" Byproduct Ovens at a French Colliery

The colliery owners in Germany also are firm believers in education and maintain schools where their aspiring employees are trained. One such school at Bochum near Essen is considered by many to be the finest in the world. It is supported by a levy on the output of what is called the inspection district of Dortmund, which has an area of about 750 sq. miles. This district has an output of 90,000,000 tons of coal a year, and about 375,000 miners are employed.

There are also numerous "preparatory" schools, where instruction is free, and where miners and others are admitted who have been employed in the mines for not less than two years. Attendance at the preparatory schools lasts for two years, eight hours weekly during the first 18 months and 10 hours weekly during the last six months. The subjects taught are German language, arithmetic, geometry, drawing, elementary natural science, and laws relating to coal mining.

The Bochum School

The school at Bochum is for the purpose of training men for the positions of under-officials at mines, both underground and on the surface. Before admittance the applicant must show that he has worked for at least four years underground and that he is a capable workman. Surface employees are compelled to supply proof of their skill as engineers, mechanics, blacksmiths, machinists, etc., and must have had at least four years' practical experience, one of which may have been underground. All applicants are compelled to pass an examination before they are admitted, but this is only to show that they are able to draw a little and have other elementary knowledge.

There are two divisions of instruction, and in the lower division the students attend the school 20 hours each week during the first year and 24 hours per week during the second year; during this time they continue at work in the mines and support themselves. The excellent railroad and tram-car service enables them to travel quickly between the mines and the school, and they may attend classes either during the morning or afternoon. School hours are from 7 a.m to 11 p.m., and from 3:30 p.m. to 7:30 p.m.

In the upper division the student attends school six hours per day, and he often saves sufficient money to keep himself during the time he is away from the mines; some favored or exceptional students, however, receive assistance from the owners of the mines at which they are employed.

Young Men Are Given a Practical Training

The training the students receive is *practical;* that is, they are taught how to take a piece of machinery to pieces and put it together again—the school is equipped with hundreds of models and machines—they are taught how to test ropes, how to test fuels in boiler furnaces, how to analyze gases, and note gas caps on safety lamps in chambers containing known percentages of methane, how to lay track, and do various forms of timbering in a gallery, how to remedy defects in pumping appliances, etc.

And particularly are they taught how to plan and lay out mining operations and surface plants. The German is a great believer in planning things; he likes to see the end of a job on paper before he begins work on it. The minor official and the workman are guided by the blue-

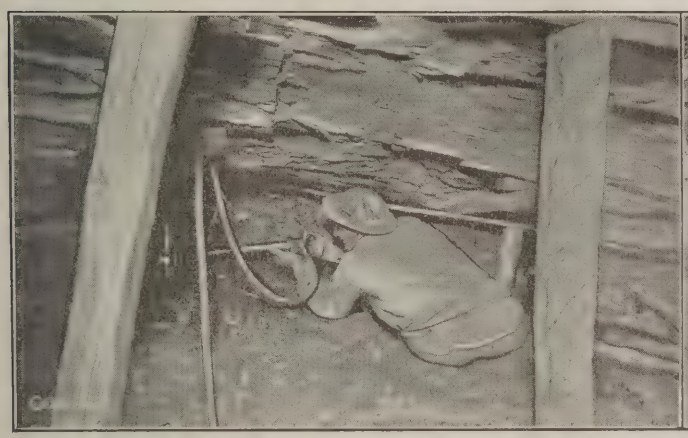
*Delagua, Colo.

print. If they propose to introduce some new method of working, they spend weeks on it in the drawing office before commencing actual operations. If it is found necessary to make some slight change in the haulage arrangements, for instance, they first prepare their plans and work according to the blueprint.

At the Bochum school the students are taught mechanics, machine design, mathematics, drawing, surveying, mining, coal screening, electricity, natural science, mining law, and rescue work.

The students are enabled to quickly acquire knowledge which they might never have an opportunity of obtaining at a mine, or which would probably take many years to grasp without systematic instruction.

For example, there is an excellent large-scale model of a coal-washing plant, complete in every detail; the students could take this apart, build it up again, and go to work washing coal; then they could make a test and see what percentage of coal there was in the residue, and what percentage of moisture and ash there was in the washed coal. So it is all down the line, with all the different appliances connected with coal mining. And bear in mind the student receives all this tuition *gratis*. This partly explains the success of the Germans; they are strong believers in organization and system.



Undercutting Thin Seam with Pneumatic Hammer



A Group of Miners at a Colliery in France

Germans Not Greatly Interested in Sports

It also shows a strong determination; the young man who works every day in the mine and puts in four hours' work a day at school is setting himself no trifling task. Naturally few of them know anything about ball games, football, golf, etc., and as I have always been interested, more or less, in such things, I inquired how they managed to maintain health and good physical condition. "Oh, we get our physical culture and gymnastic training when we go for our period of service with the army," they said.

I asked this question also: Is it possible for a miner, in your mines, to rise from the pick to the position of, say manager? They answered reluctantly, No. I then said, Could not an exceptional miner, a man with unusual natural ability, and who had saved money, or who had been provided with money by some benefactor, to enable him to study at the schools—could not such a man rise to the position of manager? They replied that such a man might rise to the top, but said they knew of none having done so in recent years. There were a few old men on the boards of directors of mining companies who in their early years had dug coal.

Then they explained to me the gruelling training which a man goes through who is destined to be a mine inspector, mining engineer, or general manager. Such men do not receive their training at schools like Bochum, but at the mining academies, and universities at Berlin, Aachen, Freiburg, etc., and before a man could enter such a university he must have passed through a high school. So that if he had studied at Bochum it would be necessary for him to go back to the high schools before proceeding to the university, and by that time he might be up in middle life.

The Making of a Mining Engineer

The training of a mining engineer in Germany is about as follows: He starts going to school at the age of 6, and at 18 or 19 he enters the mines and works underground for one year. He then takes his first examination, and, having passed it, starts on another period of four years' training, and then comes his second examination. Having passed that he has another four years' training in front of him, and during this last four years he will serve his one or two years with the army. He is not at the university during the whole of the last two periods, but for two or three months at a time he is at the mines holding generally an official position of minor importance. He then takes his third and final examination; he may pass it, or he may not; if he does not pass he sits again and may be over 30 years of age before he secures his final certificate and is available for a position as inspector of mines for the government, or able to act as manager or mining engineer. After passing his final examination he is given the title of *Bergassessor*.

I was told that it cost as much as $15,000 to train a modern mining engineer, and that he generally speaks English and French in addition to his own language.

A Knowledge of Foreign Languages

How very few English-speaking mining men are able to read German and French mining literature. Continental people are a long way ahead of us in this respect, and this calls to mind an incident during my travels. It was "tag day" in Rotterdam one Sunday morning when I was there; the "tags" were in the form of roses, and two maidens, natives of Holland, approached me and fired away in their native tongue. With a shrug of the

shoulders I said I did not speak Dutch. "I'll bet you do," said one of them, and naturally, of course, I bought a rose.

In France many mining engineers and managers speak English and German, especially the younger men. Watteyne, of Belgium, speaks English, as also does his assistant, Lemaire. Taffanel and some of his assistants speak English.

The Mines in France

It was a delightful sojourn in the colliery districts of France. How happy the people appeared to be, and they were unfailingly courteous. One wonders what the country looks like now. Around Lens, where some of the heaviest fighting has taken place, there are collieries as far as the eye can see, and the district all the way up to Lille is thickly populated. Lens is the home town of Taffanel, and was formerly the home of another famous Frenchman, Georges Carpentier, who worked in the pits a few years ago. Lievin, where the experimental gallery is located, is only a few miles away.

Coal Mining in Belgium

In Belgium the shafts are deep, the seams thin, the pitches variable, and often steep. Perhaps there are no



Showing Large Supply of Props Kept on Hand at a French Coal Mine

more gaseous mines anywhere. Sudden outbursts of gas sometimes throw out or dislodge 100 tons of coal. The laws are naturally strict. Shotfiring is not allowed in mines subject to sudden outbursts.

The mines are divided into three classes, viz:

1. Mines where firedamp has once been seen in a safety lamp, but not an explosive mixture.
2. Mines where firedamp is seen frequently.
3. Mines subject to sudden outbursts of explosive gas.

In mines of the first class, shotfiring is allowed in brushing, but not in mining coal. In No. 2 mines, shotfiring is allowed in brushing intakes, but not in returns. In No. 3 mines shotfiring is allowed only in rock tunnels, not in brushing mine ways or in coal.

In the three categories, ventilation must always be ascensional, except in No. 1 mines, where the air can descend, but not along the faces. In 2 and 3 the air must always ascend.

In mines where gas has never been found, shotfiring is allowed in the coal. Black powder is allowed in mines which are not classed, and there is no charge limit on black powder. In classed mines permissible explosives are used exclusively, not by law, but by suggestion. The highest charge limit is 1 lb. 15 oz.; the charge limit varies with different explosives. Only very few shots of any description are fired, however, even in mines where explosive gas is never found. The miners shoot their own shots in nonclassed mines.

A Freedom from Dust Explosions

The volatile mater in Belgian coals is low, not often exceeding 13 per cent. The ash content is high, being from 10 to 25 per cent. And as the seams are thin, there is much brushing which forms incombustible rock dust, and all these conditions probably account for the freedom from dust explosions. The object of the "powers that be" has always been to remove the cause of explosions, or prevent them from starting. The rules regarding safety lamps are severe. They keep track of the number of safety-lamp glasses broken per year at each mine. The inspectors suggest that electric safety lamps should have two thick glasses around the bulb, and that the space between the glasses should be filled with water.

The majority of the seams are only about 1 ft. 6 in. thick, and when it is remembered that shotfiring is not allowed in the coal, it will be seen at once that the pick does the work. Very few coal-cutting machines are employed on account of the pitch of the seams and irregularity of the strata, but some small single hand air punchers are used. A few face conveyors are coming into use, and more such machines may be used in the future.

Where shots are fired, "external tamping" is frequently employed, but not generally. A board is suspended or supported in front of the hole, and on this board is a pile of shale dust. The mines are not treated specially by either watering or stone dusting.

Accidents

The fatal accident rate for years has been low, being about 12 fatalities per year per 10,000 men employed. Roof falls caused 50 to 60 per cent. of the accidents. Systematic timbering is employed only in one or two mines. The roofs are dangerous and timbering costs are high, being over 20c. per ton in many places. The working faces are cross-barred. Back timbers are not withdrawn; the props being short and thin are valueless after being withdrawn; they easily break with the weight.

Benzine locomotives are used only in intakes, but such locomotives are prohibited altogether in mines of the third class. Compressed-air locomotives are used, but not electric locomotives. The gage of the tracks varies, but is generally about 2 ft. The capacity of the mine cars is from 700 to 1000 lb. each.

The total output of coal in Belgium is about 25 million tons, and 100,000 men are employed underground. The mines work on an average 300 days a year. There is one 9½-hour shift for coal hoisting, and one 9½-hour shift for repairs. Prices paid for mining are variable on account of the difference in the hardness of the coal and pressure of the overburden. Miners' earnings average about $1.20 a day; there are some men, of course, who make over $2 per day. The minimum is about $1, but this is not a legal minimum. Company men who do the packing behind the longwall faces receive 80c. to $1 a day. The miners timber their own working places.

There Are Two Labor Unions

There are two unions of miners in Belgium, the Catholic and the Socialist. The majority of the men belong

to the Socialist union. The unions are not recognized by the operators. The general strike of last year lasted only 15 days; it was a political strike for the principle of "one man one vote." Long strikes are unknown.

The government of Belgium is conservative; mine workers are well treated and receive old-age pensions after the age of 55 years.

Coal sells as high as $5 a ton at the mine. The price of patent fuel or briquettes is $3.60 per ton f.o.b. at the mines. There are 2,700,000 tons of briquettes manufactured per year, these being used largely on locomotives on the railroads, and under stationary boilers. They are made from the finest slack or dust; pitch is used as the binder.

The production of byproduct coke is 3,000,000 tons per annum, the price of coke being $4.20 per ton at the ovens.

The deepest coal-mine shaft in Belgium is 4000 ft. deep. The average depth of all mine shafts is about 2200 ft.

(To be Continued)

Extracts from a Superintendent's Diary

Last night I dropped in on the members of our first-aid team while they were assembled for their monthly meeting.

After the regular session was adjourned, some of the men remained behind for an informal talk and the talk became so interesting that I regretted the arrival of midnight with its turning out of all of the camp's electric lights, causing a rush for home.

Many of the points discussed and adventures related had to do with outside camps, as our men have volunteered their services at most of the explosions that have occurred within a radius of 100 miles of our mines, and this fact rather added to the interest of the narratives.

The most interesting discussion had to do with the necessity of the front helmetman of a party dragging a line of some kind along with him. The man who suggested the question once found himself in an entry with another helmetman, and just as they had about reached the face of the heading, they realized that their helmets were defective and they were in the midst of a large amount of blackdamp. The man's buddy began to show the effects of the damp almost immediately by his crazed actions and as he was much the larger man, our narrator hurried out in search of help and other helmets; he feared that should he attempt to lead his companion out, both of them might perish.

He found help and with these rescuers, returned to where he had left his companion. Although but a few minutes had elapsed, the other man had wandered away, and they were so long locating him that he had perished before they found him. If the two had had a rope with them, our man would have tied it around the waist of his companion and they would have had no trouble in following him no matter how much he might have wandered around.

At another time, under almost identical circumstances, except that the two men had a rope with them and the man left behind was tied, the fellow who went in search of help came upon three men without helmets at the mouth of the same entry and although they were afraid to penetrate far into the entry on account of blackdamp they managed to bring the man to them by pulling on his rope.

Another point brought out during the evening, was the terrible risk that helmetmen run, especially in fighting mine fires, where there are no emergency helmets left on top to be used if some of the rescuers inside meet with an accident.

Several instances have occurred where helmetmen have been left to their fate, because no apparatus was at hand to make possible their rescue.

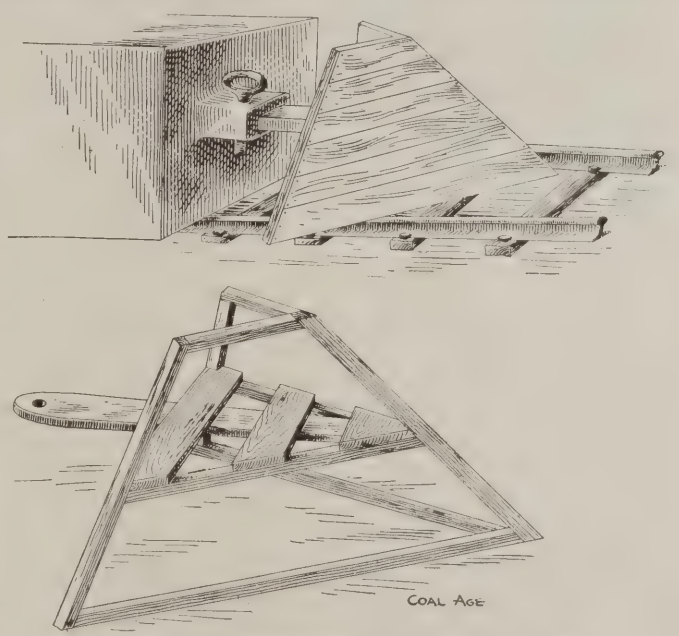
Whenever the talk got too gruesome, some of the fellows would relieve the strain by relating some of the foolish things that some of the others had done while under the influence of gas.

In almost all cases, men crazed by damp tell their companions to leave them and rescue the others and then follow such heroic utterances by foolish talk and singing. Two of our men who have been irreconcilable enemies for some time were made to feel very much ashamed of themselves when told of their actions some months back while both were two-thirds overcome by gas, but filled with heroism.

Our team is considered the best trained squad in the state, and when called to mines where the rescue work seemed to drag, they have sometimes taken the initiative before being urged to do so. This has kindled a little jealousy with outsiders but it has created a get-together spirit within our own squad that comes to the surface whenever our men meet.

A Unique Snow-Plow

The accompanying illustrations show a snow-plow which was used successfully by an Ohio coal company last



SHOWING CONSTRUCTION OF SNOW PLOW

winter. With this device, pushed by the motor, one or two trips accomplish the work, which ordinarily required two or three hours' work for the entire outside force.

A snow-plow of this sort should be made of heavy material, and the pole should be large enough to entirely fill the opening in the bumper of the motor, thus insuring rigidity.

Bunker Coal at Panama

By James Steelman

SYNOPSIS—The government invites private companies to participate in the business of supplying ships at Panama with bunker coal. Storage sites will be rented upon reasonable terms. The government will make a charge for use of the federal coal-handling machinery. The plant on the Atlantic terminus will store approximately 500,000 tons of coal. Both wet and dry storage will be arranged for. War precautions taken.

Now that the Panama Canal is in active operation, the question of bunker coal becomes of interest. This is especially true inasmuch as the first seven weeks of operation has disclosed a greater canal business than was anticipated. The European War began about two weeks prior to the opening on Aug. 15, so that we may very well consider that the canal has made a first-rate start.



Setting the Steel Caissons that Will Contain the Concrete Columns Designed to Support the Coal-Loading Wharves

During these opening weeks, an average of two vessels per day used the waterway. About 30 per cent. of these were British vessels and 50 per cent. American. It is scarcely probable that this relation will be maintained. In fact, more British vessels went through during September than did American, although during the previous two weeks only two British ships used the canal. If we include the tonnage of 115 barges which used the canal prior to the day of formal opening, the total net tonnage passing through up to the end of September amounted to 297,655. Including pilot charges, the tolls amounted to $360,706.29—an average of $1.25 per net ton.

Price on Coal at Panama

Although the two big Government coal-handling plants have not yet been installed, coal is now obtainable at either end of the canal. The price on the Pacific, or southern, end is $1 per ton more than on the Atlantic, or northern, end. At Cristobal, the Atlantic terminal for coal, the price of bunker coal is $5.40 per ton, trimmed in bunkers. This represents coal delivered from lighters. If the ship's own gear is employed in loading from railroad cars alongside wharf, the price is $5.15. The use of steam hoist and crane may be obtained for $1 per hour. The difference of $1 in cost is due to the expense of transportation across the isthmus. No coal is being brought from ports on the Pacific Ocean. The present sources of supply are the coal fields of Virginia and West Virginia. Probably the whole passes through the terminals located at Hampton Roads, Va.

On the Atlantic end of the canal, coal is transferred to vessels either by the aid of lighters or else by a single cantilever crane serving a coal wharf. On the Pacific end, lighters are the sole dependence. The capacity of the present facilities at either terminus is about 600 or 750 tons per 9-hour day. When the new Government plants go into service, there will be an enormous increase in capacities.

Where ships approaching the canal or on the way through may want to advise of their desire for coal or to inquire the price and so on, the proper procedure is to send in a radio message directed to *Receiving and Forwarding Agent, Panama R.R.,* either at *Cristobal* or *Balboa,* according as it is desired to do business with the Atlantic or Pacific terminal. There are Government radio stations at both ends of the canal, which handle commercial messages. When it is desired to take on coal at Cristobal, the radio station at Colon is the one

nearby. If the coal is to be taken on at Balboa, there is a station at the same point. In case inquiries of a general character are to be made, the officer addressed is properly the *Captain of the Port, Cristobal* or *Balboa* as the case may require.

The present radio stations have limited transmission capacities. The Colon station has a reach of about 300 miles in the daytime and the Balboa station a 200-mile daytime reach. More powerful stations are now under construction by the Government. When these are put into service, it will be possible to transmit in the daytime to a distance of 500 miles.

The two coaling plants will not be duplicates in design nor in construction, although there will be duplicate features.

It seems to be anticipated that the great bulk of the bunkering business will be at the Atlantic terminus. A controlling factor is no doubt the increased cost of getting coal to the Pacific side. This increase in cost is not due merely to the fact of a longer haul. The toll charges play an important part. All commercial vessels using the canal are subject to a toll of $1.20 per measured-ton of cargo space, when going through with a partial or complete load. If the passage is made in ballast, the same cargo space is charged for, but at a 40 per cent. discount. The Government recognizes no intermediate condition between a full load and no cargo at all. A barge going through with a load will pay $1.20 per measured-ton of cargo space one way, and $0.72 the other way. As a measured ton is 100 cu.ft. and as 2000 lb. of bunker coal occupy about 40 cu.ft., we have for the round-trip toll charge $0.768 per short ton or $0.860 per English ton or $0.845 per metric ton. Most of the vessels that have so far used the canal have gone through loaded.

The Government Invites Private Enterprise

With reference to the new coaling plants, which are expected to go into service in 1915, the policy of the Government is to welcome private parties and concerns who wish to participate in supplying ships with bunker coal. The Government will make a moderate charge for the service of its handling plant, the use of coal barges, etc. Storage land will probably be rented upon reasonable terms. At present, the license is revocable at the pleasure of the Government and without provision for reimbursement for permanent improvements on the land. These terms are, of course, unattractive, and cannot hope to find responsible takers who have in contemplation the expenditure of any considerable sums upon wharves, piers, etc. However, this situation will surely be corrected by Congress. The Isthmian Canal Commission called attention to the matter in its report for 1913. The real estate tax upon the value of the improvements is 1 per cent. per annum. There is also a merchandise tax of 5c. for each short ton of coal sold.

Originally, the design for the plant at the Atlantic terminus had in contemplation the storage of 300,000 tons; but it has been decided to increase this 62 per cent. This change of plan has arisen because of the demand for space. The area is to be 1700 ft. long and 310 ft. wide. A large part of the coal in storage will be perpetually under water. To provide a suitable site for the wet storage, a suction dredge was put to work some time back with instructions to dredge to 28 ft. below the sea level. Dredging of the berths alongside the wharves is to be carried to a depth of 41 ft. for a frontage of 1065 feet.

The general site is located at the north end of Mindi Island between the present Panama Canal and the old French Canal. It will thus be situated alongside the sea-level stretch to the north of Gatun Locks. There will be an unloader wharf where coal will be loaded in and a reloader wharf where coal will be loaded out. The reloader wharf will extend along the west side of the site—the side facing the Panama Canal. The unloader wharf will extend along the east side—the side facing the old French Canal. Both these wharves will be 1170 ft. in length and will be connected on the north by an end wharf. The three wharves will inclose the storage spaces and will provide for the coal-handling equipment. The wet storage space will be at the northernmost end. South of this will be the dry storage space. This latter site has already been filled to the required level of 2 ft. above the sea. A certain amount of work has also been completed on the concrete construction. Thus, the side walls of the dry storage space were about completed on Oct. 1.

Concrete Piers for a Foundation

The wharves will presumably rest upon the rock. The foundations are being constructed of great concrete piers



Excavating for a Coal-Storage and Coal-Handling Plant at Panama Canal

6 ft. in diameter. These are constructed by driving 6-ft. cylindrical steel shells to the level desired. As these go down, they are added to at the top, so that when the lowermost section has reached the rock, there will be a continuous shell extending all the way to the surface. The interior is then excavated by means of orange-peel grab buckets. A steam hammer is employed in driving down the shells. After the interior has been cleared of earth, the great shell is filled with concrete. It is a matter of indifference, I suppose, as to what ultimately becomes of the shell. Probably, only the upper part will yield to corrosion in any short period of time. The fluctuations of the tide on the Atlantic end of the canal are slight, so that only a few feet are exposed to wind and water. Corrosion will no doubt operate some feet further down than the minimum level of the water; but will probably have only a very slow effect far down. However, even if it all rusts off, we still have a heavy column of concrete.

The wet storage section of the coal pile standing on a plane 19 ft. below the surface of the water—that is, 19

ft. below mean sea level—will have a bottom stratum about 20 ft. thick that will always be submerged in salt water. This coal will be known as *wet*. The stratum of 20 ft. next above will be known as *normal dry*, and the top of the pile—a stratum perhaps 10 ft. thick—will be termed *emergency dry*. The entire height of the coal pile will accordingly be about 50 feet.

When the sea is at extreme low water, the wet coal will stand in 18 ft. of water; when extreme high water occurs, it will stand in 21.65 ft. There will thus be a total variation in the surface level of the sea of 3.65 ft. The precise level of the top of the wet coal and bottom of the normal dry will probably vary from time to time, and perhaps from point to point. It is assumed as 1 ft. above mean sea level. The wet coal is reserved for naval use. The 50-ft. pile will have its top 31 ft. above mean sea level. When the plan area of the pile was reckoned at 1000x250 ft., the entire contents were estimated at 298,800 short tons. In the wet stratum were 125,000 tons; in the normal dry stratum, 121,000 tons; and in the emergency dry stratum, 52,800 tons. The pile will, with the area extended to 1700x310 ft., contain 485,000 tons.

The equipment that will be mounted on the wharves will be quite heavy; so that the big concrete columns will really have a duty commensurate with their size. Toward the end of September, 35 steel caissons had been sunk to rock on the site of the loading-out wharf and excavated; 45 more have been set in position. On the site of the loading-in wharf, 40 caissons have been set. The rock lies from 30 to 65 ft. below the sea bottom. It is overlaid presumably by coral rock and sand—that is to say, the same materials encountered by the suction dredge when it was well under way with the dredging of the wet storage basin.

At the loading-in wharf, the channel will be about 500 ft. in width; at the loading-out wharf, the berth will be 250 ft. wide or more.

General Scheme of Operations

The general scheme of operating the plant is as follows: Coal will be brought to the loading-in wharf by collier or other vessel. Two vessels may be unloaded at a time, as four unloading towers will be provided—two for either vessel. These will dig the coal from the hold, elevate it and either deposit it in a hopper from which it may be delivered to a conveying system or to railway cars, or else transfer it immediately to the storage pile. The pile itself will be commanded by stocking and reclaiming bridges. These will serve to perform the usual functions of such apparatus. There will be a conveying system, a part of whose duties it will be to receive coal from the hopper on an unloading tower and convey it to various parts of the storage pile. Another loading-in function of this system will be the transportation of coal from a tower to the wharf bunkers.

In loading out, coal will be reclaimed and loaded by the bridges, the conveying system, the unloading towers and special reloaders. Small amounts of coal may also be loaded out from the wharf bunkers. The mechanical apparatus may be used in loading out in a variety of ways. Thus, at times it will be convenient and possible to reclaim coal from the storage pile by means of an unloading tower and to discharge it by the same means into the vessel being loaded. It is a question of the conditions at the moment.

The reloaders, however, do not act alone. They receive coal from the conveying system and deliver it to the vessel. The reloaders introduce flexibility into the loading-out operation, permitting coal to be delivered to vessels varying in freeboard and size and location of hatches. The transfer of coal from one part of the plant to another will be accomplished by means of the bridges and the conveying system.

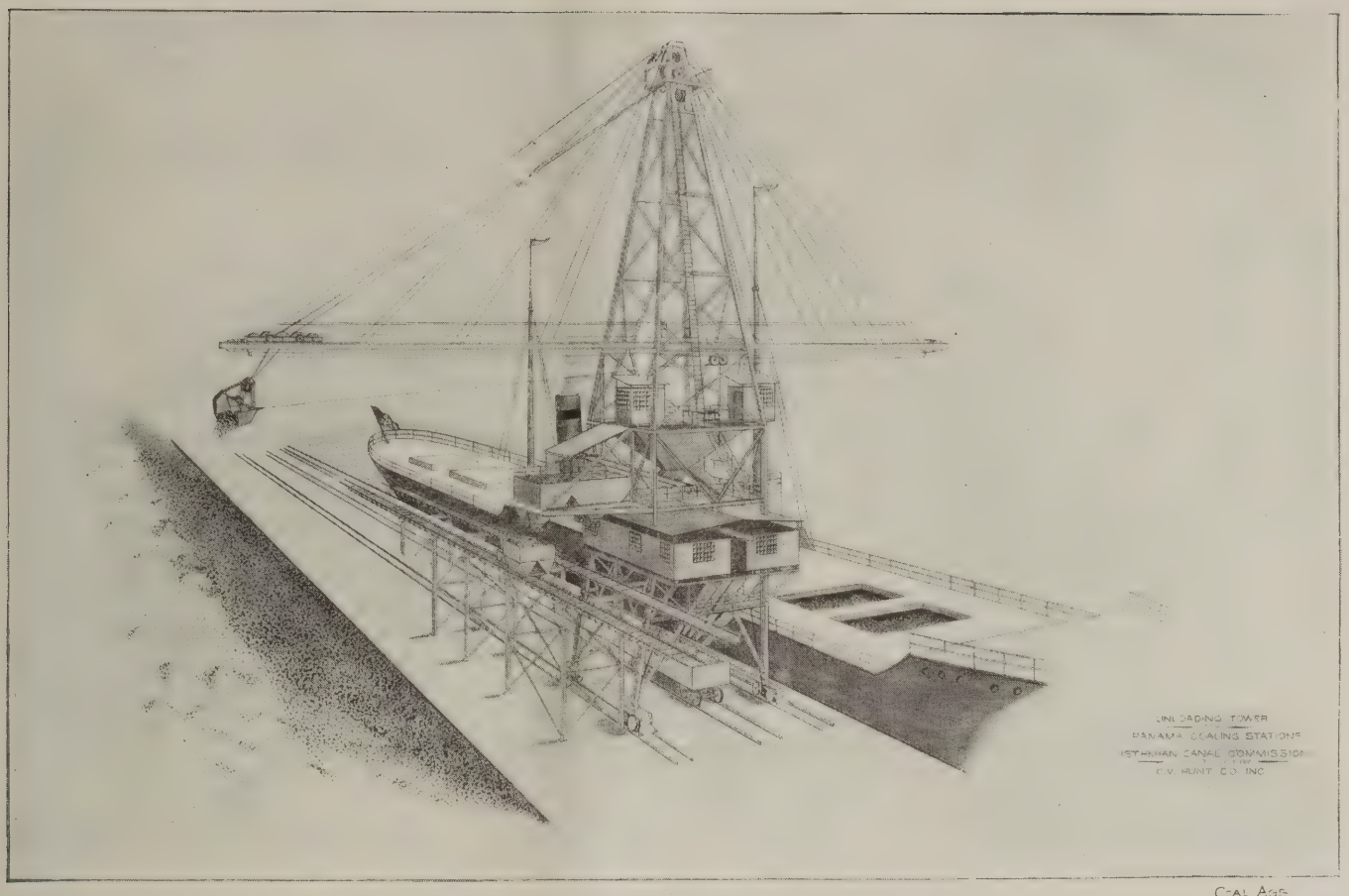
The Unloading Towers

The unloading towers are perhaps the most interesting feature. Each of the four is a self-contained unit dependent upon nothing else for its operation. It is not driven by an electric current supplied from some station, but by steam on board the tower from a coal supply always available. It is self-propelled, and in short performs all its functions by and through itself. It seems that the object especially in view in making these apparatus independent of other apparatus is to minimize the risk of having them put out of service during a war. It will not be possible for an enemy to destroy or damage an electric station and thus necessarily put an end to mechanical coaling operations. The unloading tower must itself be destroyed or damaged to make it useless. The destruction of one unloader will not affect another further than possibly to interfere with its mobility by piling up débris on the track used by the towers.

Now the unloaders are able to perform the complete operation of loading out, provided only that there is a supply within reach back of them. They may be used, too, to transfer coal from a barge to a vessel, both lying parallel alongside the wharf. From what has now been said, it will be understood why the operation has been made dependent upon power generated on board. Further, steam has probably been selected largely for war reasons. There will always be coal at hand, if the tower is to be used at all. Consequently, it will always be possible to have fuel for power generation.

The towers move on a track which parallels the dock. They are of skeleton steel construction, and rise to a height of 150 ft. above the rails, of which four are required to make up the track. Two are arranged on one side and two on the other, each pair forming a subsidiary track for the four-wheeled trucks upon which the tower is mounted. Measuring between the center lines of the subsidiary tracks, we have a distance of 34½ ft. The subsidiary tracks themselves are laid upon a 3-ft. gage. The rails are let down into the concrete floor of the wharf until their heads are flush with its surface. There are four trucks altogether, two on a side. One on either side drives while the other trails. The transmission of power to the driving trucks is effected by means of worm gearing.

Seventy-nine feet above the rails, a long boom is arranged in such manner that it passes right through the body of the tower and extends 61 ft. out from the water side and 71 ft. from the rear. The entire length of the boom is thus in the neighborhood of 170 ft. The coal is recovered from a vessel or from the stock pile by a 2½-ton grab bucket whose carrier travels along the boom from end to end. The boom is supported from the peak of the tower far above by means of suitable ropes. The inshore reach of the boom is sufficient to permit a two-track elevated railway to be located between the tower and the storage pile and still reach a point over the latter. These tracks accommodate the inter-plant conveying system.



SHOWING GENERAL STYLE OF UNLOADING TOWER AT THE NEW PANAMA COALING STATIONS

THE COAL HOPPERS

Beneath the boom but within the limits of the tower is arranged a 50-ton hopper. There are also two smaller hoppers at a lower level arranged over the elevated tracks, one over each of them. The big hopper delivers either to railway cars far below on a track arranged between the two pairs of narrow-gage track supporting the tower or else to the small hoppers. A 42-in. conveying belt carries coal from the big hopper to either one of the smaller ones.

It will now be understood that the tower is able to take coal at either end of the boom and deliver at the other end or to railway cars or to the conveying system. The 61-ft. outboard reach enables the boom also to cover the case of two vessels alongside, one a collier and the other a vessel seeking to replenish its bunkers.

There are four independent power units, all steam operated, which perform the separate duties of hoisting and lowering the bucket, of traversing the bucket carriage, of raising and lowering the boom and propelling the whole tower, and of operating the conveying belt. The first is a direct-connected, double-cylinder, 18x24-in. engine; the second is a double-cylinder, 12x24-in reversing engine; the third is a geared, 10x12-in. engine; and the fourth is a double-cylinder, 6x8-in. engine. All these units are located in a suitable closed-in space beneath the big hopper. This 50-ton hopper is constructed of ⅜-in. steel plates, and is 12x30 ft. in plan. Delivery to the railway cars beneath the power room is effected by chute. The four towers operate on the loading-in wharf facing the old French Canal.

THE BRIDGES USED FOR STOCKING

The bridges used for stocking and reclaiming are of the duplex variety—that is, each is equipped with two carriages and their buckets. The buckets are of 5-ton capacity. Eight four-wheeled trucks support a bridge. Just as the towers were self-propelled, steam-operated units, so these are self-propelled, electrically operated apparatus. They may be shifted along their track at the rate of 50 ft. a minute. These machines have a rated capacity of 1000 tons per hour. Any one of them may be used to stock and reclaim simultaneously. They deliver either to the stock pile or to the conveying system.

The function of the special reloaders is to receive coal from the conveying system and make delivery to the vessel to be coaled. There is a hopper at one end of the movable apparatus, which serves to preserve a balance between receipts and deliveries. A telescopic chute is arranged at the other end. A conveying device transfers coal from the hopper to the chute. These machines are in effect movable pockets. They operate on suitable tracks laid on the loading-out wharf facing the Panama Canal. Their individual rated capacity is 500 tons per hour.

Minor demands for coal may be taken care of by means of a stationary wharf bunker, constructed of steel and concrete, having a capacity of 1500 tons. It is subdivided into three compartments, each of 500 tons capacity. Two valves serve each compartment. The delivery opening may be made as large as 6 sq.ft. in cross-sectional area. By means of a folding chute, each compartment may be made to deliver coal through a vertical range of 14 ft., half above the wharf and half below. There is a second chute which delivers at an unvarying level of 5 ft. above.

The coal leaves the bin at points 28 ft. above the wharf. The tilted floors provide a constant pressure which becomes instantly available when the doors are opened.

The Atlantic plant is connected with the Panama R.R. A spur from the yards at Mt. Hope follows a southerly direction for about 3000 ft. when it swings to the west, making the crossing of the old French Canal by means of a pile trestle, and then goes north for 3500 ft. or thereabouts to the site. The trestle work is later on to be removed and replaced by a steel bridge with a movable span. This will permit the navigation of the old French Canal past this point.

The Balboa Coal-Handling Plant

The coal-handling plant at Balboa is subordinate in interest and size to that at Cristobal. Two of the 150-ft. towers are to be located here, where their functions will be similar to those of the four towers at the other end of the canal, except that the two towers will not connect with the storage pile.

In designing the plant as a whole, it seemed advisable to utilize certain cranes which had served constructional purposes at Miraflores, especially as these cost about $300,000. There are four of these double cantilever cranes. These will command the storage yard, 240x500 ft. in area. Here will be accommodation for 210,000 tons of coal, divided 100,000 in the wet stratum, 80,000 in the normal dry stratum, and 30,000 in the emergency dry stratum. The coal in wet storage is here reserved for the use of the Navy just as at Cristobal. In loading in, it is proposed to chute the coal from the towers directly into the storage pile. It will then be rehandled by the cranes. There is to be a conveying system here also. It will serve both the cranes and the towers when loading out is going on. It is expected to develop a loading-out capacity of 1000 tons per hour by using all six units—the four cranes and the two towers.

As before pointed out, the towers at Cristobal will be steam operated. The same applies to the two at Balboa. But, apart from the towers, the operation of all devices at both plants will be by electricity. There will be suitable substations for supplying current.

Government Colliers Will Carry Coal to the Canal

The Panama Canal will operate at least two colliers, whose names will be the "Achilles" and the "Ulysses." They will be used to carry coal from Eastern United States to the two coaling plants on the canal, and will be quite similar to the navy colliers, "Orion" and "Jason." They will have a length of about 500 ft., a beam width of 62 ft., and will be 39½ ft. deep. Their cargo capacity will be 12,000 tons each. Apparently, their own round-trip bunker supply will be in excess of this capacity. When loaded to the maximum they will draw about 28 ft. of salt water, and will have a speed capacity of 14 knots. The cost will be $987,500 each. They will probably go into commission during the early part of 1916. At the end of August, 1914, both vessels were more than a month ahead of contract time as respects their construction.

The quantity of coal obtained from the Jalainor mines, North Manchuria, in 1913, was 142,857 tons, of which 125,000 tons were delivered to the Chinese Eastern Railway and 17,857 tons to the Trans-Siberian Railway. The sales of coal from the Japanese coal mines at Fushun have increased considerably, the sales for 1913 being reported at 170,143 tons.

Standard Pipe Threads

The threads, as produced in the Briggs system, says *Power*, for Nov. 3, are shown in the illustration. The taper employed has an inclination of 1 in. to 32 to the axis, therefore the total taper is 1 in. to 16 in., i.e., ¾ in. to the foot or $\frac{1}{16}$ in. to 1 in. The angle of the thread is 60 deg. and its depth four-fifths of the pitch, or 0.8 $\frac{1}{n}$, where n equals the number of threads per inch.

Threads F are perfect at top and bottom. Back of these are two threads with perfect bottoms but flat tops; behind these are the imperfect ones produced by the chamfer of the die.

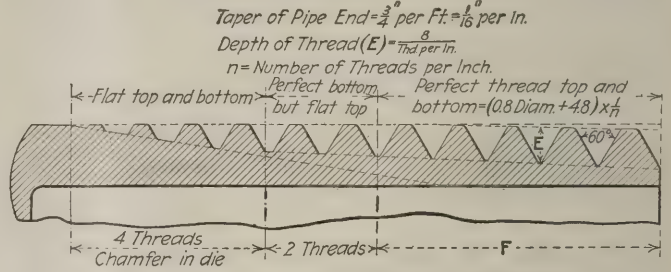
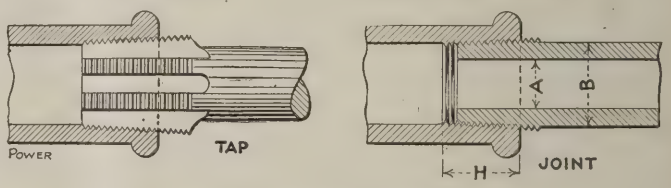


FIG. 1. LONGITUDINAL SECTION OF BRIGGS PIPE THREAD



Briggs' Standard Pipe Thread

It can be readily seen by the foregoing how necessary it is to have the pipe and fitting sizes match, so that the full, perfect threads in each will register with the other. A thread made up more or less than this will result in a less perfect joint.

PIPE THREADS

Diameter	Threads per Inch	Diameter of Drill
⅛	27	21/64
¼	18	29/64
⅜	18	19/32
½	14	23/32
¾	14	15/16
1	11½	1 3/16
1¼	11½	1 15/32
1½	11½	1 23/32
2	11½	2 3/16
2½	8	2 11/16
3 to 10 inc.	8	

West Virginia Mine Fatalities Show Decrease

The fatality list in the coal mines of West Virginia for the month of November has just been issued by the Department of Mines, and shows a total of twenty-five deaths from accidents at the mines, a decrease of nine as compared with the report for the previous month, when thirty-four were killed, and a decrease of one from the corresponding month for last year.

Eleven of these fatalities were caused by falls of roof and coal, four by mine cars, three by locomotives, three by electricity, one by mining machine, one by explosive, and two miscellaneous. The last two, while reported to the Department, were not really chargeable as fatal mine accidents, one death being due to scalding on the outside, and one due to blood poisoning, following a slight injury to the hand. Thirteen of the victims were Americans and twelve were foreigners.

Steep Pitch Mining of Thick Coal Veins--II

By W. G. Wildin*

SYNOPSIS—Only 64 per cent. of the steep pitching Mammoth bed has been obtained in the Lansford section by four successive minings, the first gangways being along the bottom rock, the second along the top rock, the third in the middle of the bed and the fourth in the Skidmore seam below. All this could have been mined out through the last mentioned gangways at great saving of cost. Paneling methods will cause an important conservation of coal and more speedy development.

At the Greenwood colliery a record was kept of every step in the driving of two adjoining breasts and in the robbing of the pillar between them (see Figs. 1 to 4), in order to determine what recovery of the vein was being made by the method in general use. At this point the coal was 59 ft. thick. The section was 190 ft. long and its total contents were 590,000 cu.ft. of solid coal or 8260 mine cars of 125 cu.ft. each. Of this 5442 mine cars were loaded out, making a 65.9 per cent. recovery. This work was done in 1909, 1910, 1911 and 1912.

The method of robbing the pillar was as follows: Chutes were first driven along the manways; slant chutes were driven across the pillars and a chute driven back almost to the top rock. Then a breast was driven up the pitch and the coal mined. Chutes along the small pillars between this breast and the old breasts recovered that part of the vein. After all the coal had been mined near the top rock, another breast was opened off the main chute (driven back through the pillar), and later chutes were driven to mine the small pillars between the breast and the old breasts.

When all the coal possible had been mined in this way toward the top rock, a breast was opened up the pitch along the bottom rock. Again chutes were driven to mine the small pillars between this breast and the old breasts. After all this had been done the upper part of the pillar was supposed to have been robbed completely; then retreat was made down the chute about 30 ft. and a main chute driven back through the pillar, and the whole operation repeated.

The drawings show a network of chutes and breasts. It has been found by experience that, in order to recover a good percentage of the coal, where the vein is so thick, chutes must be driven in any and all small pillars that have been left between any of the breasts or chutes. In every case, however, the pillar being robbed must be controlled; it cannot be allowed to run away.

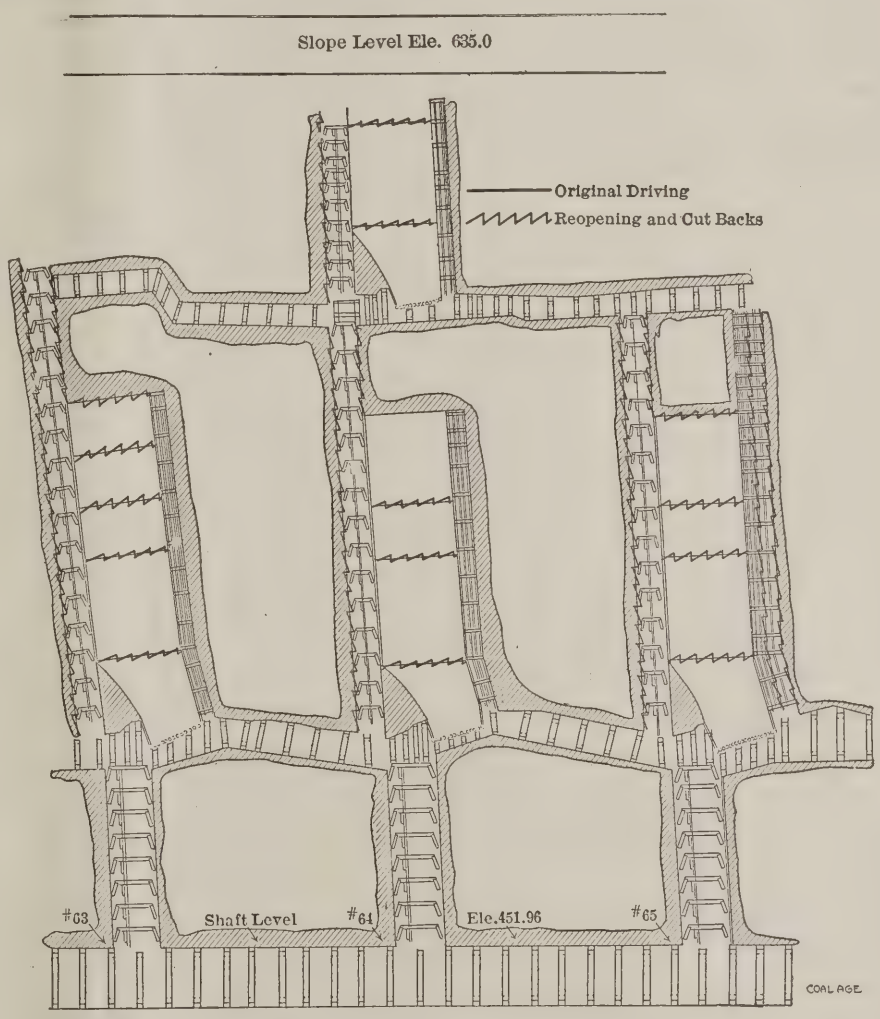


Fig. 1. Method of Working Breasts and Pillars, East Mammoth Shaft Level, Colliery No. 10

Reworking the Mammoth through the Skidmore

The reworking of old territory is always an interesting problem. Years ago it was the practice to reopen an old gangway in the vein and as a rule the cost was heavy, especially if the ground had not been standing long enough to settle thoroughly. In some instances six or seven years suffices for such settlement, but in other cases fifteen years is insufficient for the completion of that action.

The most satisfactory way to rework the old Mammoth territory has been by driving the gangways in the Skidmore vein and driving rock chutes up to the Mammoth. At first these chutes were driven about 100 ft. apart. This distance has now been extended to 120 ft.,

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NOTE—Paper read at Pottsville, Penn., meeting of the Pennsylvania Anthracite Section of the American Institute of Mining Engineers, July 25, 1914.

140 ft., and even 150 ft. at one colliery. The rock chutes are connected at the top with slant chutes; then, about 10 ft. off the rib of the rock chute, main chutes are driven straight up the pitch, and these main chutes connected by slant chutes across the pitch. These slant chutes provide ventilation and also determine the location of any pillars which have not been worked. At several collieries where the pitch is almost vertical, a straight or box chute about 40 ft. in length is driven up the pitch from the apex or meeting point of the two slant chutes (Fig. 5). At the top of the box chute two other slant chutes are driven, and again at their meeting points a box chute is put in. This is continued and we are able to reach up the pitch any distance desired, in many cases over 400 ft. This method has proved its value and at all times the miners are held safe.

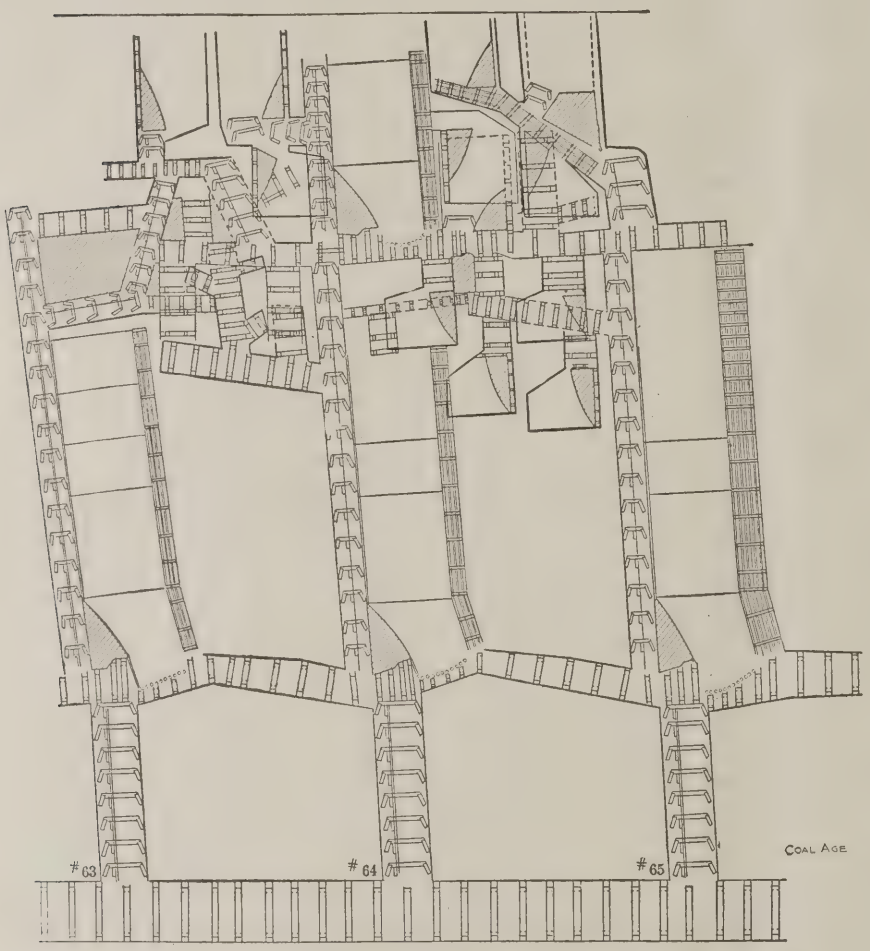


FIG. 2. METHOD OF WORKING BREASTS AND PILLARS, EAST MAMMOTH SHAFT LEVEL, COLLIERY NO. 10

THE BOTTOM BENCH OF THE MAMMOTH WAS LEFT AS TOO HARD TO MINE

As a rule this system of chutes is made in the bottom bench of the vein, which in most cases has been found solid; the reason being that the coal was extremely hard and many years ago could not be mined at a profit. At intervals, holes are driven through the 18-in. slate into the middle and top benches of the vein, and the gob from the old breasts is drawn out. Where the gob is of such a nature that it can be driven through, chutes are driven on a pitch of 30 to 35 deg. through the vein into the top rock. A pitch of 35 deg. is not too heavy through gob, as more rock has to be handled, and the gob itself is sticky or gummy.

Where the bottom bench has been worked, it is necessary to do all the opening work for robbing purposes in the gob. On the steep pitches we prefer to make the chutes on a pitch of from 30 to 35 deg. and drive across the vein (along the strike) or else directly through it (at right angles to the vein), for the reason that in the gob it is necessary to protect the roof of the chute by driving poles, 6 to 10 ft. in length and 4 to 6 in. in thickness, ahead of the actual working face, to give full protection for the placing of the next set of timber.

It is readily seen that in loose ground, if the chutes were driven directly up the pitch of say 70 deg., the poling process would be of no benefit, and miners would be in danger from falls of material.

SPACING OF ROCK CHUTES DEPENDENT ON ROCK THICKNESS

In driving rock chutes from the Skidmore to the Mammoth vein, the question often arises as to the economical spacing of the rock chutes, due to the varying thickness of the rock between the two veins. Our experience has been that where the interval is 30 ft., the chutes can be driven 100 ft. apart. Where it is 40 and 90 ft., the chutes should be spaced 120 and 150 ft. apart respectively.

About 1891, when the fourth and fifth levels at the Coal Dale colliery were opened, the gangways were made in the Skidmore vein and rock chutes driven every 50 ft. to the Mammoth vein. These chutes were about 30 ft. in length and on a pitch of 35 deg. The mining in the Mammoth vein was done according to the usual methods such as I have described. These Skidmore gangways required much repair, due to the poor top rock of the Skidmore vein at this colliery, and also to the small distance between the chutes.

At one colliery, where the pitch varies between 80 and 90 deg., a somewhat different system of slant chutes was adopted. They were driven across the pitch at about 30 deg., and along the bottom rock. At the junction point of the slant chutes a chute was driven through the vein to the top rock, then turned back again to the bottom rock and slant chutes again driven. There are a number of instances where more than 1000 ft. of such chutes have been driven from the top of one of these rock chutes.

CIRCUMVENTING A RUNAWAY BREAST

In other cases (depending upon the conditions), instead of driving the rock chute from the Skidmore to the Mammoth, a chute has been driven up the pitch in the Skidmore to the predetermined height, and then a

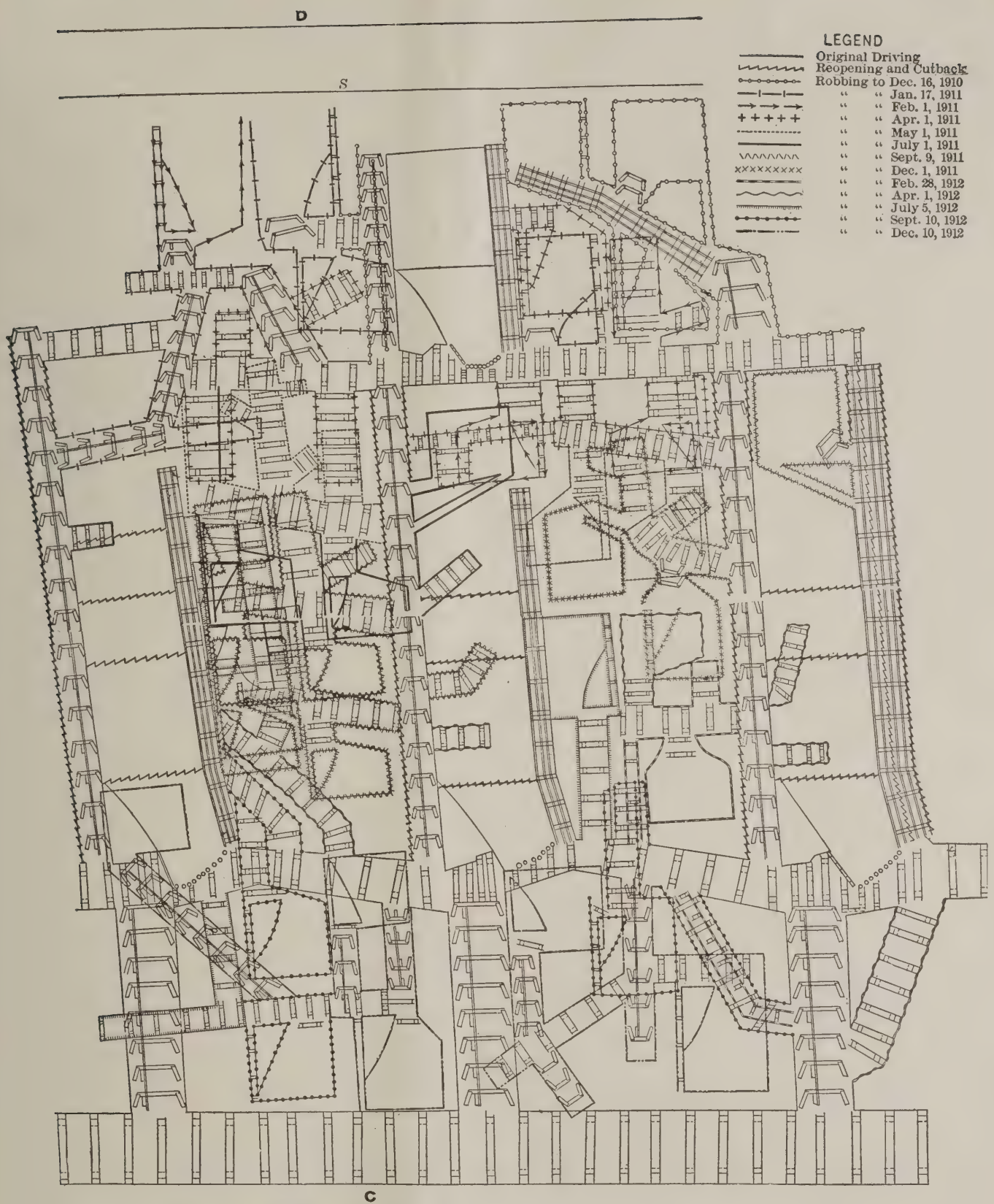


FIG. 3. METHOD OF WORKING BREASTS AND PILLARS, EAST MAMMOTH GANGWAY, NO. 10 SHAFT, GREENWOOD COLLIERY

rock chute driven into the vein, the object being to make the opening above the point where the breast has run away and filled with rock. Where we have been able to work this method it has proved successful.

A variation of this method is being tried out at the Lansford No. 4 colliery (Fig. 6), where the vein is on a pitch of 72 deg. The rock chutes are driven from the Skidmore gangways to the Mammoth, and from the top of these chutes long slant chutes—7-ft. collar and 7-ft. leg—on a pitch of 35 deg., are driven along the bottom slate of the Mammoth vein to the bottom of the old breaches on the surface. This is being done for the

purpose of re-robbing the old workings between the old Water Level gangway and the surface, the lift being about 300 ft. From these slant chutes, straight chutes—5-ft. collar and 5-ft. leg—are driven up the pitch at about 35-ft. centers, depending upon the condition of the gob. The robbing work is started at the top and is continued down the pitch. Great care is taken to keep the robbing faces so far ahead of the chutes driven later that a squeeze may not result.

Still another variation is being tried out at Lansford No. 4 colliery, fourth or Slope Level. This plan (Fig. 7) differs only from the scheme used in the Water Level, just mentioned, in that a 6x8-ft. chute is driven from the Skidmore gangway straight up the pitch in the Skidmore vein for 15 ft., these chutes being spaced 140 ft. apart on the gangway. From the top of the straight chutes, slant chutes on a pitch of 35 deg., 6x8 ft. in size, are driven along the bottom rock of the Skidmore vein for about 80 ft. and connected at the top. From that point a rock chute—6x8 ft.—on a pitch of 35 deg., is driven back to the Mammoth vein, about 30 ft.; then long slant chutes are driven on 33 deg. pitch along the bottom rock of the Mammoth vein to the old level above. The intention was to strike the Mammoth vein above the batteries of the old breasts which were filled with rock.

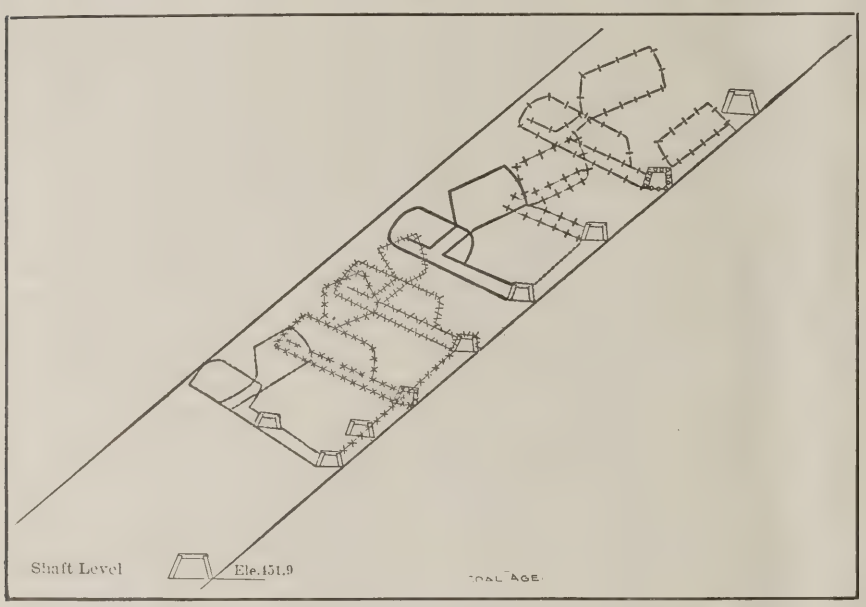
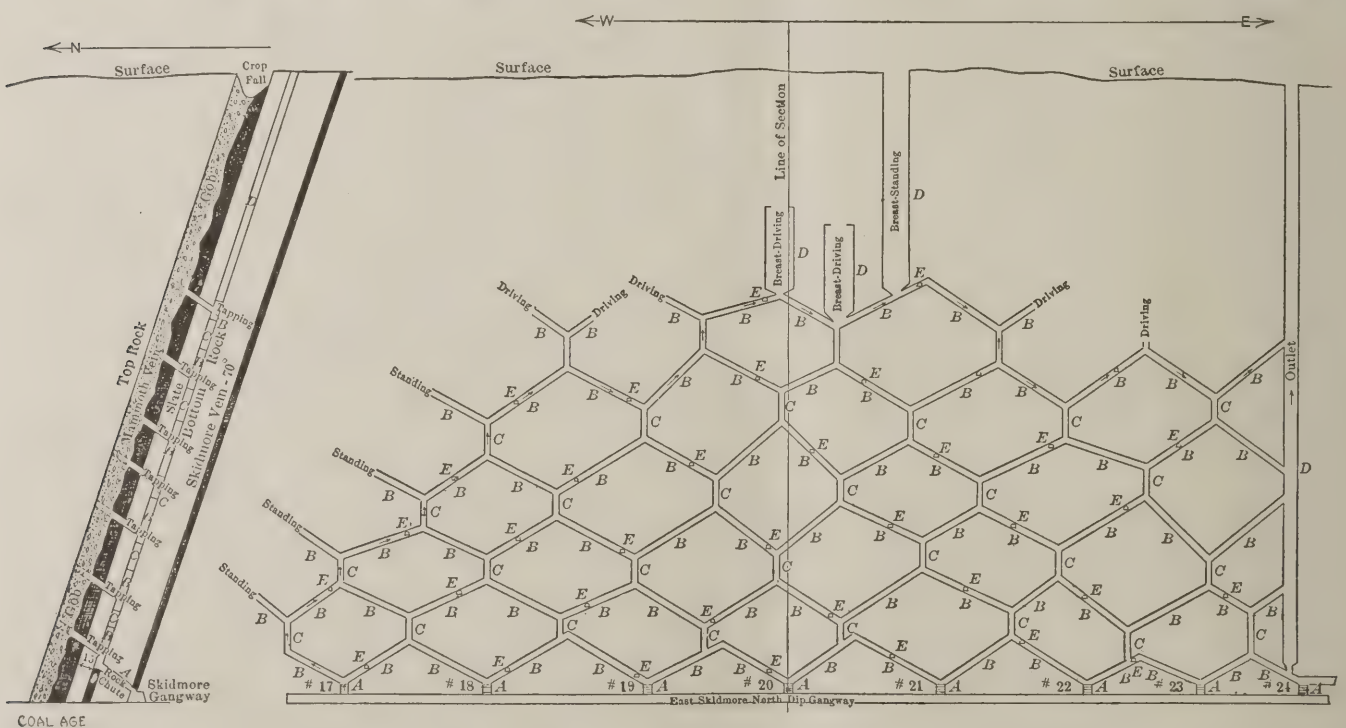


FIG. 4. SECTION THROUGH C-D OF FIG. 3

We have lately arranged to make further tests of these schemes in working new territory, in order to make comparisons with the results obtained from the old established pillar-and-breast method.

The question naturally arises, which is the better of these chute plans? The chute yardage driven is practically the same in both systems, though a little saving is made by using the long slant chute. The great advantage, however, of this latter method over the use of the box chute lies in the fact that the coal passes through practically its whole course over a light pitch and thus there is much less breakage. The only real drop of the coal is in the straight chute



Cross-Section through Chute No. 20

(A) Rock chutes, Skidmore to bottom split of Mammoth. About 30 ft. long on 35°, 6x8-ft. chute, 120-ft. centers. (B) Slant chutes on bottom rock of bottom split of Mammoth. About 70 or 80 ft. long on 35°, 6x6-ft. chutes. (C) Straight chutes up the bottom rock of bottom split of Mammoth. About 20 ft. long on 70°, 5x6-ft. chute. (D) Breasts on bottom rock of bottom split of Mammoth. About 160 ft. long to surface on 70°, 8-yd. breast, 50-ft. centers. (E) Tapping chutes from bottom split to middle split of Mammoth. Used as batteries for running coal.

FIG. 5. METHOD OF WORKING BOTTOM AND MIDDLE SPLITS OF MAMMOTH VEIN, AS VIEWED AT RIGHT ANGLES TO THE PITCH. NO. 5 SHAFT, SECOND LEVEL, EAST SKIDMORE, NORTH DIP GANGWAY

immediately at the robbing point. In the other method there is bound to be much breakage in the straight box chutes unless they are kept full at all times and this requirement, we know, is frequently neglected by the workmen. At best there is bound to be a certain amount of grinding of the coal in the box chutes.

The Fourth Attack on the Same Piece of Coal

In many cases the present working is the fourth mining of the same piece of territory, 30 per cent. having been extracted on first mining, 16 per cent. on the second, 8 per cent. on the third and 10 per cent. by the fourth and last.

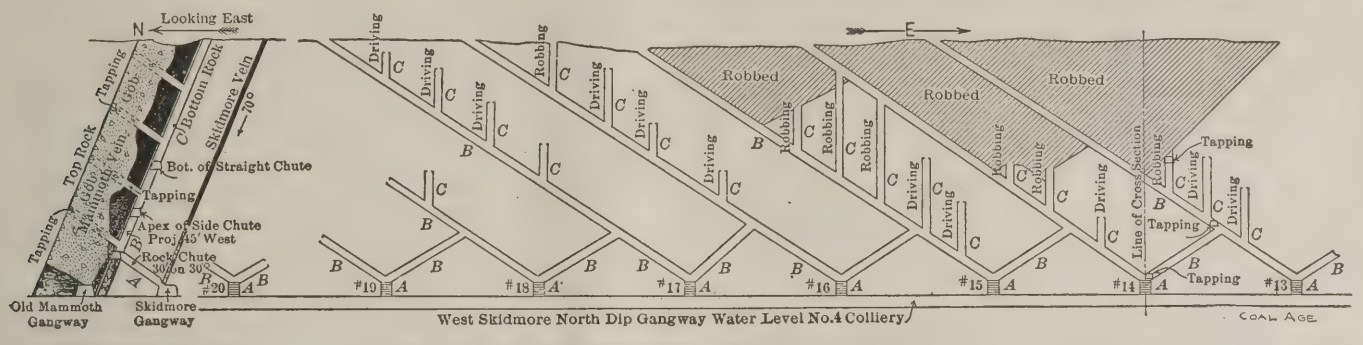
At Coal Dale No. 8 colliery workings, about 60 years ago the first gangway was driven in the Mammoth vein along the bottom rock, and mining was done by the old pillar-and-breast method. After the gangway had been driven to its limit it was robbed out. About 15 years later another roadway was driven through the same territory along the top rock of the vein, and this in turn was robbed out. About 30 years ago a third gangway was driven at a level about midway between the two just mentioned and the crop; later this roadway also was robbed out. Five years ago, believing there was a large quantity of coal to be won in this territory from the Mammoth vein, we began to drive a gangway in the Skidmore vein 30 ft. underneath the Mammoth and drove rock chutes, 100-ft. centers, to the old Mammoth workings. We figure the present recovery from this section at 10 per cent.

Only 64 Per Cent. Is Saved after Four Minings

If the present method of mining—that is, mining the Mammoth vein from the Skidmore vein by means of rock chutes—had been adopted in the original mining, not only the 10 per cent. now being obtained could have been recovered but also the 54 per cent. which has been secured only after driving the three gangways and their airways above mentioned, with their various breasts and chutes.

I have kept a record of the recovery and the cost of working 900 ft. of this territory during the past five years, and estimate that the $45,000 or $50,000 which these old openings cost could have been saved. The cross-section (Fig. 8) of the vein shows the position of the old gangways and the present Skidmore roadway.

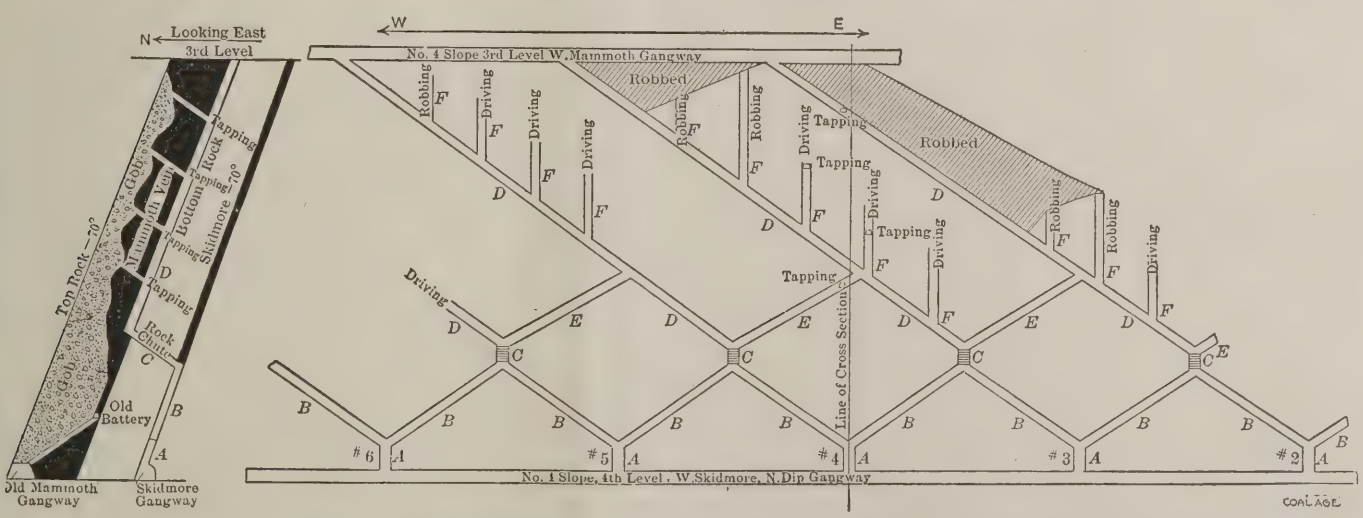
In mining very thick veins on steep pitches, it will



Cross-Section through Chute No. 14.

(A) Rock chutes from Skidmore to Mammoth; 6x8-ft. chute, 35 ft. on 35°, 100-ft. centers. (B) Slant chutes on bottom rock of Mammoth; 7x7-ft. chute on 35°, 300 ft. to surface. Side slants 55 ft. long. (C) Straight chutes up on bottom rock of Mammoth; 5x5-ft. chute, 60 to 100 ft. long on 70°, these chutes being on about 35-ft. centers, depending on condition of gob.

Fig. 6. Method of Working the Mammoth Vein, as Viewed at Right Angles to the Pitch. No. 4 Water Level, West Skidmore, North Dip Gangway



Cross-Section through Chute No. 4

(A) Straight chutes on bottom rock of Skidmore vein. Chute 15 ft. on 70°, 6x8-ft. chute, 140-ft. centers. (B) Slant chutes on bottom rock of Skidmore vein. Chute 80 ft. on 35°, 6x8-ft. chute. (C) Rock chutes from Skidmore to Mammoth. Chute 30 ft. on 35°, 6x8-ft. chute. (D) Slant chutes on bottom rock of Mammoth vein. Chute 300 ft. to third level on 33°, 7x7-ft. chute. (E) Slant chutes on bottom rock of Mammoth vein. Chute 80 ft. on 35°, 7x7-ft. chute. (F) Straight chutes on bottom rock of Mammoth vein. Chute 60 to 100 ft. on 70°, 5x5-ft. chute, 35-ft. centers.

Fig. 7. Method of Working the Mammoth Vein, as Viewed at Right Angles to the Pitch. No. 4 Slope, Fourth Level, West Skidmore, North Dip Gangway, Lansford Colliery

always be possible, even though the most improved methods are used in the original mining, to win some coal by re-mining, but the cost of obtaining what remains will depend upon market and wage conditions, and may be prohibitive.

Many years ago no coal except that of the very best fracture and best appearance was mined, because it was the only kind found salable. Also, only sizes above chestnut (made over a 7/8-in. round screen) could be sold. In recent years, all sizes including No. 4 buckwheat (made over a 1/16-in. round screen) are easily salable, and as a consequence, territory that years ago could not possibly be mined at a profit can now be made to pay.

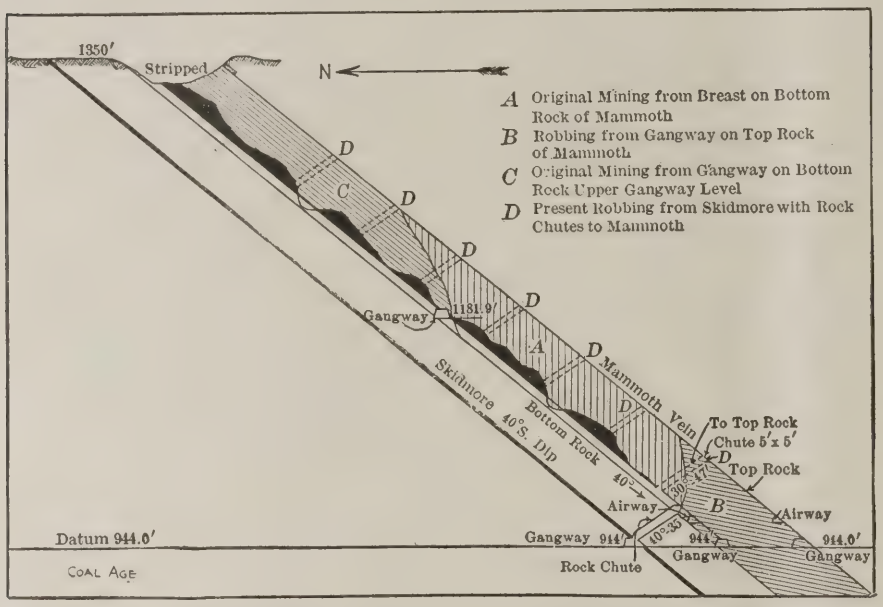


FIG. 8. CROSS-SECTION SHOWING ORIGINAL MINING AND PRESENT ROBBING OF MAMMOTH VEIN, WATER LEVEL, COAL DALE COLLIERY

THE USE OF PANELS

It has been found of great advantage to make panels of a territory where coal is virgin or where the distance between the Skidmore and the Mammoth veins is too great for practical use of rock holes. The length of these panels depends upon the distance between the veins, in some cases being 600 ft., and varying up to 1200 ft. The paneling system has been much extended during the last five or six years in the Panther Creek field, and the results have been so satisfactory that the new lifts are being laid out and worked on this plan. At practically all points, none of the veins underlying the Mammoth are workable.

The haulageway is being made in the Skidmore vein, which varies from a thin leader to 3 ft. in thickness, and tunnels are being driven at 1000-ft. intervals from the Skidmore to the Mammoth, Primrose, and Orchard veins, and gangways opened in both directions off the tunnels, thus making a section of about 500 ft. of each gangway which can be mined and robbed. This will allow an increased number of working faces, and also will greatly reduce the time during which the gangways must be maintained. In years to come this will result in a great saving in the mining of the Mammoth vein.

Where a panel tunnel is driven a pillar is left over it, this pillar being recovered when the gangway is being robbed out. At every 10 breasts a solid block of coal is left; that is, the coal which would be mined by the eleventh breast is left solid with the exception that the gangway and airway are driven through it. This block is mined on the retreat. It is left on the advance so that in case of a mine fire a solid piece of coal is available from which to begin operations. These pillars also tend to stop a "creep."

ROBBING PROGRESS SHOULD BE SLOW

Experience has shown that the best results in robbing the Mammoth gangway, where the vein is 50 ft., or thicker, are obtained when the face is brought back 80 to 120 ft. per year. To many people this has seemed unnecessarily slow, and many attempts have been made to hasten the work, but in every case these has been a decided loss in the amount of coal recovered. This is due to the disturbance of the thick vein matter, causing a general squeeze a considerable distance back from the point of actual robbing. This makes the maintenance of the gangway not only costly but almost a physical impossibility. In some instances a couple of hundred feet of gangway has been lost, owing to quicker robbing than that mentioned.

THE NEED FOR PANELING METHODS IN NEW WORK

When opening a new colliery or a new lift at an old colliery, the question often arises whether it is not better to drive gangways and airways to the boundary limits before opening breasts; also whether it is advisable to open two lifts instead of one. I believe that with the proper system of paneling better results can be attained, because it is possible to have several working faces instead of one, permitting a quicker development. These panels can then be robbed out in a reasonable time, thus preventing heavy timber maintenance cost.

With the system of driving the gangways to the limit there is a period when nothing but development work can be done, and later nothing but robbing work, whereas in the paneling system some sections can be robbed while others are being developed, thus keeping the product of more uniform quality.

The driving of the gangways and airways in the Skidmore vein has not only reduced the timbering expense, but it has improved the ventilation, for the reason that, the vein being so thin, there are no falls to block the airways.

Let Us Publish a View of Your Mining Plant

COAL AGE invites all its readers to send in large photographs, showing either outside or interior views of coal-mining plants. These pictures will be reproduced on our front cover, and a liberal payment will be made for them. If one photograph alone is used, it must be as high, or a little higher than it is wide. All views should be as large and clear as possible.

West Virginia Coal Mining Institute Meeting

By J. T. Beard

The West Virginia Coal Mining Institute held its fourteenth semiannual meeting at Huntington, W. Va., Dec. 10 and 11, 1914. In the absence of Neil Robinson, president of the Institute, owing to his serious illness, the meeting was called to order at 10:30, Thursday morning, Dec. 10, by J. C. McKinley, one of the vice-presidents of the Institute. The meetings were held in the assembly room of the Frederick Hotel.

In a few well chosen words, Mr. McKinley welcomed the members and guests present and emphasized the importance and purposes of the Institute. No expense is spared by the West Virginia operator to establish ideal surroundings and conditions in and about the mines. He considers these essential in order to attract a high class of labor. He believes in educational extension and welfare work as a means of bettering the condition of his employees.

After these few remarks, the chairman of the meeting introduced Mayor Floyd S. Chapman, of Huntington, who made a brief address of welcome and was followed by H. A. Zeller, president of the Chamber of Commerce, who addressed the Institute, welcoming the members and guests present, and extending to them the privileges of the Elks Club, the Guyandot Club, and the Hippodrome, Lyric and Colonial Theaters. Mr. Zeller also stated that the jobbers and manufacturers of Huntington were arranging for a dinner at the Frederick Hotel, Friday evening, at 8 o'clock, at which all of the members of the Institute and their guests were cordially invited.

The Institute then listened to an interesting and valuable paper prepared and read by Richard Smethurst, Cincinnati, Ohio, on "Cost Accounting." This paper was followed by the reading of a paper entitled "Coöperation," which was presented by Col. Z. T. Vinson. This paper, as Col. Vinson stated later, was intended to draw the attention of the coal operators of West Virginia to the need of united action on their part for the purpose of fighting effectively the ever growing aggression of labor leaders. In his paper, Col. Vinson did not limit the effects of this aggression to the coal-mining industry; but stated that business men in general must take up the fight for the protection of their interests. He charged the United Mine Workers of America with being a socialistic body rather than a labor union. The discussion of the paper, following the noon recess, showed a decided unwillingness on the part of some of the members to go on record as indorsing in full the policy advocated, although the value of the paper was fully appreciated.

Following this discussion, in the afternoon, Frank Haas, Fairmont, read an interesting paper on "Mine Gases," which was thoroughly discussed by the members present. This was followed by an instructive paper entitled, "The Pottsville Measures West of the Kanawha and New Rivers," which was prepared and read by R. V. Hennen, Morgantown. Mr. Hennen illustrated his paper by reference to geological charts, showing the location and correlation of the coal measures in the state.

The Thursday evening session of the Institute was devoted almost wholly to the presentation of welfare work in coal mining. J. D. Van Scoten, Interstate Secretary for the Young Men's Christian Association in West Virginia and Maryland, with headquarters at Washington, D. C., offered a few introductory remarks, after which he presented Dr. Peter Roberts, New York City, who is a member of the International Committee of the Y. M. C. A., and is assigned to welfare work. The title of Dr. Robert's paper was "Teaching English to the Foreigner." Dr. Roberts explained his system of teaching the English language to foreigners and stated that this system had been quite generally adopted in different sections of the country. He emphasized the need of instruction in the commonplace details of everyday life and advocated discarding the use of textbooks prepared for schools and colleges.

An interesting paper entitled, "The Visiting Nurse," was read by Miss Mary K. Quick, Moundsville. Before adjournment was taken, a resolution was adopted expressing the sympathy and regret of the members, for the illness of Pres. Neil Robertson, who was detained at his home in Charleston. A committee was then appointed to prepare nominations for the election of officers the following day.

The Friday morning session opened at 10:30 o'clock and was devoted to the discussion of several important questions in coal mining, as follows:

1. What is the best roofing material for mine tenements?
2. Assuming the force system of ventilation, is a door regulator preferable to a box regulator?
3. Has the wisdom of the Compensation Law been proven by results so far obtained?
4. Are oil safety lamps to be preferred to electric safety lamps in gaseous mines?
5. Which is the best method of caring for the accumulation of dangerous gases in gob sections?

Officers Elected for the Ensuing Year

The discussion of these questions occupied a portion of the afternoon session. The election of officers, which followed, resulted in the choice of J. C. McKinley for president, for the coming year. In order to represent more satisfactorily the several mining districts of the state, the number of vice-presidents of the Institute was increased to five, and the following persons were chosen from the districts named:

Pocahontas district, Col. William Leckie, Leckie.
Kanawha district, Earl A. Henry, Charleston.
New River district, E. E. White, Glen White.
Fairmont district, George T. Watson, Fairmont.
Upper Potomac district, J. W. Bischoff, Elkins.

Prof. E. N. Zern, Morgantown, was reëlected secretary-treasurer. By the action of the Institute, Prof. Zern was authorized to secure the services of a stenographer to aid him in his arduous duties in promoting the interests of the Institute. In this connection, the members discussed the need of bringing the work of the Institute to the attention of the coal operators throughout the state, in such a manner as to impress them with its importance and advantage to the industry. Valuable suggestions were made by the members in respect to awakening a new interest and securing a more general attendance and support not only of the operators but of all mining men within the state. Some good work may be expected to be done along this line in the coming year.

What Would You Do If You Were the Boss?

THE problem illustrated in the cartoon from *Power* published below is one that every mine official has to meet on frequent occasions. It is an interesting and somewhat complicated situation that confronts the boss. All of the men before him are competent, loyal, of good character and good health.

The man in the chair is balancing in his mind "company duty," for he knows that a corporation must be human and recognize obligations of service, just as an individual must recognize them.

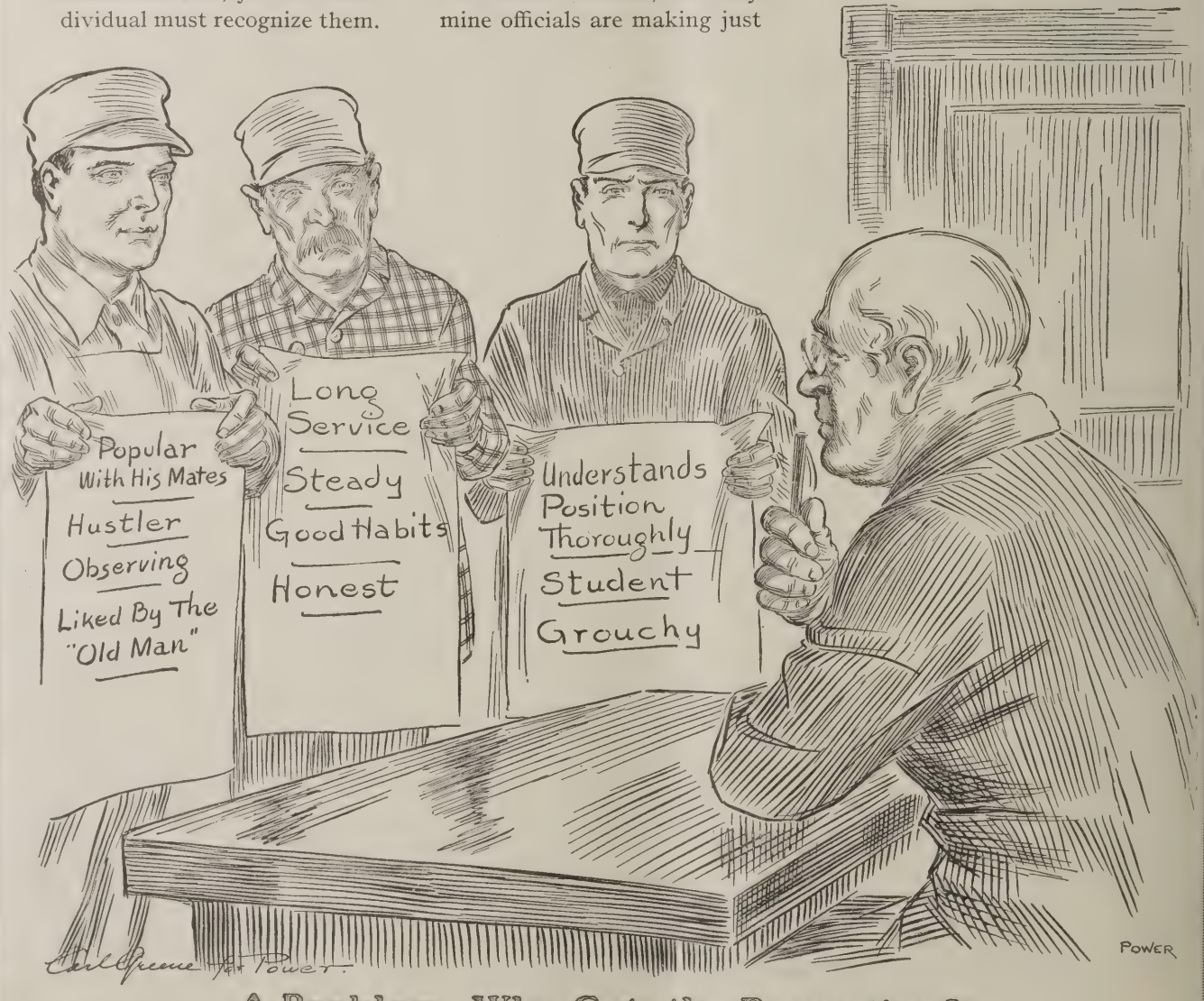
He is also carefully weighing the future value of each man's service; his ability to rise and meet unusual occasions, and his skill in dealing with his fellow-men.

The boss knows full well that his own success depends in large measure on his ability to surround himself with competent subordinates. Their mistakes reflect on him, and he must be responsible to the man higher up for *all* errors of the organization he has built.

The problem shown in the cartoon is a live one, for many mine officials are making just such decisions today. Therefore, it is worth discussing in Coal Age, *and we will pay* $10 *for the best answer reaching us before Jan.* 9. Other answers than the one taking first prize will be published and paid for at a liberal rate.

Each reply must be concise and contain not more than 500 words. The author's name will be published or withheld, just as he chooses.

Let us have answers from everyone to this most interesting question.



A Problem—Who Gets the Promotion?

Editorials

A Spurious Patriotism

We have a friend, who is not versatile but merely unstable. He has wandered around from one form of activity to another, lured by the specious brilliancy of projects he did not really understand and casting carelessly behind him opportunities more substantial, merely because he was able to weigh them more or less truly and, as a result, knew they would never prove bonanzas. He could believe anything he chose about distant, imponderable benefits, though they usually proved not merely delusive, but even actually unattainable, when pursued.

Our friend reminds us of one Commodus, who wore the imperial purple in Rome, who might have sought the dignity of being the greatest and most beneficent of a long line of emperors, few of whom were either great or beneficent. But, instead, enamored of the glitter of the amphitheater and the plaudits of the multitude, he chose to enter the arena and become a third-class gladiator.

With this preface we wish to speak of the enthusiastic spirit with which Americans have been urging themselves to enter into foreign markets. Look, we are told, at the success of Great Britain and Germany. Why should we not secure some of the trade which comes to them?

So one of our enterprising magazines, *System* by name, asked Sir George Paish's views on this subject. "It is all very easy to secure foreign trade," he replied in effect, "if you will only finance foreign enterprise. Pour your dollars into South America; give the merchants and manufacturers a long line of credit; build their railroads; erect their opera houses; open their harbors—and their trade will be yours."

And this is surely good advice—if we have the money to spend. Let us build up the Southern Hemisphere if we are satisfied that our work in the Northern is measurably complete. But if we think not, if we believe that we prefer to spend our money at home where we can watch it in businesses and among people we understand, we will not be so anxious to do what England and Germany have done.

In fact it has been stern, unrelenting, regrettable necessity which has forced the British and the Germans to do a world-wide trade. They did not have enough at home. We Americans would do better to congratulate ourselves on our home business, our home requirements, which have enabled us to conduct our enterprises without depending in large degree on foreign markets and getting the almost inevitable trimming which is the fate of those who invest in alien securities.

Some of us remember how the Barings and the Mildmays lost millions in South American securities and how other English bankers dropped other millions in the South after the Civil War. These are merely single instances of losses, for there is a continuous drain from all sources; oil, for example, in Calgary, rubber all over the tropical world and coal mines in the United States have severally removed the hard-earned cash from the pockets of the English, German, Dutch, French and Belgian people.

Let us then realize that American conditions are on the whole satisfactory and will not be modified materially until necessity causes a change. As profits decline in America, foreign investments will be more desirable and foreign trade will follow. Some of our products will be so desirable that they will make their way even where the British, German and other flags fly and also in those countries where the flags of those industrial nations are not seen outside the harbors and consulates.

We will not deny that there are some wonderful opportunities abroad, but we also know that there are splendid chances to lose money, much of it in fact destined by the investor to be expended abroad has been known to get little further than New York. Certain it is that our industries here need the money and can best be conducted with American capital. Why build up South America with United States savings and borrow five billions of British money to create our own industry?

We should not consider war as normal, but rather so regard peace; but this is certain—that while the war has crippled us severely, it would have been far more terrible had we a large foreign trade, investments in the lands of warring nations, larger indebtedness to belligerents and a merchant marine tied up in our harbors.

As good a creed as "America a world merchant" is "America for the Americans; our capital for our industries; our products for our people." However, it is not a very lofty or a very profitable gospel. It is as noble as "Every man for himself" and pursued to its ends would not rear a very lordly people.

So perhaps we might best continue to muddle along as before without any principles regarding foreign commerce, assured that when the times are mellow, Americans will, unquestionably, show their usual scent of an opportunity. Meantime, let us sympathize with the British and other nations, forced to risk their money abroad, compelled to rake the remote corners of the earth with a fine comb, needing to keep large fleets to protect their commerce and fearful lest a war should remove the basal supplies of their industries.

Reforming at the Wrong End

The principal duty of the Bureaus of Mines and Standards and the Geological Survey is to instruct. To do this they must first inquire. But on the whole of what good is inquiry if the person who makes it keeps the results to himself?

A regulation, newly enacted, requires all U. S. bureau officials to pay their own expenses when they attend conventions, unless those conventions are agricultural. The larger part of the work of governmental bureaus is not to add to knowledge but to disseminate it. How this can be done by officials kept immovably at one spot we cannot see. In fact, in view of these regulations we wonder whether Congress has these bureaus merely for the gratification and glorification of Washington, D. C., or

to promote the advance of industry where men are actually at work.

In fact, all our economy today involves the idea that anything wasted on the public outside the big cities is to be deplored whether it be money on a post office at Punxsutawney, Penn., or the time of a lecturer at Terre Haute, Ind. But after all, the people who live in these rural communities *are* worthy of some consideration. They *also* pay taxes and also, as has been often deplored, have votes.

Congress has shown its sense of this fact by relieving the agricultural convention from bureaucratic absenteeism. Let the national legislature also show it by making it possible for the Bureau of Mines and the Geological Survey and other like organizations to do their work effectively wherever voters who are interested are to be found. Incidentally the members of those bureaus will learn something about mining and geology and even about the plain people which they could never learn in the civic centers to which Congress would confine them.

Many organizations are doing work as valuable in their sphere as is the federal government. One of them, the American Mine Safety Association, was even fathered by the federal Bureau of Mines itself, and was an attempt to induce the operator to second the efforts of the United States government. Now even the officials of that organization who are still U. S. employees cannot look to the government for their traveling expenses and from the very first have had to be relieved of membership dues. This is a disgraceful situation for a government which is always condemning the coal industry for a lack of liberality.

The Congressional—we will not say the national—attitude to learned and beneficial societies contrasts unfavorably with that of some foreign countries. There a subsidy is given or a secretary is paid, and the educational work is thus gratefully acknowledged. We do not, however, urge any such contribution to our institutions.

The dues in none of our national institutes are paid for their employees by the government. The officials must appear either as guests who are unwilling to pay their due part of the score or, if prominent officials, must expend their already inadequate salaries in the membership fees of a dozen different national organizations for the good of their niggardly master.

It is all wrong. Bureaus are intended to instruct industry and to that end to become acquainted with it. If not for that, let them be swept away. What use is there in our expending our money on them?

A Little Help Would Be Welcomed

It is doubtful if there has been a time within the memory of any of us when there have been as many coal miners on the verge of actual want as are to be found at the present time.

It is true that there are not many idle miners, but most mines are running on very slack time, so slack in fact that the employees are hardly able to buy meat and bread with their earnings.

Miners are as a rule rather improvident, and no matter how large their previous earnings, slack work always finds many of them unprepared.

The circumstance that brought the condition of our miners most forcibly to our attention was the attitude of the coal-mining camps toward the Belgium relief fund. When it comes to raising funds for the relief of the distressed, coal-mining communities have always given most liberally; in fact, it is doubtful if any other class of men give as liberally, taking everything into consideration. But just now our coal miners have nothing to give, and the Belgian solicitors, in most cases, have met with disappointment.

The coal-mining industry never fails to get its share of publicity, but in the present crisis, it seems to have escaped.

The papers have been full of details about lack of employment in the steel industry, the iron industry, and manufacturing industries of all description, but that there is suffering in the mining camps has escaped their notice.

A little publicity of the right sort, just now, might be welcomed. Among other things it would show that company stores and company houses have been responsible in many cases for men without funds or credit being able to keep the wolf from the door and the door under a roof.

Judge Dayton Protects Coal Interests

The decision of Judge Dayton continuing the receivership of the Four States Coal Co., of West Virginia, for six months longer meets the hearty approval of coal men everywhere. This judicial ruling affords the company a new lease of life, and may save several hundred thousand dollars to the company's unsecured creditors.

The Four States Coal Co. is a valuable property and in normal times should be able to rapidly liquidate its burden of indebtedness. John H. Jones, the chief figure in the development and operation of the company's mines, is a coal manager of long experience and recognized ability. It is to be hoped that before the new extension in time has elapsed, the company will effect a satisfactory reorganization so that no such serious losses will be brought to the present stockholders.

It is gratifying to know that some of our courts are ready and willing to recognize that the present time is not propitious for the forced sale of valuable mining or industrial property if such an unfortunate outcome can in any way be avoided or postponed. It is the duty of everyone, in these times of stress, to extend a helping hand whenever and wherever possible. We, therefore, commend the wisdom and forbearance of Judge Dayton's decision.

Carl Scholz Again Heads Mining Congress

The American Mining Congress, at its recent meeting in Phœnix, Ariz., reëlected Carl Scholz, of Chicago, as president. No more fortunate selection could have been made, for Mr. Scholz has proved himself an organizer and executive of superior rank. Some of the most important work in its history was accomplished by the "Congress" during the past twelve months, and its finances have been immeasurably strengthened. We congratulate the Congress and Mr. Scholz and prophesy that 1915 will be the best year in the life of the American Mining Congress.

The 40c. Reduction in Anthracite Freights to Philadelphia

SYNOPSIS—After a rather weak defense on the part of the railroads, the Pennsylvania State Commerce Commission has ordered a heavy cut in freights to Philadelphia. Preparations are under way to carry the case to higher courts.

The decision of the Pennsylvania Public Service Commission that the anthracite roads must reduce their freight rates to Philadelphia 40c. per gross ton, is one of the most sweeping reductions in rates ever made. That the railroads will appeal from this decision and carry it to the Interstate Commerce Commission and the courts if necessary, is a foregone conclusion; they cannot afford to do otherwise.

The amount of anthracite coal consumed in Philadelphia in 1913 was 3,775,701 tons, practically all of which was used for domestic purposes and for heat, light and power in office and store buildings, apartment houses and hotels; the use of anthracite as a steam fuel for manufacturing plants has almost entirely given way to the bituminous coals of lower ash and higher heat value, or to mixtures of anthracite and bituminous, the former added in order to lessen possible smoke production.

The reduction in freight of 40c. per ton applies to pea coal and all prepared sizes; for the smaller sizes, the reduction is from 21 to 25c. per ton. Taking the proportions of these sizes as shipped from the mines in 1913 and applying these figures to the Philadelphia consumption (for which no tonnage of different sizes is available) we have the following:

	Gross		Philadelphia
	Tons	%	Tons
Prepared sizes	43,688,694	61.7	2,329,607
Pea	8,142,571	11.2	422,878
Sizes smaller than pea	18,927,047	27.1	1,023,216

On this basis, the total freight reduction would amount to about $1,356,798. How much of this amount will be saved to the people, remains to be seen.

The railroads do not seem to have made a very strong defense of their position. The fact stated by the Commission in its opinion, that the present rates had been in existence for between 17 to 24 years, without any revision must have told against them.

The admission of the railroad officials that they did not know, nor had they ever tried to ascertain the cost of transportation on anthracite coal to Philadelphia, that it was practically impossible to ascertain this cost, was certainly a rather unwise statement, to say the least.

The Question of a Differential

Charging a lower rate on coal for shipment "beyond the Capes" than that for local delivery is entirely in line with the practice elsewhere under similar conditions and its reasonableness has not been questioned. The Norfolk & Western, for instance, as well as the Chesapeake & Ohio and Virginian Railways have always had a lower rate on coal for shipment beyond limits of Chesapeake Bay than for Norfolk or Newport News, $1.40 per gross ton being the rate for outside coal as against $1.50 per net ton for local delivery.

The basis of such differentials is, of course, the necessity of meeting competition at points beyond the Tidewater shipping port. But on all the prepared sizes of anthracite, their is no competition except with anthracite; it is only the small steam sizes that compete with bituminous coals in the coastwise markets.

As far as the exports of anthracite coal from Philadelphia are concerned, the amount is so small that they need not be considered, only 63,481 tons last year. And there never will be a foreign market for anthracite. It is not used in South America and the European countries can get their supplies from Great Britain, which has a better grade of anthracite than any in this country.

A similar differential between local and outside rates exists at Philadelphia on bituminous coals, but no mention is made of this fact in the decision, although the rates per ton-mile for export and outside bituminous coal are given.

The findings of the accounting experts, employed by the Commission, as to the transportation costs on anthracite coal to Philadelphia, as compared with rates per ton-mile on other roads, apparently told strongly against the anthracite railroads' case. The rate of $1.55 per gross ton, a 2.5 mills per ton-mile on the Chesapeake & Ohio Ry. from Marrowborn, Ky., to Newport News, a distance of 623 miles (not 673 as given) is rather beside the question, as no coal is shipped over that route.

Prejudice against the Hard-Coalers

There is another point that does not seem to have been considered by the Commission which is, that it costs the railroads more to deliver anthracite coal to local points by rail than to the coal piers. This is due to the greater amount of switching on local deliveries, as well as to the interest and depreciation on city tracks and switches.

As to the opinion of the people generally, there can be no question but that there is a deep-rooted feeling among all classes against the anthracite roads and this feeling was bound to have an effect upon the Commission and to have had a certain influence. The statement by the Commission that the evidence in this case points strongly to the conclusion that the respondent railroad companies exercise an extended influence over the output and disposition of anthracite coal, is certain to intensify the general feeling of distrust.

If the opinion of the Commissioners is to be contested by the railroads, they should put up a much stronger line of evidence than they did and they should make greater efforts to educate the general public as to the true state of affairs from their standpoint.

The "Boston News Bureau" makes the following comment on the decision: "The new order will disturb a number of transportation questions which have been thought to have been settled in the past 15 years by legislation and regulation, state and national. The long and short haul, lake and rail rates, the interchange traffic between railroads, all questions as to competitive water and rail business and many other apparently settled transportation problems are reopened by the order. The possibility that the Interstate Commerce Commission may at any time hand down a decision in reference to interstate anthracite rates does not tend to make the future clearer."

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 12—I have been much interested in reading the many letters relating to mining laws and mine regulations. I want to say, here, that the Bituminous Mine Law (1911) of Pennsylvania is, in my opinion, the best that I have ever read. I am fully convinced that, if the requirements of this law were fulfilled, there would be very few mine accidents, notwithstanding the recognized hazard of this industry. When one reflects on the importance of taking precautions to secure and maintain certain conditions in the mine, it is strange that mine officials will permit gross violations of the law to pass unnoticed. An experience gained in 16 mines of this state allows me to say that the requirements of the mine law are not fulfilled in any one of them.

I recall an accident that is a simple illustration of what occurs almost every day in our mines. In this case, the fireboss had inspected the mine for the second time that day, while the men were at work. The assistant mine foreman had also made an examination of the workings the same day; but neither of these men had found anything wrong. It so happened that in one of the rooms, in this mine, a thin rib of coal had been left to shut off the gob and prevent the coal that was mined from mixing with the waste. At the time to which I refer, two men were drawing back the rib in this room; and they had evidently decided to mine this thin rib of coal next to the gob, to a sufficient depth to enable it to fall before morning. While engaged in this work, the coal toppled over and caught one of the men, injuring him so badly that he died three hours later.

In this case, the question may be asked, Who was to blame? I may say that the superintendent and mine foreman severely censured the fireboss, since the two miners had loaded from eight to ten wagonloads of coal off this barrier, after the fireboss had examined the place. I may add, however, that if this fireboss had found danger to exist in the place, he would have withdrawn the men and placed the required danger signal at the entrance to prevent anyone from entering the room without being warned of the danger.

In the same connection, I want to say that, in my opinion, "assistant mine foreman," referred to in Letter No. 8, COAL AGE, Dec. 12, p. 958, after discovering the need of securing the roof in a working place in the mine, should have remained long enough to see that his orders were carried out and the place made safe for work. While it is true that many mine officials would hesitate to take action against the man who escaped injury, in the first case mentioned, I believe this should be done in order that he will not try the same trick again, and thereby endanger not only his own life, but the lives of all in the mine.

According to statistics, the majority of mine accidents are caused by falls of roof and coal. It is clear, therefore, that mine laws and regulations should be specific in regard to the removal of dangerous coal, rock and slate; and that these laws should be strictly enforced and obeyed. In my opinion, the miner should be held responsible, to a certain degree, for the condition of his working place; and if he neglects to timber or otherwise make his place safe for work, I believe that he should be compelled to serve a jail sentence, without the necessity of prosecution.

Let me say that it matters not what is preached or taught, we must face the fact that accidents still continue in mines. Then, let us have legislation that will compel miners and mine officials to make a more thorough inspection of working places and to secure all dangerous roof and coal. In other words, let us fix a higher standard of inspection of all working places and the most improved methods of timbering the roof and coal. I believe the adoption of this policy in every mine would soon put a stop to miners taking the risks they are prone to assume, especially if examples were to be made of neglect or willful violation of the known rules and regulations in our mines.

It is not my desire, in what I have said, to lay the blame wholly on the miner, as much of the blame must be laid at the door of the superintendent, mine foreman or his assistant and the firebosses employed in mines. However, there is too great a tendency to shift the blame, in such cases. Therefore, mine legislation should be such as to hold the employer and employee proportionately responsible for the maintenance of safe conditions throughout the mine.

PENNSYLVANIA FIREBOSS.

———, Penn.

Letter No. 13—I was much impressed by Letter No. 8, relating to mining laws, COAL AGE, Dec. 12, p. 958. I read this letter with careful attention. It certainly teaches every coal-mining man of wide experience, regardless of whether he is a miner or an operator, that it is useless to have good laws compelling the safe operation of a mine, unless the miners themselves will obey the laws and observe carefully the mine regulations designed for safety.

No doubt many will argue that any miner who will refuse to obey the company's rules, or who neglects to follow the mine foreman's orders, is an "undesirable" mine worker and should be punished to the full extent of the mine law. In some few cases, perhaps, a miner guilty of disobeying orders or violating rules and regulations is discharged and not permitted to again enter the mine; but, too often, no notice is taken of the matter further than to reprimand the offending miner, who is then permitted to return to his work.

It is easy to see that such law-violating miners are constantly taking chances, because they know the time when the mine foreman, or one of his assistants, is liable to visit his working place. As soon as his place has been inspected, such a miner will proceed at once to follow his own inclinations; and, as a result, a "windy shot"

occurs or a loose piece of slate falls, owing to the miner's neglect to follow the foreman's orders to stop work at once and set the necessary posts to secure the top. I would like to ask, Can anyone tell me who is responsible for such acts of recklessness and disobedience of orders? In most cases, the law does not indicate who is the responsible party.

Considering the mine as a whole, the greatest number of accidents happen in the working places, after these have been inspected, and in the absence of any mine official. There are, in fact, comparatively few accidents that happen on the main roads and entries of mines, caused by defective installation of electric wires, or improper timbering, or lack of timbering, or insufficient ventilation, or other cause that can be attributed to the improper management of the mine.

I witnessed such an accident some time ago, where a driver was squeezed between the car and the rib, because sufficient room had not been provided at the side of the track for one to pass the cars. For such an accident, the management of the mine should be held responsible. Another instance of company liability is where an incompetent foreman permits a man to work in a place that is dangerous, or orders him to draw timber where an accident is liable to occur.

The employment of a large number of foreigners, in a coal mine, makes it important for the mine foreman in charge to carefully inspect the work of this class of employees. He must acquaint himself with their habits and methods. He can judge largely from their output of coal and the appearance of their working places. For example, in respect to shooting the coal, two experienced miners can dislodge from 100 to 135 tons of coal, per keg of powder used, assuming a 4-F grade of black powder and a reasonable thickness and shooting quality of the coal. Estimating on such a basis, an intelligent foreman can soon tell who is "bumping" his coal off the solid without properly mining the seam. Such practice is particularly dangerous in a gaseous mine.

In every coal-mining state there should be a law compelling all miners to have a certificate showing their capability to mine coal in a safe and proper manner. Many Austrian and Italian miners, now employed in mines in this country, never saw the inside of a mine before coming here. They are unacquainted with the requirements of the mining law and, in many cases, cannot speak, read or write the English language. It requires a closer watch to see that these men do nothing to endanger themselves and other workers in the mine. This is one of the hardest problems the mine foreman has to meet.

In most cases, when a man is injured or killed as the result of his own neglect or disobedience of orders, he or his family are led to blame the company; and suit is frequently brought to recover damages. An example of this recently occurred in one of our mines where a man was crushed under a fall of slate, owing to his own neglect to properly support the roof. In another instance, a company recently paid the injured man $500 and all incidental expenses for an accident that was easily attributable to his own carelessness and neglect. I have offered these comments in the hope that they may help to secure the needed improvements in state mining laws, for the protection of both the employer and the employed.

J. M.

———, Ala.

The Foreigner in Mining

Letter No. 10—I have been greatly interested in reading the previous letters relating to the foreigner in coal mining. I understand the term "foreigner," as used in this connection, to refer to that class of immigrants that come from central or southern Europe, such as Poles, Slavs, Austrians and Italians.

While the letters discussing this subject have been interesting, most of them showing a broad knowledge of the subject, they have all emanated from those who view the condition of the foreigner from one and the same standpoint. These letters have come from those in direct contact with the foreigner and, in many cases, from the employers of this class of labor. I believe that the views of the more educated foreigner would be interesting and valuable. There are, in America, thousands of foreign-born mining men who have become Americanized, and who have been educated according to American ideas, and have adopted American standards of living.

My aim in the present letter is to appeal to this class of the foreign element to give us the benefit of their suggestions. Such educated and Americanized foreigners should know the best methods to adopt to reach the uneducated classes of their races. They should be able to suggest what treatment will lead the foreign immigrant to an appreciation of American conditions and American culture. They should be able to point out clearly the methods often employed that may, however well intentioned, embitter the very ones they are intended to interest and educate.

Knowing the impartiality of Coal Age, I make this suggestion in the full assurance that such contributions will be gladly welcomed. Such an intelligent summing up of the needs, aspirations and difficulties encountered by the foreigner in his transition from his previous environment to American citizenship, as told by those who have successfully passed through the ordeal, cannot fail to interest all coal-mining men and especially employers, superintendents, and foremen who are in daily contact with this class of labor.

At this time, especially, when so many improved methods and so much improved equipment are being used in mining, requiring intelligence and skill on the part of the worker, any suggestion relating to the training and education of mine employees is worthy of earnest consideration and effort in their behalf. This work has gained a great impetus in recent years and bids fair to accomplish much, in the future, for all classes of coal-mining men.

My own experience with the foreigner is somewhat limited, and, for this reason, any theory I might advance, as to their treatment, would necessarily lack weight. However, I am fully convinced of the great value of education, in the treatment of the foreigner. The methods and details of proceeding must, of course, be suited to conditions as they exist. My experience in life has taught me that *education is the greatest leveler of humanity.* Therefore, whatever methods are used to improve the condition and to utilize to greater advantage this class of labor in mining, the first aim should be to *educate them.*

In studying the question of foreign labor, we must remember that ignorance cannot appreciate knowledge,

but knowledge can always measure ignorance. It is therefore incumbent on those who have enjoyed the advantages of education to do everything possible to uplift those whom adverse conditions have deprived of this advantage. It must be remembered that whether or not there is a desire to learn, the faculty of learning exists; and the task of teaching is not, therefore, a hopeless one, though it may have limitations.

In closing, I want to relate an incident that may not only be suggestive but helpful. I recall a man of my acquaintance who had a college education and had reared and educated a family of children, instilling into them *an appreciation of the best things* and *a desire to accomplish great things.* Until, one day, he told me something of his earlier life, I could not understand his genuine sympathy with the "knights of the road." Hoboes, tramps of all sorts and conditions were received by him and given food, clothing and shelter; but, more than this, he conversed with them easily and willingly, as with those of his own circle and acquaintance. The early life of this college-educated, cultured man was associated with the gypsies. Born in a covered wagon while his father was on a horse-trading trip, his boyhood was passed in a community where the men spent their time in smoking and were supported by the women who wove baskets for a living.

The picture was a familiar one to me as it recalled a summer's vacation spent near a village of low huts, with earth floors, a few boxes for seats and a bunk for a bed. The women were barefooted, unkempt and clad in faded and dirty clothes and surrounded by dirtier children. On the outskirts of the village were picketed a few raw-boned half-starved horses. Calling to mind this picture, I could not but wonder how this man had escaped such an environment. He could not explain, except to say that he had *a desire to grow, to know and to accomplish.* Not only had he risen himself, but he had elevated his children to a higher plane of living, so that they never knew the ignorance, drudgery and immorality that marked their father's early life.

The same uplift is possible in respect to the foreigner. Educate him and he'll see to it that his children are educated. Instruct him in better and more sanitary ways of living, and his children will follow. Teach him the principles of American citizenship and culture, and a generation of good citizens will be produced.

America is, in a sense, *the melting pot of nations,* and it is important to recognize that education is a factor that makes for higher ideals and a higher standard of living, morally and industrially.

GEO. N. LANTZ.

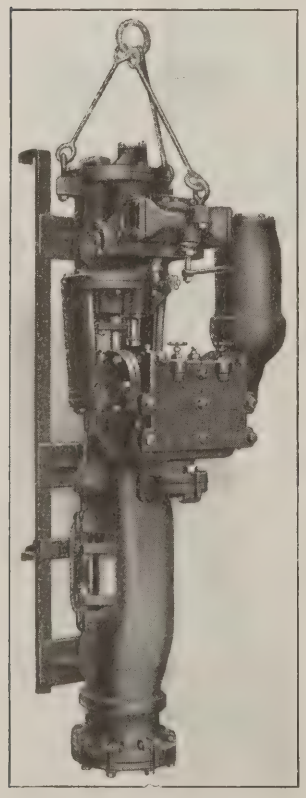
New Straitsville, Ohio.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Sinking Pumps—The class of pumps commonly known as "sinking pumps" differ from other types only in their form of construction, which adapts them to hanging in a shaft, during the process of sinking.



SINKING PUMP

Sinking pumps are mostly of the **plunger type,** because this class is less subject to wear in the handling of the shaft water, which always contains more or less sand and grit. In the **Cameron pump** shown in a front view on this page and in vertical section on the opposite page, the wear of the packings is greatly reduced by the sand pockets, located above the single stuffing-boxes.

Another distinguishing feature of this pump is the form of hinged bolts used to secure in place the suction and bottom covers, the valve-chest bonnet and stuffing-box caps.

In this pump, also, the discharge or column-pipe and air-chamber connections are interchangeable. Also, the steam supply and discharge lines can be connected on either end of the steam chest. These simple provisions greatly facilitate the handling of the pump in a shaft where room is limited and every possible means must be employed to save time and labor and economize space. This pump is an outside center-packed plunger pump.

The two valves shown above the valve chest are for the purpose of priming the pump. It is claimed that these priming valves, as arranged in the Cameron pump, are a distinct advantage over the usual arrangement, inasmuch as they permit the water from the column pipe to flow into the valve chest and thence into the pump barrel, without entering the suction hose of the pump. As the latter is designed to resist collapse only, it would frequently be in danger of bursting if subjected to the full pressure of the column pipe when priming the pump.

The Coal Age Pocket Book

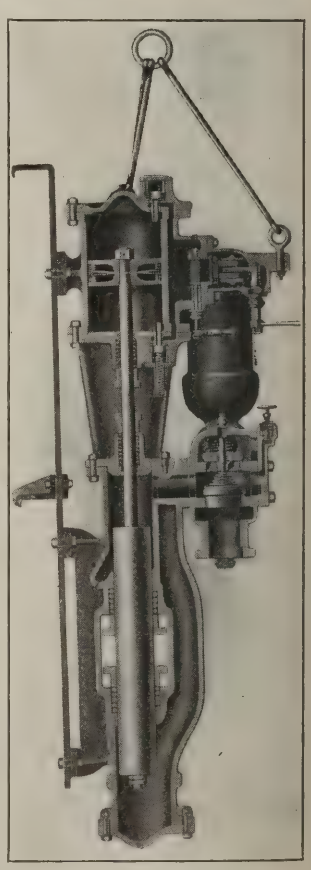
Use of the Sinking Pump—Sinking pumps are designed to be suspended in a shaft while the operations of sinking are in progress. Attached to the end of a cable, the pump is lowered to within 15 or 20 ft. of the bottom, where it is hung on cross-timbers or buntons, by means of the suspension frame or hangers shown in the accompanying figures. The pump is then ready for operation when the steam lines and suction hose are connected.

Operation of the Pump—To start the pump, steam is turned on, slowly at first, and the priming valves opened to allow the water in the column pipe to fill the valve chest and the pump barrel. As soon as the pump begins to draw or "takes water," the priming valves are closed and no further attention is required. It is important when shutting down a pump in cold weather to open the drips so as to enable the water to drain off and avoid trouble from freezing.

Requirements in Sinking Pumps—A sinking pump, above all, must be strongly built to withstand the rough usage it will receive in the shaft, owing not only to collision with shaft timbers when lowering or hoisting the pump, but because of possible injury from the blasting of rock to which it is constantly exposed. There must be no projecting valves, levers or other light parts that may be easily broken off by contact with timbers or flying rock.

The construction of the pump must be simple and such as to give ready access to all valves and stuffing-boxes, for the purpose of removing any obstruction or renewing worn parts or packing.

The size of the pump shown here is 12x7x13 in.; its weight is 3400 lb.; and its capacity at ordinary speed is 200 gal. per min.



SECTIONAL VIEW

Inquiries of General Interest

Hoisting in Slopes and Shafts

If an engine of 300 i.hp. will hoist a load of 30 tons, gross weight, from a slope having a grade of 45 per cent., how many tons, gross load, will the same engine hoist in a vertical shaft? Assume the length of the slope and the depth of the shaft are each 500 ft.

JUSTUS VOLK.

Boswell, Penn.

In answering this question, we will assume that, in the slope, the gross weight W_1 includes the weight of the loaded cars and the rope; and, in the case of an unbalanced hoist in a single-compartment shaft, the gross weight W_2 includes the weight of the loaded cars, cage and rope hanging in the shaft; or in the case of a balanced hoist in a double-compartment shaft, the gross weight W_2 includes only the unbalanced weight of the coal hoisted and the rope hanging in the shaft.

Then, assuming that the engine is operated at the same speed and develops the same power when hoisting in the shaft as when hoisting in the slope; but that the arrangement is such as to provide the required speed of winding or velocity of rope, v_1, in the slope, and v_2, in the shaft; and taking the inclination of the slope or the slope angle as A, we have, since the work performed is the same in each case,

$$W_2 v_2 = W_1 v_1 \left(sin\ A + \frac{cos\ A}{40} \right)$$

Applying this formula to the case in hand, it is necessary, first, to calculate the slope angle for a 45-per-cent. grade. Estimating the grade as the vertical rise per 100 ft. horizontal distance, the tangent of the slope angle for a 45-per-cent. grade is $tan\ A = 0.45$; and $A = 24°\ 14'$. Hence, $sin\ A = 0.41045$ and $cos\ A = 0.91188$.

Now, assuming a speed of hoisting in the slope, $v_1 =$ 8 ft. per sec., and in the shaft, $v_2 = 20$ ft. per sec., and substituting values in the above formula, we have, for the gross load W_2 that can be hoisted in the shaft, by this engine, under the assumed conditions,

$$W_2 = \frac{30 \times 8}{20} \left(0.41045 + \frac{0.91188}{40} \right) = say\ 5\ tons$$

In considering such a question as the above, it is important to remember that winding engines such as are ordinarily used for hoisting coal from slopes or shafts, are commonly designed for a piston speed varying from 600 to 800 ft. per min. In coal-mining practice, the speed of the mine cars commonly varies from 475 ft. per min., or 8 ft. per sec. (5.4 mi. per hr.), to 625 ft. per min., or 10.4 ft. per sec. (7.1 mi. per hr.).

On the other hand, the speed of hoisting in vertical shafts may vary from 15 to 50 ft. per sec., depending on the depth of the shaft and the general equipment and requirements in respect to the desired output of coal. In the above solution, we have assumed as the speed of winding, in the slope, 8 ft. per sec., and, in the shaft, 20 ft. per sec. It is possible to assume other speeds and obtain varying results by substituting other assumed values in the above formula.

The Ramsay Revolving Car-Dump

I was greatly interested in the article of H. S. Geismer, COAL AGE, Sept. 12, p. 412, describing the Ramsay revolving car-dump, in operation at the Woodward iron mines. I notice it was also stated that several of these dumps are in operation at coal mines in different states; namely, Pennsylvania, Tennessee, Alabama and Utah. Mr. Geismer has described a number of the advantages of this style of dump, but failed to mention the *disadvantages* of which some doubtless exist.

There are several questions that arise in my mind, in regard to which I should like more information. For instance, how is rock or other waste handled; or, is this dump adapted only to the handling of material containing no waste?

Another question is, what kind of coupling is used between the cars? An ordinary link-and-pin coupling could not be used evidently, as the pin would fall out when the dump turned over. If a pin is used having any sort of locking device, would it not be necessary to have a man inspect the trip as it comes from the dump, to make sure that none of the pins have worked loose, which would allow a portion of the trip to run wild down the slope?

When and how are the cars oiled; and does the use of this style of dump very materially reduce the working force required on the tipple, as compared with that required in the operation of the crossover dump? These are some of the questions I would like answered.

M. L. O'NEALE,
Coal City Mining Corporation.

Coal City, Ala.

Replying to the above questions which were submitted to him, Mr. Ramsay states that where it is desirable to provide for the handling of waste material, this can be accomplished by installing a movable apron that could be adjusted to carry such material to the proper chute. This was not done at the Woodward mine, as there was no waste material to be handled.

Mr. Ramsay also states that the inclination of the track on the Woodward dump provided a sufficient tension in the car couplings to prevent the pins from dropping out when the dump turned over. In this arrangement of the dump, there is no necessity for a locking device to secure the pin, and no inspection of the trip is required after dumping. In the use of this dump, no accident from this cause has ever been reported.

The H. C. Frick Coke Co. has recently installed one of these dumps at one of their mines in the Connellsville region. The dump has a capacity for handling 18 cars at a time. The cars are oiled in the mine and but one man is required on the tipple to weigh and dump the trips and remove the checks from the cars.

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—How should explosives and detonators be handled and taken into a gaseous mine?

Ans.—Detonators should never be carried into the mine in contact with or in the same receptacle with powder or other explosive. Detonators should be carefully wrapped and carried in a small box or tube where they will be protected from an accidental blow or friction with other material.

Only sufficient dynamite or powder should be carried into the mine, at one time, for use during that shift. This amount should not ordinarily exceed 5 lb. The explosive should be carried in a small canister or closed can, which must be carefully protected from any undue jar or blow, or from contact with electric wires. Any receptacle containing detonators or explosives should be kept in a wooden box and away from open lights. Dynamite cartridges when not in use should be laid down and not stood on end, as in the latter position the nitroglycerin has a tendency to leak from the cartridge.

Ques.—The water-end of a certain pump has a diameter of 8 in. If this pump is run at a piston speed of 100 ft. per min. and the efficiency of the water-end is 90 per cent., how many gallons of water will the pump discharge in a minute?

Ans.—The sectional area of this pump is $0.7854 \times 8^2 = 50.26$ sq.in. At a speed of 100 ft. per min., the piston displacement is $50.26 \times 100 \div 144 = 34.9$ cu.ft. per min. If the water-end of the pump has an efficiency of 90 per cent., the discharge is $34.9 \times 0.9 \times 7.48 =$ say 235 gal. per min.

Ques.—If the water-end of a pump is 10 in. in diameter and its stroke 4 ft., the efficiency of the water-end being 85 per cent., how many gallons per minute will this pump discharge when making 48 strokes per min.?

Ans.—The sectional area of the water-end is $0.7854 \times 10^2 = 78.54$ sq.in. The efficiency of the water-end of the pump being 85 per cent., the discharge of this pump is

$$\frac{0.85\ (78.54 \times 4 \times 12 \times 48)}{231} = \textit{say } 666 \textit{ gal. per min.}$$

Ques.—Describe, in detail, the duties of a mine foreman.

Ans.—To describe a mine foreman's duties, in detail, would require a small volume. They are, briefly, as follows: A mine foreman should devote his entire time to the supervision of the operations and equipment of the mine in his charge. He should hire and personally examine all the miners employed in the mine. He must have a thorough acquaintance with the provisions of the mining law and a thorough knowledge of every portion of the mine and its equipment. He must so order the mining operations that the work will be conducted with the greatest safety to the men and the largest output of coal be produced at a minimum cost.

As far as possible, he must personally superintend the operation of the mine and inspect all working places, haulage roads, travelingways, giving particular attention to the condition of the timbers supporting the roof in the entries and working places throughout the mine. He must see that the mine is properly ventilated and that the air is conducted to the working face in such quantities that there shall be no dangerous accumulations of gas in the workings or in any of the abandoned and void places in the mine. He must see that the mine is properly drained and that all needed material is promptly supplied to the miners at their working places. He must examine and sign the daily reports of the firebosses, to assure himself that the mine is being operated in compliance with the requirements of the law. He must attend to the prompt removal of all dangers reported to him or withdraw the men from such places until this can be accomplished.

Ques.—In what velocities of the air current do the respective safety lamps used in mines become unsafe?

Ans.—The unbonneted Davy lamp is unsafe in a current having a velocity exceeding 360 ft. per min. The unbonneted Clanny lamp becomes unsafe when the velocity exceeds 480 ft. per min. Different types of bonneted safety lamps have been found to withstand velocities varying from 1500 to 2000 ft. per min., depending upon the particular form of construction of the lamp and chimney. The type of safety lamp known as the Marsaut, multiple-gauze chimney, has been found to safely withstand current velocities varying from 2000 to 3000 ft. per min. These represent the principal types of lamps, now in use, in numerous varieties, in coal mines. The velocities given refer to pure air. When gas or dust is present in the air, the safe limit of current velocity to which the lamp is exposed is reduced. Much depends, also, on the condition and degree of perfection of the lamp.

Ques.—Is it possible for an explosion in a safety lamp to be of sufficient force to pass the flame through the gauze?

Ans.—Yes. This is most apt to occur when withdrawing a lamp from a body of "sharp" gas or where the proportion of gas to air is such that the mixture is above the maximum explosive point. The entrance of fresh air into the combustion chamber of the lamp when the latter is being withdrawn from such a mixture increases the explosive condition within the lamp chimney; and, as a result, a violent explosion may occur in the lamp that will force the flame through the gauze of the chimney.

Ques.—Why is it that marsh gas is generally found lodged near the roof and carbon dioxide near the floor in a mine?

Ans.—This is because of their relative specific gravities. Marsh gas being lighter than air (sp.gr. 0.559) has a tendency to accumulate at or near the roof. For the same reason, carbon dioxide, being heavier than air (sp.gr. 1.529), has a tendency to accumulate at the floor or in other low portions of the workings.

Coal and Coke News

Washington, D. C.

The Interstate Commerce Commission has handed down its decision in the so called 5 per cent. rate case, granting to the roads the desired 5 per cent. advance east of the Mississippi River except as to certain selected commodities. But as already forecast, these exceptions include practically all the heavier products, including first and foremost coal and its associated products for reasons already familiar to every student of the coal industry and its problems.

The essentials of this important decision in so far as they affect the coal industry (after the language in which the Commission announces the granting of the advance), are as follows:

While we differ as to the relative importance to be attached to the various considerations presented, we agree in the conclusion that, by virtue of the conditions obtaining at present, it is necessary that the carriers' revenues be supplemented by increases throughout official classification territory. Whatever the consequences of the war may prove to be, we must recognize the fact that it exists, the fact that it is a calamity without precedent, and the fact that by it the commerce of the world has been disarranged and thrown into confusion. The means of transportation are fundamental and indispensable agencies in our industrial life and for the common weal should be kept abreast of public requirements.

The original report, besides approving a rate increase in central freight association territory, suggested 10 sources of additional revenue for all carriers throughout official classification territory; the present report, recognizing the existence of a new situation since July 29, acquiesces in a territorial extension of the relief granted to the central freight association lines by permitting the carriers to file tariffs providing, with certain exceptions specified herein, for horizontal rate increases in official classification territory. It is expected that the constructive work suggested in the original report for the purpose of conserving and augmenting the net revenues of the carriers generally will be carried forward without interruption.

Carriers will be required to keep an account of the additions to their revenues from increases in rates subsequent to July 29, 1914, and from new charges, and to report separately thereon to the Commission at the end of 12 and 24 months, respectively.

For various reasons we shall except from the proposed increase the following rates:

1. Rail-lake-and-rail, lake-and-rail, and rail-and-lake rates. It is shown on the record that since the rail carriers acquired ownership and control of the Lake lines successive increases have been made in the rates via Lake tending to lessen the differences between them and the all-rail rates.

2. Rates on bituminous coal and coke. Not long since these rates were investigated and maximum rates were prescribed by the Commission. The key rate upon bituminous coal—the rate from the Pittsburgh district to Youngstown, and the rate on Lake cargo coal to Ashtabula—have been fixed in the light of the various factors which enter into the transportation of such coal. The prevailing rates are remunerative, and the financial condition of the principal bituminous coal carriers is in marked contrast with that of many of the other carriers in official classification territory.

Twice in the not distant past the rates on bituminous coal have been increased 5c. a ton, and would seem now to be as high as may fairly be allowed. It must be remembered also that the carriers are not seeking general increases in rates on anthracite coal, and both kinds of coal are used in competitive markets. As to coke, the rates controlling the greater volume of traffic now moving in official classification territory have recently been set by the Commission upon a basis which was specifically designed to guard against shrinking the carrier's revenue therefrom, and which really resulted in substantial additions to their earnings on that traffic.

3. Rates on anthracite coal and iron ore, largely because they are before us for review in other proceedings.

4. Rates held by unexpired orders of the Commission.

In our original report we declined, for reasons there stated, to allow increased rates in central freight association territory on cement, starch, brick, tile, clay, and plaster. On further consideration, in the light of the existing situation, these rates may be increased throughout official classification territory under the limitations herein set forth.

Joint rates between official classification territory on the one hand, and southeastern territory, the Southwest and points on or east of the Missouri River on the other, may be increased not to exceed 5 per cent. of the division of the rate accruing to the carriers in official classification territory. If these increases involve a change in the relationship under the long-and-short-haul rule between intermediate points and more distant points outside of official classification territory relief from the fourth section of the act must first be secured on regular application.

HARRISBURG, PENN.

The coal operators of the state are much interested as to the outcome of the new river and harbors appropriation bill which carries the appropriation of $1,500,000 for the Delaware channel and a provision for the survey of the Schuylkill River with a view to dredging it to a depth of 35 ft., provided there is coöperation by the city of Philadelphia and the state of Pennsylvania. The Schuylkill carries a good share of the Philadelphia port's commerce, but it has been passed over heretofore by the general Government in its river improvements on the ground that Philadelphia and the state should take care of it. The latter have spent money on it and will be encouraged to spend more if the general Government will give its aid as it should to improve navigation of that river.

There is grave danger that the entire bill will inspire the same opposition that the last river and harbors bill did. The total of $34,006,000 is about as much as was cut out of the last bill to overcome the opposition in the Senate. It may be that the worst features of last session's bill do not appear in this, but a rivers and harbors bill in a short session is not difficult to kill if there is any strong opposition to it.

Many Accidents Are Preventable

Verdicts rendered during the recent past in mine cases investigated are notable in that they point to ignorance or negligence on the part of mine employees. In one case it was found that a miner had tamped an overcharge of powder with an iron drill and in another that a miner shortened a squib in order to hasten the explosion. The explosion came before he could get out of the way.

The public often reads startling statements in the newspapers by state and federal officials about the astounding number of preventable casualties in the coal mines. They agree that at least one-half of all the accidents are preventable. The first thought is that the operators are negligent in not having provided proper safeguards, and new laws are constantly suggested to overcome delinquencies.

The operators are not blameless, but the miners themselves are responsible for a large percentage of the preventable casualties. They are constantly in the midst of danger and become accustomed to it. Most of the accidents are caused by falls, yet some employees persist in working in places where roofs are threatening. They strike matches in gaseous places, shorten squibs, do not give sufficient warning to those in close proximity when a blast is about to be fired, and commit other indiscretions. One great trouble is that employees are too anxious to get through with their work, and take chances that sometimes result disastrously, especially when getting on cages.

It is almost impossible to bring about greater caution through legislation, but a remedy that is always available is seldom tried—the prosecution of employees who are wilfully and grossly negligent in endangering the lives of fellow workmen.

A Far-Reaching Decision

In a decision rendered Dec. 21, in reference to transportation rates on anthracite from the Schuylkill, Lehigh and Wyoming regions to Philadelphia, the Public Service Commission of Pennsylvania ruled against the railroads, and announced that it shortly will issue an order compelling the coal carrying lines in the state to cut their rates 40c. a ton on all anthracite delivered to Philadelphia. The decision was written by ex-Governor Pennypacker for his fellow members of the board. The reduction order affects all sizes of coal down to pea, and stipulates that coal under that size shall be carried for the same rate as pea. The ruling carries with it a lowering of rates of between 25 and 30 per cent.

The decision places Philadelphia on an equality with other great American cities and enables dealers there to get their coal at prices on a par with that charged for its delivery there for transportation to other points.

The railroads affected by the ruling are the Philadelphia & Reading, the Pennsylvania, the Central Railroad of New Jersey, the Lehigh Valley and the Delaware, Lackawanna & Western. From the railroads' standpoint the commission's ruling, if put into effect means a nullification, in this state, of the increased revenues made possible by the Interstate Commerce Commission's grant of a 5 per cent. increase in freight rates. The roads were barred from raising the rates on coal, coke and ore, and a reduction in anthracite rates practically means a wiping out of the additional revenue on merchandise tonnage allowed by the Commerce Board.

Furthermore the commission recites the rates of delivery on barges makes them equal in amount to the rates heretofore designated for local delivery. In its findings the commission submitted a statement showing the cost to the railroads of carrying anthracite per ton. It adds also a table showing the new rates on the various sizes of coal, which it will make mandatory on the railroads.

A considerable proportion of anthracite coal intended for local delivery in Philadelphia is carried by the various companies to points upon the Delaware and Schuylkill Rivers, and there unloaded upon barges, which transport it to the wharves and other places of final delivery along these rivers. For this service the barges make a charge of 25c. per ton or some other definite sum.

The respondents have heretofore so arranged their rates that they, together with the barge charges, shall be substantially equal to the charges for local delivery by rail. It is the opinion of the commission that the rates of delivery upon barges shall be so reduced as to make them, with the added expense of the barges, with respect to each class of coal, equal in amount to the rates heretofore designated for delivery by track service.

PENNSYLVANIA

Anthracite

Larksville—The new $75,000 high school building, which is here in course of construction, was badly damaged recently, by a mine-cave in the Boston Colliery of the Delaware & Hudson Co., whose mines are beneath the site of the building. When the force reported for work one morning, it was discovered that the building was about 7 in. out of plumb. Investigation showed the surface to be settling, and since then the structure has sunk a depth of 18 inches.

Shamokin—When workmen at the Hickory Ridge colliery of the Susquehanna Coal Co. discovered on Dec. 15 that the increase of fare would not be rescinded they refused to go to work. The colliery is now tied up. The rate from Shamokin to the colliery is double the old fare. It is feared that unless the company grants the miners less than a first-class passenger rate more collieries will be made idle.

Hazleton—Admitted to the State Hospital three months age with a leg so hopelessly crushed by a fall of coal in the Drifton mines that amputation seemed the only expedient, Peter Marley, a miner, recently walked out of the institution with a new leg bone constructed out of splices taken from healthy bones and grafted to the splintered member This is the first instance of bone grafting in the Hazleton coal fields, where many miners lose limbs by falls in the mines

Coaldale—It is reported that "all fire bosses, foremen and other lesser officials of the Lehigh Coal & Navigation Co. must from now on refrain from participation in politics, or give up their jobs."

Mauch Chunk—Since the Lehigh Coal & Navigation Co.'s Lehigh canal was opened in 1851 nearly 35,000,000 tons of anthracite coal have been transported over that waterway through the locks here. The canal has been in operation every year since 1851, except in 1902, when it was out of commission on account of the excessive floods during February and March, when portions of the banks were washed away.

Wilkes-Barre—In a special report, the War Department which investigated flood conditions of the Susquehanna River in Wyoming Valley, places much of the blame for existing conditions on the great amount of culm in the bed of the stream. For years coal companies have dumped their refuse into the river until the bed is well filled. The investigators find that the construction of levees, elimination of the Nanticoke dam, removal of culm and other refuse from the channel, changing the course of a few creeks and the construction of basins, etc., are necessary to eliminate flood conditions in this end of the anthracite coal field.

Bituminous

Star Junction—Announcement has been made by the Washington Coal & Coke Co. that it would fire 100 ovens at once and 100 more by the first of the year at its Washington Nos. 1 and 2 plants. The further statement was made that the company expects to go on full time after the first of the year.

Jerome—In spite of the prevailing depression in the coal business in this vicinity, some of the operators are supremely confident that the worst is over and that from the first of the year on conditions will improve rapidly and steadily They point to the fact that many of the mines in the southern part of Somerset County have already been reopened and are taking in a good run of orders and that this condition appears to be spreading rapidly to other workings Some of the mines have been long idle and are now working on full or nearly full time, with a good supply of orders

Barnesboro—Three men were fatally burned in an explosion of powder while at work in the powder house of a privately owned coal mine here on Dec. 17. In some manner the powder in five different kegs became ignited and each apparently exploded at the same moment. The powder house, a small building, was blown to atoms.

Boswell—The big tipple of the Merchants Coal Co., which went out of commission recently, when something went wrong with the hoisting machinery has been repaired. It is expected that operations will be resumed in a short time. The mine had been busy up to the time of the accident, and there is said to be plenty of business in prospect to keep the mines busy for some time to come.

Uniontown—At a receivers' sale on Dec. 15, the American Steel Co. of Pittsburgh purchased the Cyrilla and Francis No. 1 coke plants of the Francis Rocks Coal & Coke Co. for $1 and the assumption of a $100,000 obligation, consisting of mortgages, etc. The Cyrilla plant consists of 100 coke ovens and 110 acres of coal land, while the Francis No. 1 plant consists of 200 ovens and 100 acres of coal lands. The purchase for the steel company was made by Eugene Riley, president of the firm. Before leaving Uniontown, President Riley said that fires in both plants would be started by the first of the year, and that each would run at full capacity. The plants have been in the hands of a receiver for some time and idle for a year.

Connellsville—Coke operators are elated over the decision in the Eastern railroad freight rate case. The fact that no advance in coke rates has been allowed naturally pleases the coke men, who would have reopened their fight had the rates gone up. Independent coke operators believe the railroads will now place their steel orders.

WEST VIRGINIA

Clothier—About 150 miners in the employ of the Coal Valley Mining Co., at this place, returned to work recently, after a week of idleness. The men went on strike after the company had discharged a miner for the alleged loading of dirty coal. The company refused to reinstate this man but the miners agreed to return to work, and in the meantime the discharge case will be taken under consideration by the board of arbitration.

Rosemont—The 200 miners employed by the Weaver Coal Co. have returned to work after having been on strike for about two weeks. They left the mine following a disagreement over the employment of a check weighman, and the alleged wrong done them through the operation of the docking system. The company has agreed to the employment of a check weighman at a later date and the docking system will be taken under consideration at a conference to be held in the future.

Charleston—The Department of Mines of West Virginia, for November recorded 25 deaths from mine accidents as compared with 34 for the previous month. Eleven deaths were caused by falls of roof and slate, 4 by mine cars, 3 by locomotives, 3 by electricity, one by a mining machine, one by an explosion, while one death was due to scalding outside of the mine and one to blood poisoning following a slight injury.

Coalwood—West Virginia coal interests are much pleased with the report that George L. Carter has arranged to transfer his general offices from Johnson City, Tenn., to Coalwood, where the Carter Coal Co. has extensive operations. This firm has made the announcement that it will invest $750,000 for opening new mines and making Coalwood the center of activity in that region.

ALABAMA

Montgomery—Because of the fact that the production of coal in Alabama is not sufficient to warrant the appointment of an additional state mine inspector, the Governor has announced that he will not fill the vacancy on the board caused by the expiration of the term of office of Judson F. Webb, of Quinton.

Birmingham—W. H. Skeggs, of Chicago, recently sold a large tract of coal land near Berry. This land is a part of 30,000 acres in the Corona field, all of which is underlaid with the Corona bed of coal varying in thickness from 5 to 7 ft., and occurring at a depth of from 400 to 700 ft. About a year and a half ago part of this tract was sold to the Bessemer Coal, Iron & Land Co. and a half interest in the balance to Henry L. Badham, president of the above named firm. This is one of the most valuable tracts of coal land in Alabama.

Bessemer, Ala.—Coal mining in the Blue Creek district shows somewhat of an increase. The mines of the Tennessee Coal, Iron & Railroad Co., at Sumter and Johns, are now operating five days per week, with a prospect of running six days after the beginning of the year. The indications are that there will be good business shortly at all mining camps.

TENNESSEE

Jellico—The coal mines in this section have been running only a few days per week in the past. Operators now hope to start the new year with six days per week. Already the Bon Jellico Coal Co. is working six days, while the Gatliff Coal Co. and the Mahan-Jellico Coal Co. are endeavoring to operate full time. The Louisville & Nashville R.R. Co. is experiencing some trouble on the Pine Mountain branch, in keeping train crews from working over time. Another crew will probably be added upon this branch to take care of the passenger and coal traffic.

KENTUCKY

Harlan—Guthrie Bros. & Norval have taken a lease from Denver Cornett of the Harlan Home mine and will improve the equipment and increase the scale of operations. The lessees are Alabama operators who have met with success in that section.

Lexington—Fifteen men have received certificates as mine foremen out of the 16 who recently took the examination conducted here under Dean C. K. Norwood, of the State College of Mines and Metallurgy, Thomas Robinson, a graduate of this year's class, headed the list and since receiving his certificate he has been made mine foreman by the Northeastern Coal Co. First, second and third class certificates were given, the first class fitting the holder to serve as foreman in any mine and second class certificates to serve in that capacity only in non-gaseous mines.

Sturgis—A 10-day shutdown is all that will be necessary at the mines of the West Kentucky Coal Co. near here as a result of the burning of the tipple several days ago. Mine run coal will be taken out for the time being and reconstruction of the tipple will be pushed. Defective electric wiring is blamed for the fire which caused a loss of $10,000 partly covered by insurance.

Sebree—There were no bidders when the property of the Sebree Coal & Mining Co. was cried at the courthouse door in Dixon several days ago, the first sale of the property having been disallowed.

Hemphill—The K. S. Potter tract of coal lands on the Lexington & Eastern branch of the Louisville & Nashville R.R., has been leased by White L. Moss and others, of Pineville, Ky. The company, after the first of the year, will begin to develop on a large scale and proposes an initial capacity of 1200 tons daily. Mr. Moss is manager.

OHIO

Bellaire—Twenty-five mules formerly used at the Blaine mine of the Lorain Coal & Dock Co. were recently removed from the mine and shipped to a point in the interior of the state. This completes the partial abandonment of three of the Lorain Coal & Dock Co.'s mines. It is not known yet whether any of the machinery from these operations will be removed. It is intimated that the three mines of the company are to be abandoned and the machinery moved to West Virginia, where this firm is believed to have recently made extensive purchases of coal lands.

Columbus—Receiver Charles Cohenour of the Maple Gallia Coal Co. will sell all of the assets of the company at public auction, Jan. 9, at the courthouse, in Columbus. The main part of the assets consists of mines at Nelsonville and Clarion.

INDIANA

Evansville—The mines at Spottsville, Ky., on Green River, owned largely by capitalists of Evansville, will be abandoned. They were flooded recently and all efforts to clear them of water have been in vain. Two hundred miners have come here to seek other mine work.

Jeffersonville—The advance guard of large consignments of coal is arriving from Pittsburgh, the first since May 1, on account of low water in the Ohio river. It is estimated that 10,000,000 bushels are loaded on barges at Pittsburgh. Most of this will go to the South.

ILLINOIS

Chicago—Leases under which 11 coal mines in Illinois and Indiana, owned by the Chicago & Eastern Illinois R.R. were operated by coal companies, have been canceled, and the mines will hereafter be operated for the railroad company by receivers Bering, Peabody and Wooley, who are executive heads of the lessee companies. The output of these mines will, however, continue to be marketed through the same coal organization.

OKLAHOMA

Wilburton—Property of the Great Western Coal & Coke Co. was recently seized by Sheriff Lawrence upon writs of execution issued in the District Court to satisfy judgments amounting to $40,544.05 growing out of the deaths of six men who lost their lives in an explosion in one of the company's mines in April, 1909. The original amount of damages awarded was $34,500, which with interest and costs to the present time amounts to the figure above named.

FOREIGN NEWS

Fernie, B. C.—The demand for coke from the Crows Nest Pass Coal Co. is increasing and 100 ovens were recently started at the Michel colliery. It is expected that additional ovens will be fired there soon. The mines have also been working much more regularly than heretofore, and while they are only producing slightly over a third of their capacity, the prospect is more favorable than it was a short time ago.

PERSONALS

Mark Storen, the new United States marshal for Indiana, has named as his first deputy, Frank Barnhart, a miner of Farmersburg.

William Farrell has been made general manager of the Holliday Coal Co., operating in the Nuttalburg coal measure. For the past 10 years, Mr. Farrell has been with the New River Co. as a mine superintendent.

Paul C. Mansfield, formerly of Clarksburg, W. Va., has taken a position as traveling representative of the Sidenfeld-Hammond Coal Co., of Columbus. He will cover northern Ohio, southern Michigan and a portion of Indiana.

Harry F. Butler, for several years sales agent of the Pittsburgh Coal Co., at Buffalo, N. Y., has resigned to go into other business. He has been succeeded by E. Seymour Whitley, for some time salesman connected with the Buffalo office.

Delwyn Wolfe has been promoted by the Lehigh Valley Coal Co. from division engineer of the Delano division to district inside superintendent, with headquarters at Hazleton, to succeed Thomas R. Jones, who has taken charge of the Mahanoy division.

O. B. Tanner has been placed in charge of the new office of the Goulds Manufacturing Co., in the Third National Bank Building in Atlanta, Ga., as district manager. This company is one of the largest manufacturers of triplex, centrifugal, hand and spray pumps.

John Rowlands of the Lehigh Valley Coal Co., employed as general outside superintendent, has tendered his resignation. This will go into effect the first of the year. For many years he has been in the employ of the concern and previous to that was an employee of the Coxe Brothers Company.

Martin Bolt, for many years chief clerk of the State Mining Board of Illinois, has resigned. John E. Jones, the newly appointed state mine inspector for the third district, will fill this position temporarily until James F. Morris, recently appointed to this place by Governor Dunne, can take charge.

Thomas L. Lynch, president of the H. C. Frick Coke Co., was suddenly taken ill with peritonitis on Dec. 16. An operation was performed early the next morning. At the present writing he is at his home in Greensburg, Penn., and is reported to be doing as well as may be expected under the circumstances.

Captain Charles J. Menges, river manager at Cincinnati for the Monongahela River Coal & Coke Co., was the guest of honor at a dinner recently given at the Business Men's Club by members of the Cincinnati Coal Exchange, the occasion being Captain Menges' early departure for New Orleans, where he will take charge of the company's rapidly developing export trade.

Arthur E. Jackman has been appointed manager of the machinery department of the Walter A. Zelnicker Supply Co., of St. Louis, in the place of J. J. Hilpirt, resigned. Mr. Jackman has had a wide experience and possesses much practical knowledge of steam and electrical machinery and equipment, which will be of considerable benefit to his employer's customers in his present position.

M. D. Royer has resigned his position with the Lehigh Valley Coal Sales Co. and accepted that of traffic manager of the Manila R.R. Co. at Manila, Philippine Islands. He will leave for his new post immediately after Christmas, sailing

from San Francisco, Jan. 9, for Manila by way of Hong Kong. Before accepting the position with the Lehigh Valley Coal Sales Co., Mr. Royer was for several years assistant general manager of the Galloway Coal Co., of Birmingham, Ala.

C. W. Brooke, an engineer of long experience in sales and advertising campaigns in the Pittsburgh and Buffalo districts, recently acquired an interest in the Chamberlain Co., of Detroit, Mich. In keeping with the policy of expansion on the part of this firm, Mr. Brooke goes to it as secretary and treasurer. The Chamberlain Co. has for some time past retained a number of the largest and most attractive accounts in the power plant field of technical publicity.

James E. Roderick, chief of the Department of Mines, on Dec. 15 named Mine Inspectors M. J. Brennan, Pottsville; P. C. Fenton, Mahanoy City; and P. J. Friel, of Shamokin, as a commission to investigate the Lansford No. 4 mine disaster of last summer when seven men were killed by gas. Mine Inspector Davies, of Lansford, and President Thomas Kennedy, of District No. 7, United Mine Workers of Hazleton, were authorized to accompany the commission when it enters the mines and holds its sessions.

OBITUARY

Harry K. Preston, mining engineer, and formerly owner of extensive coal operations, committed suicide on Dec. 17, in his home, 532 West School Lane, Germantown, Penn.

John C. Haddock, president of the Plymouth Coal Co., of Wilkes-Barre, Penn., died in New York, Dec. 20, of acute stomach trouble. Mr. Haddock for years had been involved in intricate litigation over freight rates. He testified on one occasion before the Interstate Commerce Commission that he had lost $800,000 in 8 years through discrimination against him by a coal road. He was born in Ireland in 1850.

Shirley Leisure, general electrician of the Consolidation Coal Co., at the Columbia mine, was accidently electrocuted Dec. 15. Mr. Leisure, in order to make certain necessary repairs, pulled the switch controlling the high tension wires, but failed to notice that because of the cold weather prevailing, the connections were not broken. Grasping the wires he was immediately killed. Mr. Leisure was 22 years of age, and had been employed by the one company for 11 years, beginning as a water boy. He was unmarried, but is survived by his father and two sisters.

Senator Robert Jaffray, of Toronto, a prominent Canadian financier, died on Dec. 16, in his 83d year, the immediate cause of death being the bursting of a blood vessel. He was born in Scotland in 1832, and came to Canada in early life, settling in Toronto. Since 1883 his attention was given to financial affairs and industrial development. He was president of the Imperial Bank and the Globe Printing Co. and a member of the directorates of the Nova Scotia Steel & Coal Co., the Canadian General Electric Co., the Canadian Allis-Chalmers, Ltd., and several other corporations. Mr. Jaffray took a leading part in the organization of the Crows Nest Pass Coal Co., of Fernie, B. C., one of the pioneers in the development of the coal deposits of the interior of western Canada, which was incorporated in 1897. He held the vice-presidency of the company for many years, retiring in 1909. Mr. Jaffray took a keen interest in politics as a leading member of the Liberal party and was appointed a member of the Canadian Senate in 1906. He is survived by two sons and two daughters.

CONSTRUCTION NEWS

Greenville, Ky.—The Gibraltar Coal Co. is constructing an addition to its power house and installing new machinery.

Carrollton, Ohio—The Inter-State Mining Co., which was organized several weeks ago at Akron, with a capital of $300,000, will develop a large tract of coal land near Carrollton. It is planned to open at once an electrically equipped mine with a capacity of 1500 tons daily. John P. Jones, of Canton, is president; August Blissman, treasurer, and C. W. Wickline, secretary.

Hazard, Ky.—The Hazard Town Coal Co. has arranged with the Louisville & Nashville R.R. Co. to install a tipple alongside the yards at the lower end of Hazard. Installation work will be begun by the coal company in the near future, the plan being to operate the No. 4 seam and carry the coal across the river to the tipple in large bucket conveyors. John B. Eversole is part owner of the tract on which the mine has been opened and is actively pushing the work.

Huntington, W. Va.—It is reported that during the coming year the Chesapeake & Ohio R.R. will follow the example of the Norfolk & Western in the field between Bluefield and Vivian, and will electrify its Guyandotte Valley branch, installing either a trolley or a third-rail system. The first of the dozen electric locomotives which will be used by the N. & W. on the section between Bluefield and Vivian has been received at Bluefield, and its size and power made a considerable impression. It is said that the electrification of the Guyandotte Valley branch of the C. & O. would be an easy matter, and that it would immensely simplify the moving of large tonnages of coal in that section.

Pine Knot, Ky.—Promoters of the Jellico Coal & R.R. Co., which owns 15,000 acres of rich mineral land in this (McCreary) county, have been engaged for a week or so in a survey of the property which, it is announced, they intend to develop at once. In this connection it is stated that the company will build a 16-mile railroad from the mouth of Capachine Creek to intersect the Cincinnati, New Orleans & Texas Pacific R.R., either at this point or a short distance south of here. The company has been taking options through this section for the past four years and, it is said, now owns most of the property through which the railroad will pass. Much of the coal is in 7-ft. beds and is all easily accessible by drift mining. Several large bodies of virgin timber are included in the area.

NEW INCORPORATIONS

Tuscaloosa, Ala.—The Riverside Coal Co. has been organized with a capital stock of $162,000.

Charleston, W. Va.—The Whyel Coal Co., of Uniontown, Penn., has been incorporated in West Virginia with a capital stock of $250,000, by George Whyel, Harry Whyel, H. L. Robinson, and John L. Robinson, of Uniontown, and F. E. Waddell, of Scottdale, Penn. It will engage in mining.

Lynchburg, Va.—The Alpha Pocahontas Coal Co. has been organized to develop Pocahontas coal field property. The capital stock is limited to $125,000, and the officers are F. M. Lee, president; S. P. Halsey, vice-president; and G. H. Wilkins, secretary-treasurer. These officers together with R. C. Scott, L. Lazarus, R. S. Terry, and F. T. Lee, compose the board.

INDUSTRIAL NEWS

Boston, Mass.—The Consolidation Coal Co., Inc., has turned over its floating equipment, steamers, tugs and barges, to a new corporation known as the Consolidation Coastwise Co. recently organized under the laws of Massachusetts.

Martins Ferry, Ohio—The largest verdict returned locally in a personal injury suit for some time was awarded in Common Pleas Court recently against the Johnson Coal Co. of Bellaire. The suit was that of Henry Unterzuber against the Johnson company and the verdict amounted to $4500. Unterzuber sued for $15,000.

Washington, D. C.—Congressional investigation of charges that the Southern Ry. discriminates against independent coal operators in the Virginia, Tennessee, and Kentucky coalfields in the interest of a coal trust was adjourned recently until Jan. 6. Upon that date, Mark Potter, president of the Clinchfield Ry., will cross-examine Frank C. Wright, of Bristol, Tenn., who has been giving testimony to support these allegations.

Bluefield, W. Va.—The comptroller of the Norfolk & Western R.R. recently made public the statement of coal shipments for the month of November compiled from the records of his office. They show from the Pocahontas field 837,577 tons, Tug River, 263,975, Thacker, 235,080, Kenova. 90,772, Clinch Valley, 237,831. Other Norfolk & Western territory 3849 tons, or a total from Norfolk & Western fields of 1,659,084 tons. There was also derived from the Williamson & Pond Creek Division 62,505 tons and from other railroads 131,269 tons, making a grand total of 1,852,858 tons. The total shipments for the corresponding month of 1912 were 1,896,817 tons, and in 1913, 2,184,338 tons. Shipments for 1914 compared with 1913 in the month of November have consequently fallen off 332,480 tons or about one seventh.

Coal Trade Reviews

General Review

Anthracite consumers becoming urgent about prompt deliveries. Bituminous quiet with sellers concerned mostly about new contracts. Effects of the customary year-end curtailment already being felt, but colder weather stimulates the domestic trade.

The continued low temperatures in all parts of the country have created an active situation in the retail end of the anthracite trade. Consumers in all directions are becoming urgent about prompt delivery, but on the other hand there is a notable absence of the insistent demand on the mines that is usually characteristic of the first winter's cold snaps. New contracts on the steam sizes are now being negotiated with prices ruling on about the same basis as last year. The feature of the anthracite trade this week was the heavy reduction in freight rates into Philadelphia, ordered by the Pennsylvania State Commerce Commission.

While bituminous is showing some well defined indications of improvement, there is still a complete absence of any important activities, and the Eastern agencies are now chiefly concerned with the new contracts expiring Jan. 1. In view of the low prices that have ruled since early spring, there is a marked tendency on the part of consumers to hold off for the time being at least; as a matter of fact, spot buyers have been practically in control of the situation over the past six months. The outlook on prices is indeterminate so far, and the opening negotiations will be watched with interest.

In the meantime the accumulations continue large, though an occasional shortage has recently been reported, due to the congestion on the railroads and the heavy storms at sea, which has given a temporary stimulus to the trade. But the mines are working on such short time that the usual slowing down over the holidays will scarcely be noticed. The usual year-end curtailment at industrial plants is being noted, but with the favorable decision in the famous 5 per cent. rate case and other constructive developments, there is a distinctly optimistic feeling noted.

Manufacturing demand in the Pittsburgh district has suffered severely as a result of the holiday cessations, but this has been partially compensated for by an increased domestic consumption, due to the colder weather. There is a notably better tone in the Ohio market due in part to the favorable interpretation placed on the Interstate Commerce Commission's ruling on the freight rate decision and also to the more seasonable weather conditions. Surplus stocks are being cleaned up rapidly, while orders held up at the mines are now being released, and occasional urgent requests for immediate shipment are coming in. There is much interest in contracts for the new year, some of the large ones expiring shortly.

The Middle Western situation has also improved considerably and running schedules at the mines have been tuned up to nearly full capacity. The screenings situation continues the feature of the market, though domestic buying stiffened up rapidly under the influence of the colder weather, and this in spite of the fact that stocks on hand were unusually large. There are well defined indications of an improvement in manufacturing and with the added stimulus of the rate increase to the railroads, the outlook is more hopeful than for some time.

ATLANTIC SEABOARD

BOSTON

Slightly better tone to bituminous but accumulations continue large. Canvassing already in progress for 1915 business but buyers are not encouraging. Georges Creek gets farther behind on shipments. Pennsylvania grades still face a restricted market.

Bituminous—Seasonable weather has caused a slight improvement in the market. Contract demand, in view of the slow movement of cargoes coastwise, is notably better, and in scattered instances there is inquiry for spot shipment. The general state of the trade is not enough better, however, to make shippers relax any in their efforts to place the tonnages that come to all the terminals in undiminished volume. Accumulations are still heavy at Hampton Roads, and while spot cargoes would command somewhat higher prices the range is very little in advance of a fortnight ago.

Pocahontas and New River interests are beginning to get actively interested in 1915 business and it is possible that January will see some interesting developments. New England buyers are likely to be conservative next season in view of the low prices that have ruled since last May and June when the contract-placing season was practically over. As a matter of record the buyers who have purchased from time to time as required have done better this season than have those who made contracts; this applies to the ordinary plant where the consumption is not so large that a continuous supply is an important consideration. Unless something unforeseen occurs, however, the early part of 1915 will probably be rather a slow season for placing yearly contracts.

At Boston, Providence, and other distributing points, on-car prices have declined somewhat on account of free arrivals the past few days, but figures now are about the same as a week ago. For a short period spot coal was scarce and a slight premium was paid.

Georges Creek shipments are getting farther and farther behind. A succession of storms has seriously interfered with tows along the coast.

The Pennsylvania grades have shown some improvement in the demand all-rail, but the Tidewater market is still much restricted. Practically all the shippers have coal standing at the piers and concessions have to be made to move it.

Water Freights are somewhat firmer on account of the weather; 70@80c. is now about the rate on vessels and barges, 3500 tons upward, Hampton Roads to Boston.

Anthracite—The retail trade is about normal and occasional requisitions find their way to the wholesalers. Stove size is in plentiful supply with all the shippers, egg and chestnut continuing to be offered by independent operators at prices considerably off the circular.

Current quotations on bituminous are about as follows:

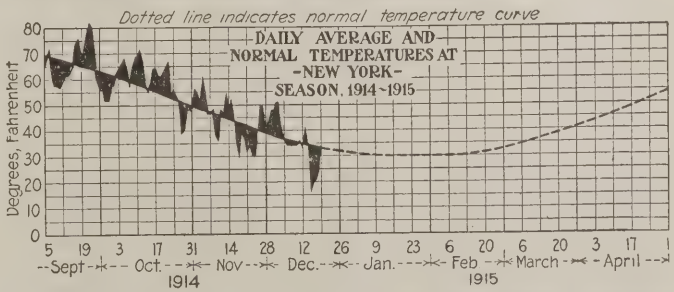
	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.85@1.45	$1.15@1.50	$1.67@1.77	
Philadelphia*.....	2.10@2.70	2.35@2.70	2.92@3.02	
New York*.....	2.40@3.10	2.65@3.05	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.55@2.75
Boston†.....	.....	.....	.....	3.50@3.73
Providence†.....	.....	.....	.....	3.35@3.63

* F.o.b. †On cars.

NEW YORK

Congestion on railroads causes a temporary shortage of bituminous but the market continues generally heavy. Colder weather has stimulated the anthracite situation.

Bituminous—Some of the railroads have been badly congested for the past week and deliveries from the mines to Tidewater are coming in slowly. This condition caught a few companies with a short supply. The recent heavy weather interfered greatly with the movement of bottoms and there was some little demand for spot float coal.



Outside of this business is still quiet. The bunker business continues in fair volume, with the exception, of course, of the regular lines which are tied up. There is considerable competition for the few contracts that are in the market for closing on January first. This is the usual period of contracting

for bunkering business, the commercial contracts being largely closed on April first.

The market is not quotably changed from the past several weeks which we continue as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The recent low temperatures have greatly stimulated buying. This is more noticeable particularly in the local Tidewater market. Retail dealers report a good volume of business and with continued cold weather the demand should remain good. The outlying districts, where stocks were heavy, have not come in with the demand experienced at tidewater. The buying at this season of the year, from this branch of the trade, is confined more to car lots, where earlier in the season heavier orders were placed. Chestnut appears to be the strongest size while stove is quite plentiful and egg continues to sell slightly off circular.

The market is quotable on the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	5.00@5.35	5.30	4.80@5.30
Stove	5.35	5.25@5.35	5 30	5.20@5.30
Chestnut	5.60	5.45@5.60	5.55	5.40@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.50@2.80	2.50@2.75	2.15@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.35@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

PHILADELPHIA

Cold weather stimulates demand in retail trade, but wholesale market is still quiet and without tone. Suspension in production owing to holidays. Situation in bituminous shows little improvement in demand, but prices are unchanged.

Anthracite—While the retail trade report that there seems to be a better demand for coal, owing to the cold weather, supplies are so ample that the expected improvement in the wholesale market has not as yet materialized. Pea coal is in especially better call, and the large companies have commenced to draw on their reserves. Broken and egg continue to lag, but stove and chestnut are moving well, and with the usual holiday suspensions at the mines, the output is likely to be well taken care of.

The feature of the week was the announcement of a heavy reduction in the rates on anthracite coal to Philadelphia, and vicinity. Many contracts are made at a delivered price, and as the announcement came at a time when many of these contracts were about to be closed up, there is considerable speculation as to the results in event of the railroads submitting to the cut; this is not likely, however, as it will probably be fought to the bitter end, and it may be a year or more before the proposition is placed on a definite basis. Dealers here are of the opinion that the reduction to the consumer should not be the full amount of the cut, and the question of the saving to the public may still be an open one. It must be remembered that a short time ago there was a threatened increase in retail prices which did not materialize and the commission's ruling, even if effective, may simply result in the dealers standing pat on their present prices.

Contracting for the steam sizes for next year is now in order, and the various companies report that renewals are coming in on the same basis as last year, with few protests as to prices. The apathetic condition of the steam coal trade during the year 1914 led many to believe that there might be some modification in prices, but as a rule, they are on the same basis as follows: Broken, $3.25; pea, $2.25; buckwheat, $1.25 and rice, 85c.

Bituminous—There seems to be a slightly better demand for the better grades of soft coal. Contrary to conditions prevailing at the Tidewater ports a month or six weeks ago, it is understood that the fleets of barges sailing from this city are carrying quite large quantities of the various grades of coal for New England consignment. This reflects a better call for coal, doubtless due to improved weather conditions, and to the fact that the manufacturing interests report that conditions are slightly improved, so that what little coal they have on hand has been depleted, and further supplies are required.

BALTIMORE

Bituminous demand poor and shows little indication of improvement until after the holidays at least. Rate decision may bring some relief.

No improvement is to be noted in the soft-coal trade. The usual slowing up in operations, due to Christmas and New Years, will scarcely be noticed. Where coal is being produced on a two-, three- or four-day basis, it is mostly to meet contract demand.

West Virginia gas coals are still selling at from 75c. to 90c. Steam coals bring from 85 to 90c. In Pennsylvania some low-grade fuels are to be had in limited lots below the dollar mark at times, while medium-grade fuels sell for $1.05 to $1.15 and best grades around $1.30.

At the piers here considerable coal is again being loaded on foreign account and December is expected to make a fair showing on exports. If the month's total reaches 80,000 it will bring the shipments on foreign account for this year to nearly 100,000 more than the record for 1913

In many quarters it is hoped that the railroad rate decision will prove an aid to the coal trade by stimulating business generally. The Maryland Steel Co. officials, for instance, are said to expect a number of rail orders to be released shortly as a result of the settlement of this long drawn out affair.

BUFFALO

Anthracite stimulated with the coming of severe weather, but bituminous is still slow. Railroad men predict a stir after the middle of January. Loading winter cargoes.

Bituminous—The cold weather has done something for this trade, but as a rule shippers say that it will take a genuine revival of business to make much impression. The business situation improves, but so slowly that it may be months before it will amount to anything. Shippers look for something better now that the railroads have their long-demanded advance in freight rates. It is already reported that Canada is more active, not only on war orders, but in some other directions. This is naturally the dullest part of the business year and when it is past there should be some improvement and it is likely to be considerable. For the present there are reports everywhere that many factories are going to be idle during the last half of the month, so that if coal sales keep up even fair it will mean that there will be a good demand when the business starts up after the first of the year.

The mines tributary to this market are running not over half-time, as a rule, and there is often difficulty in disposing of even this restricted output. Some consumers have taken more stock than they should and others are refusing to take more than they must have, which reduces sales to their lowest in both cases. There is a better tone to the bituminous market, though it is based largely on a general belief that all business is going to be better soon. Slack is steadily growing stronger and sizes are following to a certain extent. Quotations remain on the basis of $2.80 for best Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley sizes about 25c. lower.

Anthracite—The demand is good, though it is noted that the big shippers have not the amount of orders on their books that they commonly have at this time of the year. As a rule they are fairly swamped with orders with the setting in of good fall weather. Quite an amount of the usual insistence on deliveries has been eliminated by the activity of bituminous shippers who handle independent anthracite. Sales are made at regular circular prices.

The shutting down of the Lakes for the season has not stopped the loading of coal into vessels. There is quite a large surplus of egg here that is not required and this is being put afloat to get it out of the way. One shipper has loaded two cargoes and has half a dozen more chartered.

TORONTO, CAN.

Colder weather has started a better domestic movement and steam demand is increasing slightly.

The setting in of cold weather has brought about a revival of activity in the coal trade, and stocks are moving freely. The market for steam coal is only fair, as many plants are still closed down or curtailing their output, but conditions are slowly improving largely on account of extensive orders for war supplies. Quotations are as follows, with a stiffening tendency as regards slack. Retail anthracite egg, stove and nut, $8; grate, $7.75; pea, $6.75. Bituminous steam, $5.25; screenings, $4.35; domestic lump, $6; cannel, $7.50. Wholesale f.o.b. cars, three-quarter lump, $3.68; screenings, $2.54.

HAMPTON ROADS

Movement from Hampton Roads only fair. Government loadings about 15,000 tons during week. Movement confined mostly to contracts.

Dumpings over the Tidewater piers for the week have been about fair; export cargoes have gone to Canal Zone, Rio de Janeiro, Valparaiso, Port of Spain, Havana and Buenos Aires while coastwise movement has been principally to the New England market. Two government colliers have been taken care of, their cargoes amounting to about 15,000 tons.

There has been little, if any, change in the prevailing circular and the demand has been light, the greater part of the coal moving having been on old contracts. The

amount of coal in the railway yards is still somewhat above normal and there is only a small amount of tonnage in port waiting to be loaded.

On account of high rates for steam tonnage sailing vessels are in more demand than they have been for some time. The schooner "Frontenac" has loaded a coal cargo for Rio which is quite a departure from the ordinary for this class of tonnage.

Indications now are that figures for December will show a decline when compared with previous months as well as with the corresponding month of last year.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Oakley C. Curtis		Norfolk	Portland	2000	
Dorothy Palmer		Hampton Roads	Searsport	2315	
Luigi	Italian	Baltimore	Brindisi	2260	

Note—Steamers are indicated by **bold face** type, all others being schooners.

OCEAN FREIGHTS

Steamer rates stiffen up still further.

The freight market is considerably firmer than a week ago, with but few steamers available for Bermuda, Kingston or Cuba, at less than the rates quoted below, except small boats, carrying 800 to 1500 tons each. The two large sailing vessels that were reported as having been chartered to take coal to Rio only secured $4.50 and $4.37½ clear form of charter, and not as previously reported; $6 is offered for coal steamers to Rio, but this rate can be shaded for Montevideo.

We are in a particularly fortunate position to name favorable rates on coal to Valparaiso, or other West Coast ports, either by single cargo or on contract. Steamers employed in this trade carry about 6000 and 7000 tons each.

To	Rate	To	Rate	To	Rate
Havana.....	$1.75@2.00	Kingston†...	$2.00@2.25	Tampico....	$2.50
Cardenas††	2.25@2.50	Curacao.....	2.00	Rio.....	6.00@6.60
Cienfuegos....	2.25@2.50	Santiago.....	2.25@2.50	Buenos Ayres**...	5.40@6.00
Port of Spain.	2.50@2.75	Guantanamo.	2.25@2.50	Mediterranean.....	8.40
St. Lucia.....	2.50@2.75	Demerara....	4.00		
St. Thomas...	2.50@2.75	Bermuda....	2.25		
Barbados.....	2.50@2.75	Vera Cruz...	2.50		

*About. †Small boats to Kingston $2.25@2.50. **Or La Plata. ††Or Sagua.
W. W. Battie & Co.'s Coal Trade Freight Report.

OHIO VALLEY

PITTSBURGH

Retail demand much improved, but manufacturing demand correspondingly diminished on account of the holidays, operations remaining at slightly under 40% of capacity. Prices continue irregular.

The cold weather of the past ten days, the temperature ranging between zero and 40°, has given a great stimulus to the retail coal demand, which has been by far the best of the season thus far, but an influence in the opposite direction has practically counterbalanced this improvement, as the demand from the iron and steel mills has very considerably decreased, owing to quite general closing of plants over the holidays. In many instances plants will close Thursday, Dec. 24 and not resume until Monday, Jan. 4.

Railroad demand is about the same as formerly and on the whole the mines of the Pittsburgh district have been unable to increase their operations, but are dragging along at an average rate slightly under 40%. Some are doing much better than this while others are operating light two days in the week only and a few are closed entirely. Prices are as irregular as formerly, even slack not having reacted to the full nominal price of 90c., and about 80c. seems to be a fair average quotation. What may be called regular asking prices, subject frequently to concessions of about 10c. a ton, are as follows: Slack, 90c.; nut and slack, $1; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district.

TOLEDO

Surplus stocks being cleaned up and the situation is distinctly better. Same important contracts coming up.

The cold weather has brought a better demand for both domestic and steam coal. The steam dealers have been picking up track coal for economy's sake and are now in the market for supplies. Some of the large automobile concerns in Detroit are also in the market for coal on contract and it is said that many other concerns which have not yet contracted are now ready to come in. The better situation in the eastern Ohio fields is regarded favorably here, especially among operators having mines in that territory, and it is hoped that strike difficulties will soon be a thing of the past.

CINCINNATI

Continued cold weather has maintained the market. Dealers' stocks apparently large. Steam business remains dull.

The flurry of business due to the cold snap has subsided, despite the continuance of the most severe weather of the winter during the past week. The necessity for shutting off the local gas supply to large industrial consumers indicates the increased consumption of fuel, both coal and gas, and also gives promise of an early betterment in the steam market, as more than a hundred large consumers have had to go back to coal. However, dealers seem to be well supplied with coal, and it will take more cold weather to bring them into the market. The decision of the Interstate Commerce Commission in favor of higher rates for the railroads is expected to be a factor of importance. More liberal buying by the carriers will relieve the situation to a considerable extent, and will be of great assistance in reviving industry in general. These favorable changes are expected to materialize shortly after the first of the year, but at present, with a slow demand from the trade, plenty of coal, both rail and river, the market is in rather poor shape, and this has resulted in some price concessions.

COLUMBUS

The cold wave has stimulated the trade. Domestic demand increased though the steam business is still slow. Retailers are having a rushing business.

More favorable weather has had a marked effect on the coal trade. Domestic business has been stimulated and prices strengthened all along the line On the whole there is an improvement in the tone of the market with future prospects growing brighter.

Retail trade became quite active as soon as the cold spell arrived. Dealers' stocks were generally low and as a result operators and jobbers began to receive orders; in many cases there were requests for immediate shipment and where orders had been held up, instructions were given to permit shipments to come forward Retail prices have been firm at the same levels and there is some likelihood of an advance if the favorable weather conditions continue

The steam business is still dull and manufacturing must improve before any marked change will be noted. Consumers of steam grades are buying on the open market in many instances. A number of contracts will expire after the first of the year and an effort will be made to renew them at the old figures. The tonnage required for railroad consumption is not large.

The circular price list is still quoted but cutting on practically all grades continues; this is especially true of mine-run which is one of the weakest grades The small sizes are still strong as the production of lump is limited.

Production has been increased in most of the Ohio mining districts. The Hocking Valley produced about 70% of the average and Crooksville, Cambridge and Jackson about 60% normal The output from Pomeroy Bend district is about 90% of normal and in some instances full time was worked.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump.....	$1.55	$1.65	.....
Inch and a quarter.....	1.50	1.55	$1.40
Three-quarter inch.....	1.35	1.40	1.35
Nut.....	1.15	1.25	1.15
Mine-run.....	1.10	1.15	1.10
Nut, pea and slack.....	0.65	0.65	0.60
Coarse slack.....	0.55	0.55	0.50

CLEVELAND

Cold weather and light receipts have braced the market and prices are 5 to 10c. higher. Retail trade beginning to come into the market.

The ruling price on track here is $1.75 for high-grade slack. A few cars were sold at the opening of the week at $1.65 to clean up coal held over Sunday, but slack is none to plentiful and operators and jobbers are holding all that does not move readily.

Coarse coals are showing more strength; generally, three-quarter coals are 5c. higher, and in some instances as much as 10c. The cold weather has increased the demand to a small extent, and the retail trade is beginning to run short of some grades. Another week of cold weather would bring the market up.

Pocahontas on track has been well cleaned up and circular is being asked for spot coal. Youghiogheny inch and a quarter is being held at $1.45, mines. The spot market on all coals is equal to shipment quotations.

The local market has been relieved by West Virginia No. 8 being consigned to Buffalo. Factories are buying for immediate needs and will be closed over the holidays. This will

reduce the demand to a large extent the last of this week and most of next.

Prices for shipment are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmount	W. Va. No. 8
Lump	$3.35	.....	.....	.....	.....
Lump, 6 in.	.....	.....	$2.45	.....	.....
Egg	3.35	.....	.....	.....	.....
Egg, 6 in.	.....	.....	2.10	.....	.....
Lump, 1¼ in.	.....	$2.45	2.25	.....	.....
Lump, ¾ in.	.....	2.30	2.10	$1.95@2.00	$1.95@2.00
Mine run	2.55	2.25	1.95	1.85@1.90	1.90
Slack	2.40	1.80@1.85	1.75	1.85	1.80

COKE

CONNELLSVILLE

Two big furnace coke contracts placed, practically winding up the contracting movement for the present, with 250,000 tons a month closed. Production and shipments about stationary.

Corrigan, McKinney & Co. have closed with W. J. Rainey for their entire furnace coke requirements for 1915, the understanding in the trade being that the price is $1.75. The firm is operating four furnaces, requiring about 40,000 tons a month, but has two idle furnaces that may be started later, making about 60,000 tons involved in the contract. The Youngstown Sheet & Tube Co. is understood to have practically closed for its coke, placing a contract for one active and one idle furnace with J. H. Hillman & Sons Co., and a similar contract with the Producers Coke Co. The idle furnaces are expected to be started within a few months, so that each contract involves 30,000 to 32,500 tons a month. The gossip in the trade is that the first named contract was at $1.75 and the other at $1.70.

With business already reported, the total contracts placed on this movement, during the past six weeks or so, is about 250,000 tons a month, mostly for the year 1915, but two contracts, on a sliding scale, run over two years, and a few are for first-quarter or first-half only. Nearly all the furnaces now operating have covered for their coke. The Pittsburgh Steel Co. has a twelvemonth contract with six months yet to run. There are many idle furnaces and these, of course, have been unable to contract. The market is quotable as follows: Prompt furnace, $1.60; contract furnace, $1.65, $1.70 and $1.75 respectively for three months, six months and one year; prompt foundry, $2@2.20; contract foundry (nominal, for best brands), $2.35@2.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Dec. 12 at 196,275 tons, an increase of 700 tons, and shipments at 200,058 tons, an increase of 3901 tons.

BUFFALO

The coke activity has been so long delayed that if it does not appear before long the trade will come to the conviction that it is not coming at all. Prices remain at what are apparently bottom figures, $4.25 for best 72-hr. Connellsville foundry and $3.30 for stock coke.

BALTIMORE

Coke is in poor call and sells in the Connellsville region to the trade here at from $1.75 to $1.90 for furnace, and around $2.45 for foundry. West Virginia furnace is quoted at $1.50 and foundry at $2.

CHICAGO

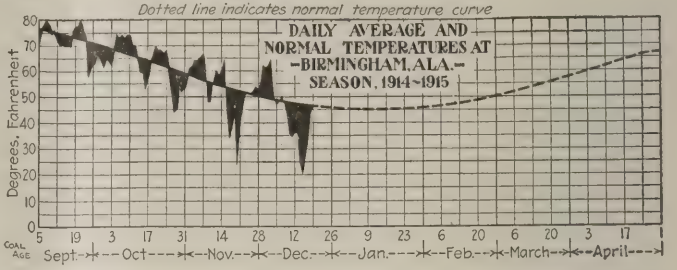
There has been considerable activity this week in the domestic trade sizes, and the market is stronger for furnace and foundry coke. Prices, however, are about at the same level as last week, as follows: Byproduct, $4.75@4.95; Connellsville, $4.75@5; Wise County 72-hr. (select), $5; gas coke, $4.25@4.50; furnace coke, $4.50@4.75.

SOUTHERN

LOUISVILLE

Market toned up appreciably in the past week.

Exceptionally cold weather, and a general easing up of labor conditions in the mining field, have done a good deal for the Kentucky coal market and operators are now looking forward to a good January business. Price quotations already show an advance on most grades, in some cases as much as fifteen or twenty cents a ton. The best grade block coals are selling around $1.85; block and lump $1.60; egg and nut, though hard to dispose of, from $1 to $1.25, while nut and slack ranges from 60 to 70c. for the better grades and around 40c. for the poorer, all prices f.o.b. mines.



MIDDLE WESTERN

CHICAGO

Cold wave stimulates trade. Mines on full-time schedules. Domestic demand stronger. Screenings still tending upward. Anthracite steady with fair buying.

The advent of freezing winter weather has greatly benefited local market conditions. The thermometer ranged around the zero mark for several days. Domestic buying showed an immediate better tone, and while the stocks in Chicago coal yards, which are unusually large at this time of the year, have not been depleted to any great extent as yet, the out-of-town purchases were considerable. Throughout Illinois and Indiana the mines have been working on full-time schedules during the past week. Householders, apartment and office buildings have been laying in considerable stocks of coal during the past few days, which has perceptibly added to the stronger undertone.

The steam trade shows betterment. Less domestic coal has been offered to steam buyers, and in addition some of them have been obliged to use fuel for heating purposes, resulting in generally increased consumption. Screenings are being absorbed rapidly, and prices are holding firm around 75c. to 80c., even in the face of a heavy increase in the output of fine coal due to better domestic demand.

There is a shortage here of chestnut anthracite, and the better demand recently has reduced the surplus of egg and stove sizes. Prices are firmly held at circular quotations.

Franklin County coals have shown an improvement this week, and operators are asking full circular prices. The demand for steam coal is particularly strong.

The country dealers favored Indiana operators with an increased number of orders for domestic coals, and the mines were able to make prompt shipments, being amply supplied with cars.

Smokeless coals have been fairly strong and all demurrage shipments have been eliminated.

Hocking grades have improved; surplus shipments have been moved and prices are generally on the circular basis.

West Virginia splint shipments have all been cleaned up, and no demurrage coal is now on hand. The country buying in these coals has been good.

Springfield screenings are at a high level, touching 85c. per ton in some cases. The demand for Springfield domestic sizes has been very active at good prices.

Eastern Kentucky coals have been in good demand, although prices have varied widely.

Prevailing quotations are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump	$1.50@1.75	$1.50	....	$1.50@1.60	$1.75
4-in. lump	....	....	$1.60@1.75	....	....
Steam lump	....	....	....	1.20	....
2½-in. lump	....	....	1.50	....	....
1¼-in. lump	....	....	1.35@1.50	....	....
Mine-run	1.15@1.25	....	....	1.10	....
Egg	1.40@1.60	....	....	1.50	....
No. 1 washed	....	....	....	....	1.60@1.75
No. 2 washed	....	....	....	....	1.50@1.75
6x3-in. egg	....	1.50	....	....	1.60@1.75
Nut	....	1.35	....	....	....
No. 1 nut	1.50@1.75	....	....	....	....
No. 2 nut	1.40@1.60	....	....	....	....
Screenings	0.80@0.85	0.75	0.70@0.85	0.70@0.80	....

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump	$1.75	....	....	....	....
1¼-in. lump	....	....	....	....	$1.50@1.60
Lump and egg	....	....	$2.25	$2.25	....
Mine-run	1.20@1.30	....	1.40	1.40	1.25
Egg	1.60@1.75	1.50@1.75	....	....	....
No. 1 nut	1.75	....	....	....	....
No. 2 nut	1.40@1.60	....	....	....	....
Screenings	0.80@0.85	....	....	....	....

ST. LOUIS

Stimulating effects of cold weather have passed off. Screenings continue the feature of the market. Influence of the 5% rate decision.

During the few days of cold weather prices on domestic sizes advanced 10 or 15c. a ton in many cases, but the rise was not warranted and the market is back to the level of the past few weeks. Even if the weather is cold through Christmas week, it will hardly cause any change in domestic prices. Steam sizes are in good demand, with screenings from 70 to 80c., and Nos. 2, 3 and 4 nut are hard to get, while premiums are the rule in both fields. Washed coal shows some improvement.

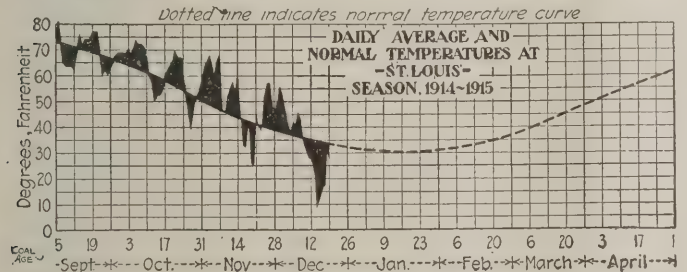
In the Standard field 2-in. lump has been down as low as 90c., with the average at $1. This on account of the extraordinary demand for screenings, which find a ready market at 55 to 60c., and indications are that they will go higher.

There is nothing moving in the way of anthracite or smokeless.

The 5% increase in freight rates has made the outlook brighter now than for many months. St. Louis being the center of a great manufacturing district will be benefited to a great extent. Activity in many industries that consume a large tonnage of coal is expected after the first of the year.

Market is quotable on the following basis:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.25	$0.95@1.05	$1.10
3-in. lump	.....	....	1.40	....	.....
6-in. lump	$1.30@1.50	....	1.50	1.15@1.25	1.25
Lump and egg	1.85@2.15	$2.25	.....	....	1.35
No. 1 nut	1.15@1.35	....	.....	0.90@0.95	.....
Screenings	0.50@0.55	....	0.80@0.85	0.55@0.60	0.60
Mine-run	1.00@1.10	....	.....	0.85@0.90	.....
No. 1 washed nut	1.50@1.60	2.00	1.60	....	.....
No. 2 washed nut	1.25@1.30	....	1.45	....	.....
No. 3 washed nut	1.10@1.15	....	.....	....	.....
No. 4 washed nut	1.10@1.15	....	.....	....	.....
No. 5 washed nut	0.75@0.80	....	.....	....	.....



INDIANAPOLIS

Cold weather has caused an improvement. Mines on better time and more men at work. Slack selling at full prices and all the output covered. Railroad buying slightly larger.

With snow on the ground and the railroad rate increase in effect, there is a better feeling in the coal industry. The first, accompanied by temperature that went below zero, made the immediate demand for domestic and steam coal better with the result that running schedules have been increased, and there are more miners at work than for several weeks; some companies would now be making full time were it not for a shortage of hopper cars.

Slack is in good demand and quite easily disposed of at 80c.; operators are of the opinion that the strength is due to increased orders rather than to a shortened supply. They believe they see an improvement in industrial conditions and they expect this to increase, following the railroad rate decision. In the block field, small mines have profited from the short running time or shut-downs at the big mines, slopes and gin shafts getting the local trade. There has been some cutting of prices, best quality selling at $1.80 to $2.60 a ton as against the usual $2.75.

KANSAS CITY

Seasonably cold weather and snow have stimulated orders. Prices are firming up.

The advent of winter weather has resulted in moving much of the large accumulations and there is no coal now on demurrage, while all grades are strong. There has been no change in price lists, but coal is generally selling higher than during the previous three or four weeks. While no definite announcements have been made, it is expected that coal companies will advance prices the first of the year. Domestic deliveries have been hampered by heavy snows. Kansas slack has been the feature of the market for the week, and at times the demand overtook the supply. Illinois coal remains weak.

Prices are now quotable on the following basis: Missouri lump, $2.25; Illinois lump, $1.75; egg, $1.50; nut, $1.50; Kansas lump, $2.25; nut, $2.10; slack, $1.40; mill, $1.65.

PORTLAND, ORE.

First cargo of anthracite via Panama Canal is now en route. Colder weather stimulates business.

The first cargo of anthracite coal to come to Portland from the Atlantic coast by way of the Panama Canal is now en route, the American steamer "Cricket" having sailed from Philadelphia for the Columbia River Dec. 1. The coal is expected to arrive here the latter part of this month. It is all egg size and will be retailed at from $14 to $15 per ton. Heretofore, egg anthracite of this kind has commanded from $18 to $20 per ton, so that the water freight rate will reduce the cost about $5 per ton, which, it is believed, will mean a considerable increase in the demand. This will probably be the only shipment to come here this winer from the Atlantic coast, but a large movement is anticipated next season, when the opening of the Celile Canal in the Columbia River will enable the trans-shipment of coal on barges into the Inland Empire, where the consumption of coal is about six times as large as here. The canal, which will remove the obstructions to navigation in the upper Columbia, is expected to be open for traffic next year without fail. As a result of this reduction on anthracite, the Western roads may reduce their freight rates from the mines in Washington, Utah and Wyoming to this district. This in turn would be followed by lower prices all around and an increase in the coal consumption.

During the past week the temperature droped sharply, and as a result the coal business was stimulated considerably.

PRODUCTION AND TRANSPORTATION STATISTICS

IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports of the United States for October, 1913-14, and for the ten months ending October, 1912-13-14, in long tons:

	10 Months			October	
Imports from:	1912	1913	1914	1913	1914
United Kingdom	4,864	5,259	8,672	662	262
Canada	1,169,702	897,489	840,447	69,476	69,289
Japan	20,718	89,115	50,099	10,040	5,560
Australia and Tasmania	140,502	141,578	187,537	20,192	23,213
Other countries	2,105	3,296	2,053	480	.....
Total	1,337,891	1,136,737	1,088,608	100,850	98,324
Exports: Anthracite					
Canada	2,971,546	3,540,336	3,351,569	420,814	334,411
Brazil	.....	.....	6	.....	.....
Other countries	61,145	58,007	54,916	4,527	10,023
Total	3,032,691	3,598,343	3,406,491	425,341	344,434
Bituminous					
Canada	8,907,968	11,662,469	8,221,467	1,378,471	979,611
Panama	396,227	419,680	239,837	32,098	25,706
Mexico	256,657	417,262	289,259	19,509	31,879
Cuba	943,262	1,111,573	908,324	128,181	114,426
West Indies	563,948	524,260	510,167	59,615	30,272
Argentina	.....	61,877	207,904	6,000	14,118
Brazil	.....	241,099	235,453	30,054	34,382
Uruguay	.....	5,163	71,819	.....	10,376
Other countries	1,327,714	1,100,273	1,570,527	95,765	111,207
Total	12,395,776	15,543,656	12,254,757	1,749,693	1,351,977
Bunker coal	6,151,280	6,483,020	6,285,770	719,436	573,822

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for June and the three months of the years 1913 and 1914:

	April		May		June	
State	1913	1914	1913	1914	1913	1914
Missouri	204,255	179,723	186,366	165,395	187,723	185,731
Kansas	444,142	378,192	407,124	370,097	412,371	490,561
Arkansas	136,153	87,002	130,020	95,749	145,306	133,350
Oklahoma	246,155	239,443	252,901	241,180	255,481	273,692
Totals	1,030,705	884,360	976,411	872,421	1,000,881	1,083,334

This statement only covers the tonnage of members of the association, which is estimated to be at least 95% of the entire production.

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for October and the four months of the fiscal years 1913 and 1914, in short tons:

	October				Four Months			
Destination	1914	%	1913	%	1914	%	1913	%
Tidewater	377,280	19	238,780	15	1,362,981	17	1,058,046	17
East	235,818	12	229,018	15	844,711	11	781,628	13
West	1,326,240	65	9 3,183	63	5,225,134	66	3,939,842	63
Total	1,939.338		1,460,981		7,432,826		5,779,516	

From Connections								
Bituminous	87,266	4	109,091	7	502,111	6	427,821	7
Anthracite	1,274		1,645		6,544		6,464	
Total	2,027,878	100	1,571,717	100	7,941,481	100	6,213,801	100
Coke	8,713		33,035		68,366		119,383	

BITUMINOUS COAL MOVEMENT

The following is a summary of the movement of coal and coke over 13 principal railroads during August and the first eight months of the last two years, in short tons:

	August		8 Months	
Anthracite	1913	1914	1913	1914
Baltimore & Ohio[1]	94,702	84,737	933,805	868,744
Chesapeake & Ohio[1]	1,642	1,866	11,988	10,637
Erie[2]	769,423	828,318	5,739,611	6,100,421
Pennsylvania[1 3]	713,451	805,585	6,851,626	7,153,407
Virginian[2 1]	.....	27	809	248
Total 5 roads	1,579,218	1,720,533	13,537,839	14,133,457
Bituminous				
Baltimore & Ohio[1]	3,456,089	2,922,802	24,101,535	21,896,284
Buffalo, Roch. & P.[1 2]	833,388	842,991	6,201,264	5,339,956
Buffalo & Susq.[1 2]	155,375	128,298	1,206,526	777,404
Chesapeake & Ohio[1]	1,665,525	2,104,217	11,036,996	13,576,576
Erie[2]	9,872	5,418	293,740	52,250
Hunt. & Br'd T. Mt.[1 2]	108,975	82,043	894,913	681,287
New York Central[3]	763,112	678,572	5,953,578	5,322,584
Norfolk & Western[1 2]	2,250,079	2,450,808	15,825,423	17,470,191
Pennsylvania[1 3]	4,562,339	4,299,810	33,396,286	31,821,349
Pitts. & Lake Erie[1 2]	1,154,219	1,095,211	8,585,935	7,651,429
Pitts. Shaw. & North[1 2]	239,808	169,525	1,798,320	1,512,079
Virginian[1 2]	376,083	361,906	2,898,742	2,675,980
Western Maryland	312,053	255,586	2,271,229	2,047,766
Total 13 roads	15,886,917	15,397,187	114,464,487	110,825,135
Coke				
Baltimore & Ohio[1]	391,999	242,283	3,221,370	2,337,794
Buffalo, Roch. & P[1 2]	36,220	21,647	376,107	185,446
Buffalo & Susq.[1 2]	20,006	40,725	200,032	249,362
Chesapeake & Ohio[1]	26,723	21,181	237,206	253,969
New York Central[3]	.....	.....	36,207	.....
Norfolk & Western[1 2]	108,158	79,156	1,059,509	748,331
Pennsylvania[1 3]	1,161,484	792,656	9,731,462	6,867,676
Pitts. & Lake Erie[1 2]	537,557	418,471	4,656,960	3,523,446
Pitts. Shaw. & North[1 2]	.....	.....	9,383	.....
Western Maryland	8,822	6,614	53,232	48,610
Total 10 roads	2,290,969	1,622,733	19,581,468	14,214,634

Total Coal and Coke 13 Roads	1913	1914
January	19,314,523	18,157,998
February	17,594,079	15,446,830
March	17,672,305	20,233,213
April	16,882,326	15,497,444
May	19,015,721	16,523,385
June	18,610,757	16,984,476
July	18,736,979	17,589,427
August	19,757,104	18,740,453
Total, 8 months	147,583,794	139,173,226

[1] Includes coal received from connecting lines.
[2] Includes company's coal.
[3] Does not include company's coal hauled free.
Note:—The Southern Railway hauled 316,945 short tons of bituminous coal during July, 1914, and 2,264,415 short tons during the seven months ending July 31, 1914.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable, in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

Contract No. 14—Panama, C. Z.—This contract (pp. 814, 854, 892, 933), which calls for furnishing all or any part of the requirements of the Panama R.R. Co., estimated at 500,000 tons of coal, has been awarded to William C. Atwater & Co., Inc., 1 Broadway, New York. The bid of this company was for 350,000 tons of Pocahontas semi-bituminous steam coal, at $2.70, delivery to be made at Lambert's Point (at the option of the Panama R.R. as to an increase in the amount to be supplied). From a report of the Bureau of Mines, Washington, D. C., is stated that this bid—the cost being figured on a basis of 1,000,000 B.t.u.—was the lowest submitted. The coal is to be taken from the Thelma and Nora mines of the Virginia Pocahontas Coal Co. at Colwood, McDowell County, W. Va.; also from Mine No. 1 of the Lake Superior Coal Co. near Huger, McDowell County, W. Va. Address R. E. Rutherford, Assistant Purchasing Officer, Panama Purchasing Department, 24 State St., New York.

Contract No. 20—New York—This contract (pp. 892, 933, 972), which provides for furnishing and delivering 300 gross tons buckwheat coal No. 1, has been awarded to Joseph P. O'Connor, at $3.66 per ton. Address Auditor, 400 East 29th St., Borough of Manhattan.

Contract No. 22—Philadelphia, Penn.—The date for receiving bids on this contract (pp. 933, 952, 1009) has again been extended to 12 o'clock noon, Dec. 24. This action was taken in order to provide the prospective bidders with an opportunity to make due allowances for the new freight rate schedule recently put into effect by the State Commerce Commission. Press reports are to the effect that this contract involves 140,500 tons of anthracite, and 269,000 tons of bituminous coal, and that the gross consideration will aggregate more than $1,000,000. Address Director Loeb, Room 225, City Hall, Philadelphia, Penn.

Contract No. 32—New York—The bids on this contract (p. 1009), which provide for furnishing, delivering, storing and trimming coal in the Borough of Queens, were as follows: Smith, Lineaweaver & Co., $14,015; Charles B. Norton & Co., $13,400; John W. Peale, $13,540; Meeker & Co., $15,545; Burns Bros., $14,280; George D. Harris, $13,700. Address William Williams, Commisisoner, Department of Water Supply, Gas & Electricity, Room 2351, Municipal Building, Manhattan.

Contract No. 35—New York—Sealed bids will be received by the Board of Trustees, Bellevue Hospital, until 3 p.m., Dec. 31, for furnishing fuel supplies under specification No. 2. The surety required will be 30% of the total amount of the bid, and a deposit of 1½% shall accompany each bid. The time for completing this contract shall be from Jan. 1 to Mar. 31, 1915. Blank forms and further information can be obtained on application to the Auditor, 400 East 29 St., Borough of Manhattan.

Contract No. 36—Pittsburgh, Penn.—Bids are requested for furnishing the penitentiary with its fuel supply for one year from Jan. 1, 1915. Bids will be open Saturday, Dec. 26. The board reserves the right to reject any and all bids. Address, John Francies, Warden, Western Penitentiary of Pennsylvania, Pittsburgh, Penn.

Contract No. 36—New York—Sealed bids are requested by the Department of Corrections, until 11 a.m., Dec. 30, for furnishing and delivering anthracite and semi-bituminous coal. The amount of security required is 30% of the amount of the bid, and deliveries are to be completed before Jan. 15, 1915. Blank forms and further information may be obtained at the office of the Department of Corrections, Municipal Building, Borough of Manhattan.

Contract No. 37—New York—Sealed bids will be received, until 10.30 a.m., Dec. 28, for furnishing and delivering bituminous coal at the Fire Department buildings as follows: Manhattan, 150 tons; Brooklyn, 150 tons; Bronx, 75 tons; Richmond, 25 tons. The amount of security required is 30% of the amount of the bid, and the time for completion of the contract is Dec. 31, 1915. Blank forms and further information may be obtained at the office of the Fire Department, 11th floor, Municipal Building, Manhattan. Robert Adamson is fire commissioner.

Contract No. 38—Hamilton, N. J.—Bids are requested for furnishing the pumping station of the Standard Oil Co. with 5000 tons of No. 1 buckwheat coal for delivery during the year 1915, in equal monthly proportions. Proposals will be received until December 28, 1914. Address J. L. Hutchison, Coal Purchasing Agent, 26 Broadway, New York City.

FOREIGN MARKETS

GREAT BRITAIN

Dec. 11—Tonnage is arriving more freely and there is a rather steadier tendency in regard to all classes of coal. Quotations are approximately as follows:

Best Welsh steam	$4.80@5.04	Best Monmouthshires	$3.96@4.02
Best seconds	4.32@4.56	Seconds	3.84@3.90
Seconds	4.08@4.20	Best Cardiff smalls	2.70@2.72
Best dry coals	4.32@4.56	Cargo smalls	1.56@1.80

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage and for cash payment.

Freights—Tonnage is offering more freely, but loading turns are becoming difficult to arrange. Rates are approximately as follows:

Gibraltar	$3.00	Venice, Ancona	$5.22	Singapore	$5.28
Malta	3.24	Alexandria	4.68	Las Palmas	2.88
Marseille	4.06	Port Said	5.04	St. Vincent	3.12
Algiers	4.29	Aden	5.04	Rio Janeiro	3.90
Genoa, Savona	4.08	Colombo	5.16	Monte Video	3.48
Naples	3.96	Sabang	5.04	River Plate	3.72

COAL AGE

DEVOTED TO COAL MINING AND COKE MANUFACTURE

Volume 6, No. 26
Issued Every Saturday
Hill Publishing Company

NEW YORK, DECEMBER 26, 1914

Price, Ten Cents
Contents, First Page
Advertising Index, Last Page

Byproduct Plant at Bargoed Colliery of Powell Duffryn Steam Coal Co., South Wales.



The Boys at the Mines Know the Barsteel

"When John told me a year ago he had decided to buy the *Barsteel* instead of duplicating the old solid box frame, I thought he was making a mistake, *but he knows,* and now I know.

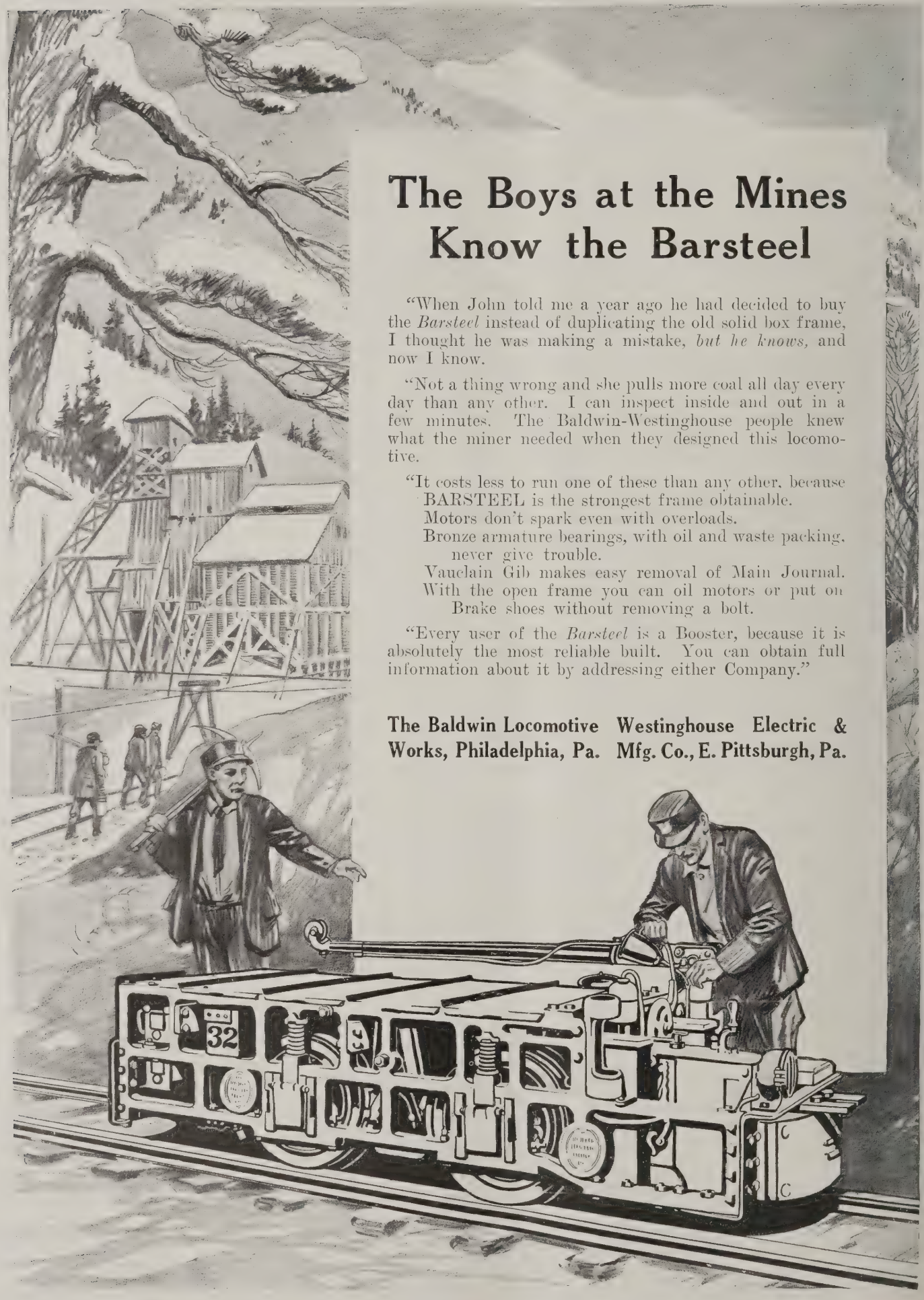
"Not a thing wrong and she pulls more coal all day every day than any other. I can inspect inside and out in a few minutes. The Baldwin-Westinghouse people knew what the miner needed when they designed this locomotive.

"It costs less to run one of these than any other, because
BARSTEEL is the strongest frame obtainable.
Motors don't spark even with overloads.
Bronze armature bearings, with oil and waste packing, never give trouble.
Vauclain Gib makes easy removal of Main Journal.
With the open frame you can oil motors or put on Brake shoes without removing a bolt.

"Every user of the *Barsteel* is a Booster, because it is absolutely the most reliable built. You can obtain full information about it by addressing either Company."

The Baldwin Locomotive Works, Philadelphia, Pa.

Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.



OF THE
UNIVERSITY OF ILLINOIS
29 DEC 1914

COAL AGE

FLOYD W. PARSONS, *Editor.*

Correspondence suitable for the columns of COAL AGE solicited and paid for. Name and address of correspondents must be given—not necessarily for publication. Subscription price $3 per year, in advance, for 52 numbers to any postoffice in the United States or possessions, and Mexico. $4 to Canada.

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VOLUME 6 DECEMBER 26, 1914 NUMBER 26

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*A VISIT TO EUROPEAN MINES: *Pages* 1014-1017
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The government invites private companies to participate in the business of supplying ships at Panama with bunker coal. Storage sites will be rented upon reasonable terms. The government will make a charge for use of the federal coal-handling machinery. The plant on the Atlantic terminus will store approximately 500,000 tons of coal. Both wet and dry storage will be arranged for. War precautions taken. James Steelman. COAL AGE, Vol. 6.

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NUMBER OF COPIES PRINTED THIS ISSUE 10,000
None sent free regularly, no returns from news companies, no back numbers.

The Weekly Ad-Talk Page

"The 'substitutor' is a mean cuss"

"Substitution" is the evil encountered by many advertisers.

Especially those whose goods have been for years on the market.

The "substitutor" is a mean cuss.

Avoid him.

He is trading on the other fellow's reputation, which has been years in the making.

He's a confidence man of the first water.

And the fellow he fools with his "just-as-good," or his palpable imitation of the real thing—that man is the goat.

Be sure you get what you ask for.

* * * *

There's just as much art in being a good buyer as there is in being a good seller.

If you care to consult Mr. Dun and Mr. Bradstreet you'll find out that there is about one concern in fifty which succeeds in business.

And if you could study the *successes* from an inside point of view, you'd learn that *good buying* had a lot to do with it.

You can't become a good buyer unless you keep constantly in touch with the best things being sold in your line.

And you can't do this unless you read the ads.

The day is past when ads. are merely *tolerated*, like the train-boy who tries to sell you everything from hemp cigars to souvenir post cards.

Most of the ads. in this paper are *good sellers*—and weekly association with them is bound to make *good buyers*.

Someone once truly said, "Proportionately as a man's backbone weakens his 'wishbone' develops."

Good buyers have good backbones —and reading the ads. in Coal Age each week is a good spinal developer.



Jeffrey Storage Battery Locomotive, pulling car out of room neck, Grant Coal Mining Co., New Goshen, Ind.

Each Locomotive Gathers an Average of 218 Cars Per Day

Jeffrey Storage Battery Mine Locomotives

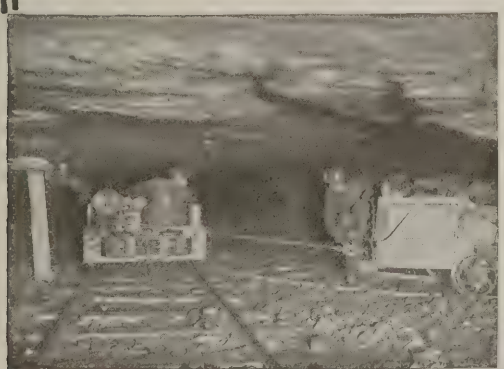
are a pronounced success at the mines of the Grant Coal Mining Co.

Six 5-Ton Locomotives are used to distribute the empty cars and gather the loaded cars to the double partings on the entries, which are worked on the panel system, the average grade being about one per cent.

Each locomotive is handling an average of 392 tons of coal in eight hours, taking care of from 50 to 62 men.

Cost of repairs on the oldest of these locomotives, which has been in operation for one year, does not exceed $5.00, and only after a year of continuous service was it found necessary to replace the electrolyte in the battery.

Jeffrey Storage Battery Locomotives are especially adapted for gathering purposes where the average grade is not excessive; our Electric Cable Reel or Crab type being the most suitable and practical under certain conditions.



Electric Crab Locomotive; can also be furnished with Combination Crab and Cable Reel.

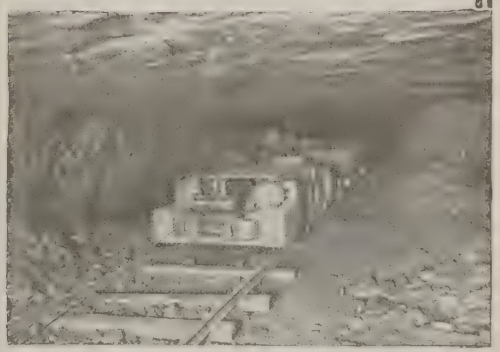
Give us full particulars about conditions in your mine and let us recommend the locomotive best suited to your needs.

Bulletins mailed upon request.

Jeffrey Mfg. Co.

Columbus, Ohio

New York, Boston, Philadelphia, Pittsburgh, Charleston, W. Va., Birmingham, Chicago, Duluth, Denver, Montreal 19-26-14



Electric Cable Reel Locomotive; can be furnished with various types of reels to suit conditions.

If you heard of a drill that could be installed anywhere an electric wire can be run at less than one-third the cost of pipe lines and can be operated and moved by two men, wouldn't you be interested?

If you learned there is a drill that will actually save 70% to 90% of your present rock excavation costs and advance the work almost ten times as fast as it can be done by hand, wouldn't you be anxious to learn the particulars about it?

If we claim the Fort Wayne Electric Rock Drill will do all this and offer to send you a Bulletin that explains all about the design, construction and operation of the drill, don't you think it would be worth writing for?

THE BULLETIN IS NO. 1144 AND IT'S FREE FOR THE ASKING.

FORT WAYNE ELECTRIC WORKS

Of General Electric Company

ROCK DRILL DEPARTMENT MADISON, WIS.

Factories: Fort Wayne, Ind., and Madison, Wis.

Branch Offices—All Large Cities

D 8

At Last, a Carbide Lamp Burner That Won't Stop Up!!

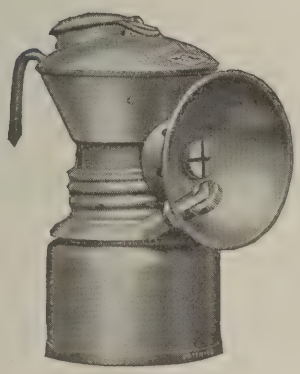
As usual it was up to us to find a means of overcoming the trouble caused by the burners stopping up.

Well, we've perfected a burner that won't stop up. This only proves once again that we are constantly on the job, that we are giving the mining industry our very best efforts and that the really good things, the important improvements, are always found first on the

Non-Cloggable Burner

BALDWIN
THE MINER'S LIGHTING BUG

Rigid Removable Reflector

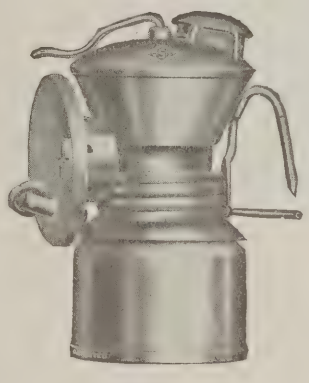


Brush Burner Cleaner



Case is made of brass and contains a sliding base into which are solidly set sixty non-rusting wires. The knob allows the brush to be locked into position.

This cleaner can be used on any burner, using a single wire as you would an ordinary needle. When used on our new burner it should be used as a brush to remove any deposit on face of burner or from the slots.



This burner is made of a solid piece of brass, slotted on the face. These slots serve two purposes.

1st. They permit of air reaching the base of the flame, this air mixing with the gas lifts the luminous part of the flame away from the burner. The flame at the burner is blue and will not carbonize (make soot) only when the flame gets very low; even then the soot deposits on the face of the burner, ***it does not get down into the gasway and clog it.***

2nd. The slots serve the same purpose as the slot in the head of the screw, and the burner is put on and taken off, just as you would an ordinary screw.

The shape of the burner, makes the sparker lighter more effective, as the burner rides close to the reflector and as the face of the burner is flat the spark from the lighter can get to the gasway. It works every time, there's never a miss.

The reflector is attached to the lamp as securely and rigidly as if soldered—still removable. This is a decided improvement on the permanently fixed reflector for several reasons.

1st. Should the reflector become damaged it can be replaced with a new one.

2nd. Different kinds of work require different kinds of light. For some, concentrated light is best, for others, partial diffusion of light is most desirable and still others, general illumination is needed.

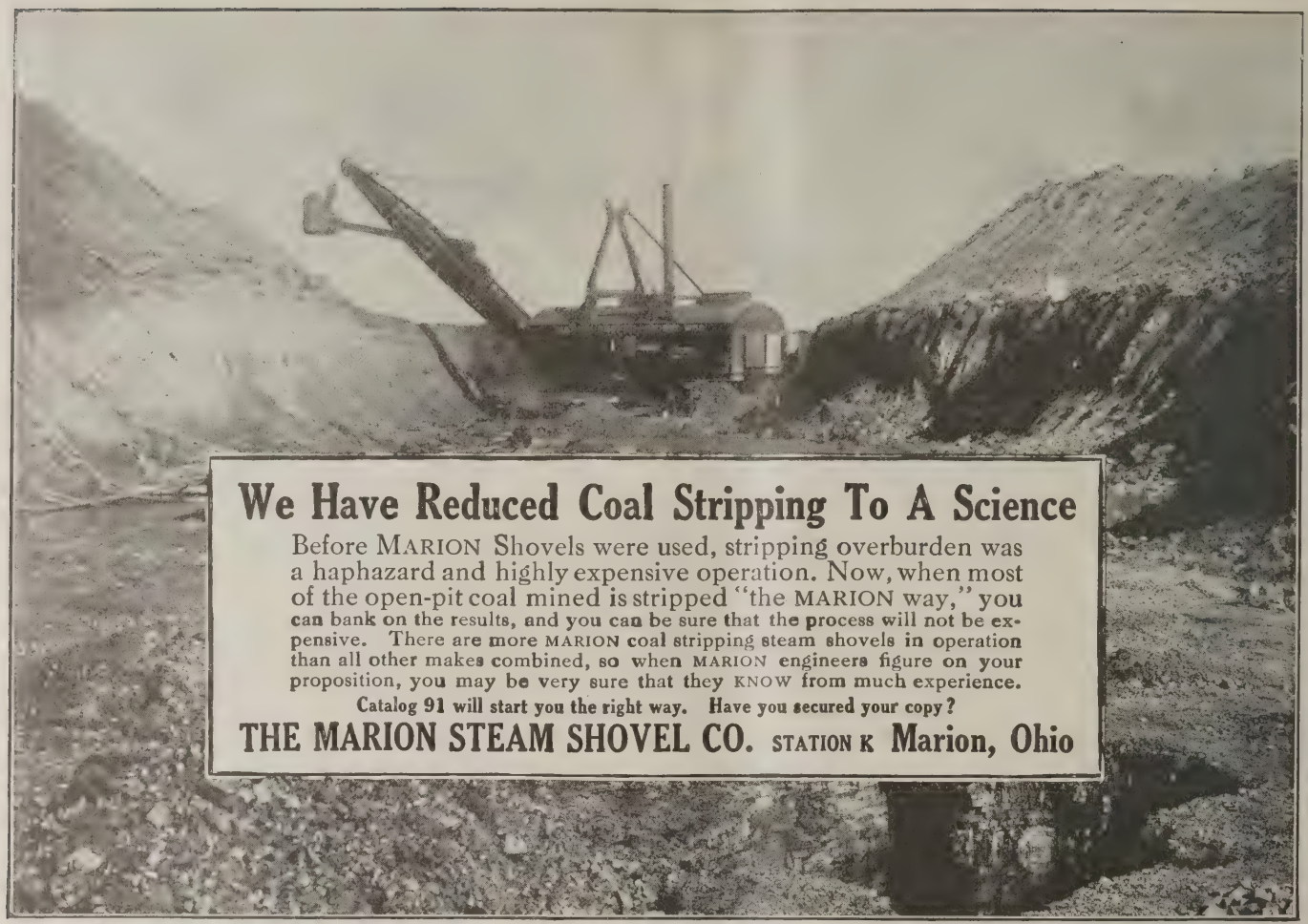
The only practical way to obtain these variations is to use different shaped reflectors—hence the need of a removable reflector.

Note please, the brass reinforcing shell, back of the reflector. This more than doubles the strength of the reflector. You cannot bend or twist the reflector when unscrewing the carbide container and it will take more than an ordinary bump against the roof or wall of the mine to seriously injure it.

John Simmons Co.

96 Centre St. **New York**

Branches:
268A Market St., San Francisco, Cal. 140 Bleury St., Montreal, Can.



We Have Reduced Coal Stripping To A Science

Before MARION Shovels were used, stripping overburden was a haphazard and highly expensive operation. Now, when most of the open-pit coal mined is stripped "the MARION way," you can bank on the results, and you can be sure that the process will not be expensive. There are more MARION coal stripping steam shovels in operation than all other makes combined, so when MARION engineers figure on your proposition, you may be very sure that they KNOW from much experience.

Catalog 91 will start you the right way. Have you secured your copy?

THE MARION STEAM SHOVEL CO. STATION K Marion, Ohio

Lansing No. 5 Concrete Mixer

Especially Adapted for Work in and Around the Coal Mine

This portable, low-priced concrete mixer is particularly suited to conditions in and around the Coal Mine. It is designed to work in confined places, but at the same time is of large capacity, is sturdily built and will stand rough usage. It will enable you to make permanent repairs, to prevent cave-ins and other expensive losses. The price is so low that anyone can afford to operate one, costing only $185.00 complete with engine, all ready to run; or $90.00 for the mixer on skids equipped for hand or belt power. **Let us tell you more about concrete for mine work.**

Lansing Company, 790 Cedar Street, Lansing, Mich.

Manufacturers of Mixers, Carts, Wheelbarrows

Warehouses and stocks at New York, Boston, Philadelphia, Chicago, Minneapolis, Kansas City, San Francisco.

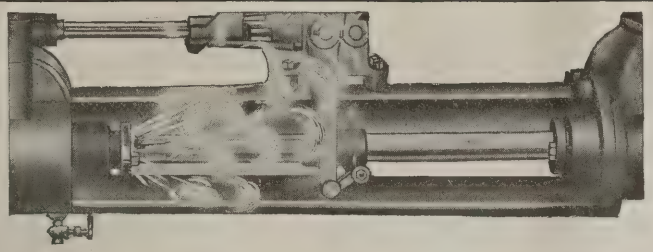


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$185 Complete



Discharging



Stop Those Leaks with

MONEL METAL

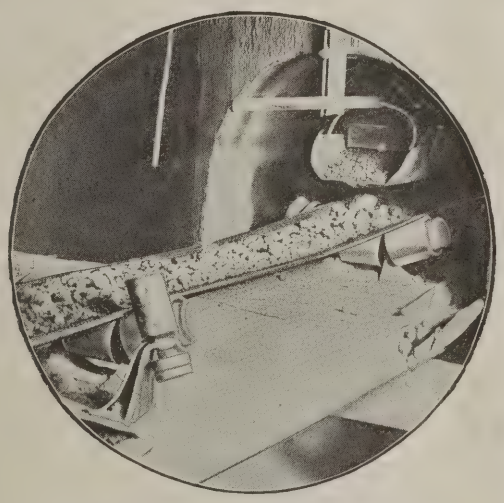
Mine Pump Rods!

Pump leaks such as this are avoided by the use of Monel Metal pump rods. They are stronger than steel, less corrodible even than bronze, and retain a polished, glassy surface, which does not wear out the packing. There is no scoring or pitting of Monel Metal rods.

Mine purchasing agents should communicate with us at once for pump rods made to meet their exact requirements.

Write for the Monel Bulletin.

Supplee-Biddle Hardware Co., *Mfrs. and Distributors*
501 Commerce St., Phila. 344 Hudson Terminal Bldg., New York



Your Conveying

problems will be radically simplified by installing

LEVIATHAN or ANACONDA BELTS

according to the surrounding conditions.
A Customer writes: "Our belt expenses are only about one-third as much as they were before we began using Leviathan."
This is a HABIT, and it means Dollars to You. Let us show you.

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Main Belting Co. of Canada, Ltd.
Montreal Toronto

HESS-BRIGHT

HB DWF

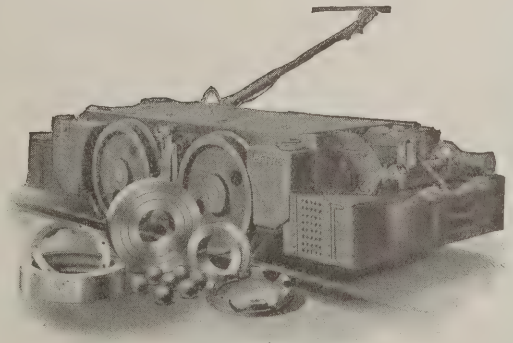
BALL BEARINGS

Is It Worth While?

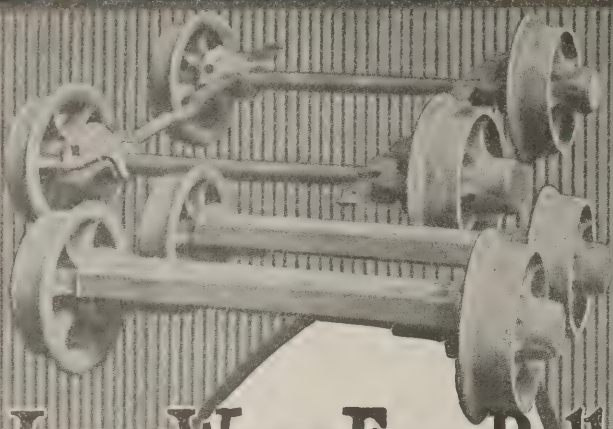
Is it worth while to reduce break-downs on motors as far as possible? This is almost the same as asking—Is it worth while increasing production as far as possible?—since interruptions in the movement of coal in and outside of the mine, clog output decidedly.

And if it is worth while to reduce breakdowns, is it worth while to install the ball bearings which assure that bearing wear on armature shafts is really reduced as near nil as human skill can reduce it?

A lot of prominent coal mining concerns have answered "Yes" to this question—and specified Hess-Brights.



The Hess-Bright Mfg. Co.
Front Street and Erie Avenue Philadelphia, Pa.



Long-Wear, Easy-Pull Enterprise Trucks

"Long Wear and Easy Pull"—that's the nut-shell story that tells a mining man just what he wants to know.

"Long Wear and Easy Pull" covers every point that any mining man can raise, for unless a truck has **every** desirable quality, "long wear and easy pull" **can't** describe that truck.

"Long Wear and Easy Pull" describes Enterprise trucks perfectly, because they roll on

Enterprise Chilled Car Wheels

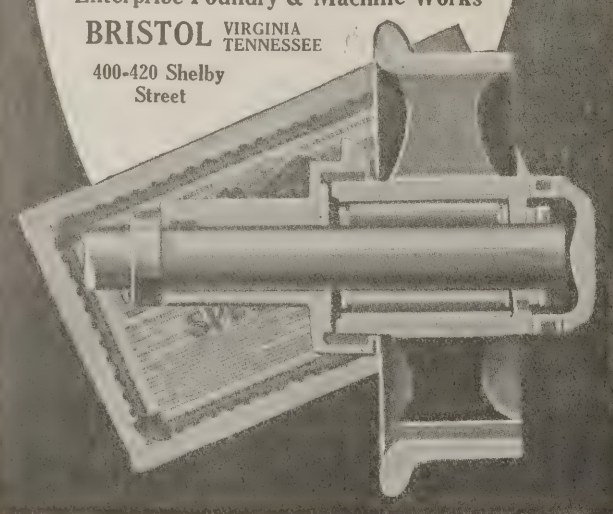
—the only kind that are unqualifiedly backed up by the most comprehensive and longest-lived guarantee of any truck made. For **five years** the user is protected by us and our reputation as mine car wheel manufacturers against wheel breakage, tread flange or hub wear, wheel failure of **any** kind; against lubrication more than **twice a year.** And it is absolutely guaranteed that the very best plain bearing truck will consume 80 to 100% more power than one using Enterprise Roller Bearing Wheels.

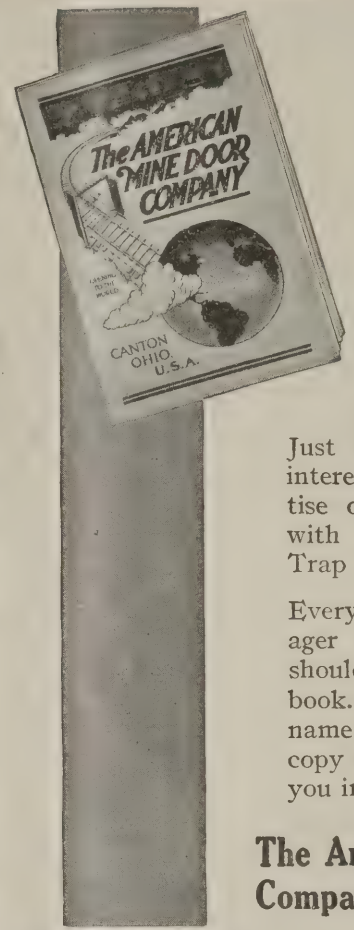
"Long Wear and Easy Pull" is the result of perfect wheel balance and perfect wheel metallurgy. The lower engraving shows the balance exactly. But let us tell you and prove to you about the **metallurgy that you cannot see.**

Enterprise Foundry & Machine Works

BRISTOL VIRGINIA TENNESSEE

400-420 Shelby Street





Your Copy Is Now Ready

Just off the press. The interesting illustrated treatise on Mine Ventilation with Canton Automatic Trap Doors and Signals.

Every mine owner, manager and superintendent should have a copy of this book. Just send us your name and address. A free copy will be forwarded to you immediately.

The American Mine Door Company, Canton, Ohio

Increased Efficiency—Greater Economy

Results obtained from use of:

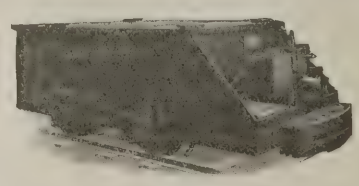
"FULLER QUALITY"

Sprocket and Traction Wheels. Wire Rope Sheave Wheels. Bearing Surfaces Hardened. Specially Treated to Resist Wear.

All kinds of Wearing Parts to Resist Abrasion.
Unequalled for Severe Duty and Long Life.
All kinds of Car Wheels.

Write for Fuller Quality Products Catalogue No. 50-B.

Lehigh Car Wheel and Axle Works
Catasauqua, Pa.

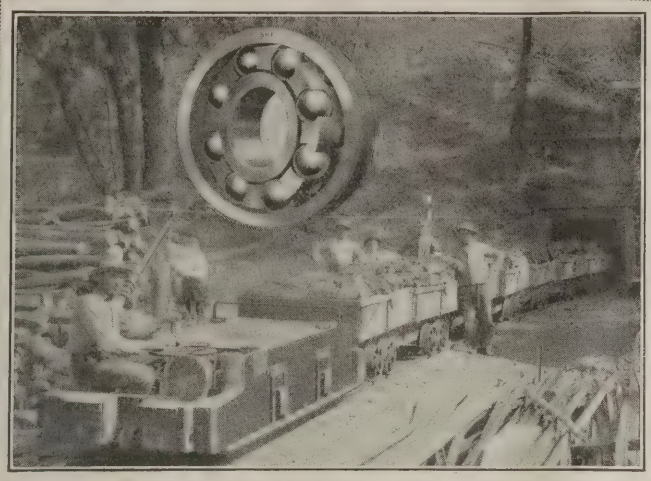


No. 5765
Storage Battery Locomotive

Investigate the money-saving features of "Atlas High Efficiency" mine cars and electric locomotives.

Bulletins and complete information sent you on request.

The Atlas Car & Mfg. Co.
Dept. O.
Ivanhoe Road, Cleveland, Ohio



60,000 Mile Run

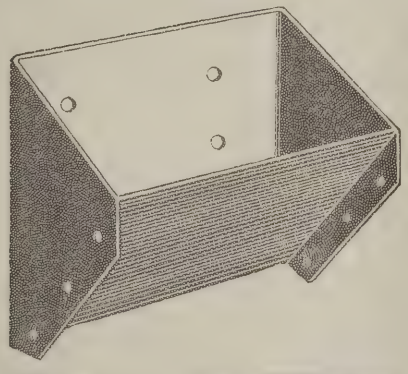
In September of this year an S K F Ball Bearing was removed from the pinion end of a mining locomotive for inspection. It had been two years in continual service and the locomotive had traveled approximately 60,000 miles. The bearing showed no appreciable wear and was immediately returned to service.

It pays to use the double row, self-aligning ball bearing.

Specify SKF on mine cars.

SKF BALL BEARING CO.

50 Church Street, New York City



BUCKETS

MANUFACTURED to meet all mining requirements. The illustration shows a perfect discharge type. Let us quote you on your bucket requirements.

We also make *perforated metal* for all purposes. Write for Latest Catalog giving details.

Hendrick Manufacturing Co.

Carbondale, Pa.

New York Office: 30 Church Street

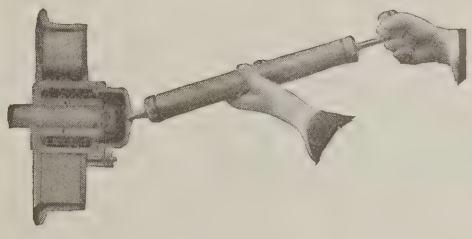
"119" KEYSTONE GREASE

for mine car wheels

NO. 119 KEYSTONE GREASE is made especially for the lubrication of mine car wheels and shows wonderful efficiency under all working conditions, winter or summer.

It furnishes lubrication for every turn of the wheels—absolutely without waste and instead of daily applications, the wheels are filled but once in *three* to *six* months making an enormous saving in both labor and lubricant.

We are prepared to demonstrate the saving by its use. A postal will have prompt attention.



¶ *Applying No. 119 Keystone Grease with a Keystone Grease Gun, which is supplied with the first order. The gun is made from heavy seamless steel tubing, with a tapered drawn brass nozzle, which can be cut to fit any opening.*

Keystone Lubricating Company

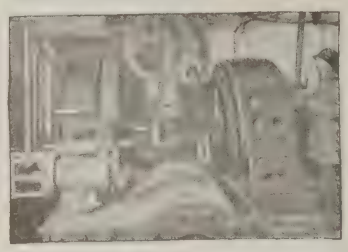
Executive Offices and Works
Twenty-first, Clearfield and Lippincott Streets

Philadelphia

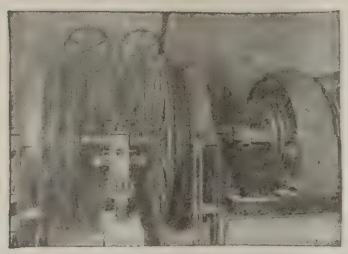
Branch Offices and Warehouses in Principal Cities of the United States
Agencies in the Principal Countries Throughout the World

Established 1884

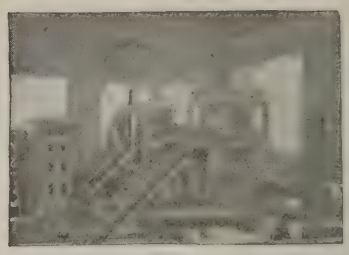
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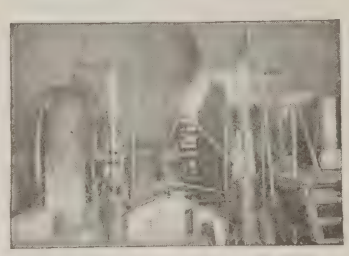
500 H.P. G-E Motor Driving Underground Hoist. Nourse Mines—In use 6 years. No delays.



500 H.P. G-E Motor Driving Underground Hoist, Silver King Coalition Mines Co., Park City, Utah.



700 H.P. G-E Motor driving Hoist. Crow's Nest Mines Keystone Coal & Coke Co. 2½ years in use, 65% overloaded. No delays.



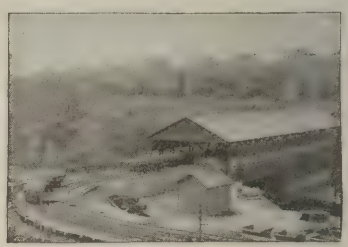
300 H.P. G-E Motor Driving Hoist, Iron Blossom Mining Co., Eureka, Utah. In successful use over 2 years.

Hoists in Use Years No Delays—No Repairs

Many reports are coming in from hoists driven by G-E motors. One was designed for 24 trips per day but has hoisted 40 for 2½ years without a delay. Another has been in use six years, while others still have been in use two years or more and in every case the report was the same. "Operation satisfactory. No delays due to electrical causes."

Mine hoists driven by G-E motors using purchased power have low operating costs because, first, there are no boilers to be fired night and day, second, the absence of vibration on rope—increasing its life and that of the head gear, etc., and, finally, because the power consumption is nothing during idle moments, but always available when needed.

Send for new hoist bulletin "Mine Hoist Equipment."



Tipple and Track Arrangement, Crow's Nest Mine. 75,000 tons per month. In use 2½ years.



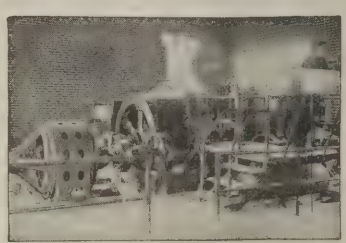
Electrically operated Tipple and washer with belt conveyor. J. K. Dering Mine, Clinton, Ind.



Mine Fan driven by G-E Multi-speed Motor, J. K. Dering Mine, Clinton, Ind.



Greensburg Coal Company's Tipple and Hoist House. Note absence of escaping steam.



300 H.P. G-E Motor Driving Hoist, Greensburg Coal Co. Shaft, Greensburg, Pa. Over a year in successful operation.

General Electric Company

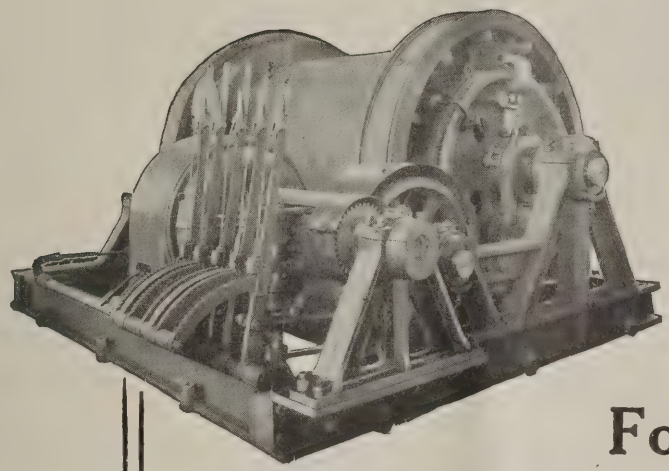
General Office: Schenectady, N.Y.

ADDRESS NEAREST OFFICE

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Baltimore, Md.
Birmingham, Ala.
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Butte, Mont.
Charleston, W. Va.
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Chicago, Ill.
Cincinnati, Ohio
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Columbus, Ohio
Dayton, Ohio
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Richmond, Va.
Rochester, N. Y.
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San Francisco, Cal.
St. Louis, Mo.
Schenectady, N. Y.
Seattle, Wash.
Spokane, Wash.
Springfield, Mass.
Syracuse, N. Y.
Toledo, Ohio
Washington, D. C.
Youngstown, Ohio

For Texas, Oklahoma and Arizona business refer to Southwest General Electric Company (formerly Hobson Electric Co.)—Dallas, El Paso, Houston and Oklahoma City. For Canadian business refer to Canadian General Electric Company, Ltd., Toronto, Ont.

5258



For What Do You Look in a Hoist?

First, you want capacity to haul your load at the most economical speed. Then you want sufficient overload capacity to enable you to haul at higher than general speeds, or heavier loads at the usual speed. The gear ratios must be such as to reduce current consumption to the lowest figure. The proportions of the hoist must be such as to withstand the severe grind of continued operation at full load. Parts should not wear quickly, nor should bearings run hot; and the manufacturer must be reputable, must be one that you *know* can build hoists and stay in business. You want EFFICIENCY!

Vulcan Hoists

are known throughout the mining world to give just what you, and every other mining man, are looking for. The thousands that have been successes on the most difficult hoisting jobs in the world are your guarantee of the service you can expect from any VULCAN Hoist, providing we have had a chance to look thoroughly into your conditions. You are free to utilize our engineering department whether you buy or not.

Vulcan Iron Works

1730 Main St., Wilkes-Barre, Pa.

New York Chicago

Classified Ads

Positions Wanted, 3 cents a word, minimum charge 50c. an insertion in advance.

Positions Open, (Civil Service Examinations), **Employment Agencies** (Labor Bureaus), **Business Opportunities, Wanted** (Agents and Salesmen—Contract Work), **Miscellaneous** (Educational—Books), **For Sale**, 5 cents a word, minimum charge, $1.00 an insertion.

Count four words for keyed address care of New York; five for Chicago. Abbreviated words or symbols count as full words.

Copy should reach us not later than Saturday noon for ensuing week's issue. Answers addressed to our care, Tenth Ave. at Thirty sixth Street, New York or 1144 Monadnock Block, Chicago, will be forwarded (excepting circulars or similar literature).

No information given by us regarding keyed advertiser's name or address.

Original letters of recommendation or other papers of value should not be inclosed to unknown correspondents. Send copies.

Advertisements calling for bids, $3.60 an inch per insertion. C A

POSITIONS WANTED

ELECTRICIAN wants position with coal company, seven years' experience in mine and central station work. P. W. 346, Coal Age.

AS MINE FOREMAN in nongaseous mine in West Virginia; 7 years' experience; can furnish A-1 references; at present employed. P. W. 345, Coal Age.



Mine Contract Work

of all kinds, including Shaft Sinking, Steel, Wood and Concrete Construction and Machinery Erection. Reasonable terms. Full details on request. **Write me today.**

F. D. Buffum Jenkins Arcade, Pittsburgh, Pa.

HANS OLSON, Pres. JNO. A. FISHER, Sec'y.

Punxsutawney Drilling and Contracting Company

DIAMOND DRILL CONTRACTORS

Testing Bituminous Coal Lands a Specialty.

Weber Bldg. PUNXSUTAWNEY, PA.



You Can't Look into the Earth

but we can get you a large clean core of all strata under your land to be examined in broad daylight. No guess work.

The J. A. Brennan Drilling Co.

Home Office—Scranton, Pa. Field Office—30 Carson St., Pittsburgh, Pa.

Contractors for Diamond Drilling.

Sullivan Post-Punchers

The machine for inclined seams, for mining out partings, for top cutting, for shearing and mining from the same set up.—Bulletin 57AC.

Sullivan Machinery Co., 122 S. Michigan Ave., Chicago

15% in Power is Saved by Wuest Herringbone Gears

This gear takes a 20 to 1 ratio in a single reduction. Almost noiseless. No back-lash. Write to us.

The Falk Co. **Milwaukee, Wis.**

Classified List

Second Hand Equipment

For Sale—Exchange—Rent—Wanted

Items not otherwise marked list equipment for sale.

Rates: Less than 4 insertions 55 cents per line—4 to 11 insertions 50 cents per line—12 or more insertions 45 cents per line. C A

NOTE—Most items are signed with only part of the advertiser's name. Complete names and addresses in alphabetical order will be found under the heading "Addresses."

ADDRESSES

NEW RIVER Co., The, Macdonald, W. Va.

AIR COMPRESSORS

Steam driven, 3 Laidlaw-Dunn-Gordon duplex 2 stage and 5 Norwalk tandem 2 stage.—NEW RIVER.

BOILERS

150 hp. horizontal tubular, Union, Atlas, Erie City, Keeler and West Point. Pressure up to 125 lb.—NEW RIVER.

ELECTRIC LIGHTS

For sale at less than half cost. Sixty 300 C.P. D.C. 220 V. Nernst arc lamps, moon globes. In perfect running condition. Can be seen in use in our offices; $4 each. (Regular price, $9.50). Price includes drop lighting switch. Must sell, as our voltage is 110 in new office. HILL PUBLISHING CO., 10th Ave. at 36th St., New York.

FANS

Ventilating from 18x7 down to 10x4, d.c. to steam engines Clifford, Capell, Robinson and Bullock.—NEW RIVER.

GENERATING UNITS

Generator sets direct current, 250 volt and 550 volt, direct connected and belted, capacities up to 250 kw.—NEW RIVER.

HAULAGE ENGINES

Tail rope and endless rope haulage engines.—NEW RIVER.

HOISTS

[Wanted]

Electric hoist from 30 to 50 H.P. D.C. 230 to 250 volts; must be complete and in perfect order. This is intended to be used for elevating waste material to dump on about 25% gradient.—BRIDGEPORT COAL CO., Bridgeport, Texas.

MINE HOISTS

Vulcan, Lane & Bodley and Robinson.—NEW RIVER.

PUMPS

High head. General service and boiler feed.—NEW RIVER.

DIXON'S GRAPHITE PIPE JOINT COMPOUND

Protects the joints of steam, air and water piping.

Send for "Pipe Joint Compound" Booklet, No. 59.

Made in JERSEY CITY, N.J., by the **Joseph Dixon Crucible Co.**

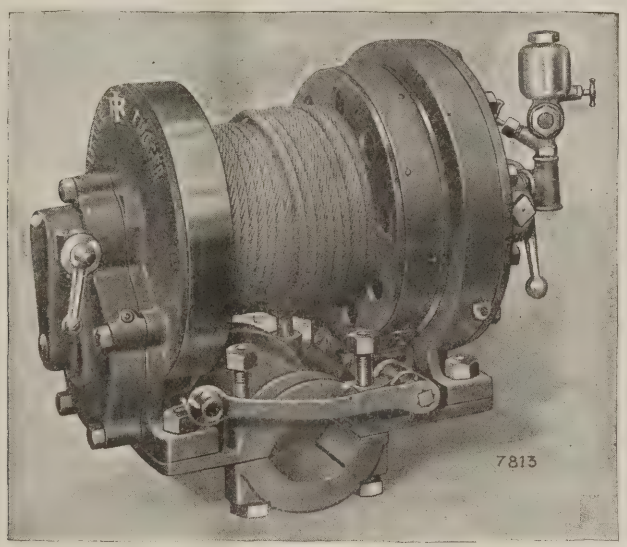
THE PNEUMELECTRIC MACHINE COMPANY SYRACUSE, N.Y. MANUFACTURERS OF

Pneumelectric TRADE MARK

ELECTRICALLY OPERATED COAL PUNCHERS ROCK DRILLS ROOM HOISTS CAP-STAN HOISTS DIP PUMPS CATALOGS ON REQUEST

"LITTLE TUGGER" HOIST

The "Little Tugger" is a brand new idea in portable hoists. It is the result of a close study of the needs of the mine manager for some quick and reliable means for hoisting and lowering machines, timbers, drill steel and other mining appurtenances.



The "Little Tugger" Hoist

It is a tool of convenience. It saves you work. It saves the time of your men for other purposes and in that way saves you money.

It is something more than merely a hoist, although in this work alone, it soon saves its cost. It is used as a light haulage engine, pulling empty and loaded cars in and out of drifts and tunnels.

It is easily attached to mine column, shaft bar, timber, flooring or other means which may be at hand.

It is furnished for operation by air or steam.

Every mine should have this work, time and money saver.

Bulletin 4033.

INGERSOLL-RAND COMPANY

NEW YORK Offices the World Over **LONDON**

Air Compressors Jackhamers Coal Cutters

4-L.H.

SOME SPECIAL TRAMWAY NOTES

Our correspondence develops the fact that some points still remain to be made clear.

SINGLE AND MULTIPLE TERMINALS—The impression still prevails that we can load at only one terminal and discharge at only one terminal. On the contrary, when conditions require and by a very simple adaptation **the automatic tramway will load at any number of points,** either grouped together or scattered anywhere along the line;—and **will discharge at any number of po nts along the line** in addition to the final terminal discharge. This therefore nables the material to be dumped to fo m a long pile or in separate bins for grading.

EXTENSION DUMP TERMINALS—The Lawson Tramway can advance its dumping terminal at will,—**an advantage not possessed by any other tramway.** For instance, in dumping spoil material, the spoil bank gradually extends itself. By a simple arrangement, **the dumping terminal can follow it up a few feet at a time** and so carry the spoil bank out to any length. The additional cost is almost nominal.

ANGLES—**The Lawson Tramway is practically independent of angles** as a restricting condition. To illustrate —we have built three tramways for special service which were continuous;—that is, in which the total curvature was a compl te circle, the tramway being, so to speak, a closed circuit.

The arrangement of anchorages is such that no lateral strain whatever comes on the curves. Unlike every other tramway, **the additional cost is tr fling** and no special attendant at the curve is required as in some.

CAPACITY OF CARS—Our Bulletins hitherto have dealt with only one capacity of car, namely,—4½ cubic feet. Experience has shown that this capacity covers 90 per cent. of the various applications.

We are, however, manufacturing a standard car containing 10 cubic feet, whose dimensions are 38″ x42″ x 12″. This car is used for comparatively light material like coal, earth, etc.

We are also designing a **"Jumbo" Tramway** in which each car will carry one cubic yard. This is intended for heavy contract work.

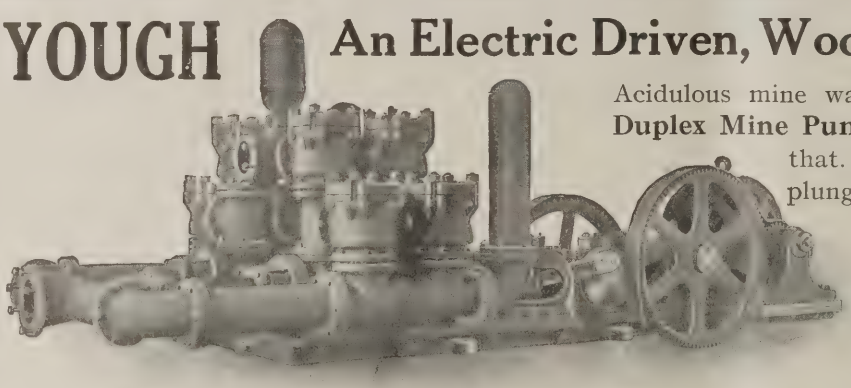
SLOPES—**All cars can be so modified that they ride horizontally on any slope.**

THE COMPLETE TRAMWAY—Unlike any of our competitors **we will contract for Tramways delivered and erected complete,** including power if desired. We can do this because we are Construction Engineers and not merely manufacturers.

Very Respectfully,

THE AMBURSEN COMPANY (Tramway Department)
61 Broadway, New York.

YOUGH An Electric Driven, Wood-Lined Mine Pump

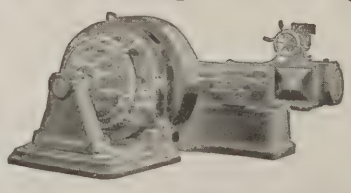


Acidulous mine water does not impair the **Yough Duplex Mine Pump**—the wood-lining takes care of that. Its double action and double plunger make this pump especially efficient. The Yough is sure to effect important savings in your pumping costs.

Our catalog on request.

Boyts, Porter & Co.
Connellsville, Pa.

One Builder and only one is responsible when you buy a Ridgway Unit

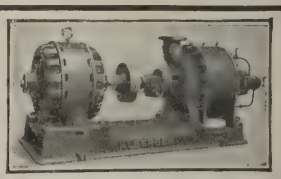


Direct and Alternating Current units with Single and Four-Valve Engines, Simple, Tandem and Cross Compound.

Ask for Bulletin Collection C.

Ridgway Dynamo & Engine Co., Ridgway, Pa.

ALBERGER MINE PUMPS

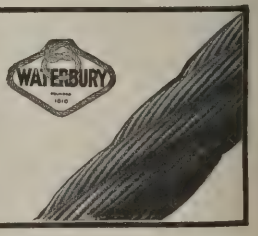


With Centrifugal Pumps, whether of the Turbine or Volute Type, the name of Alberger is a guarantee of maximum service and minimum operating expense

Write for Bulletins.

Alberger Pump & Condenser Company, 140 Cedar St., New York
Atlanta Boston Chicago St. Louis Pittsburgh San Francisco New Orleans

WATERBURY WIRE ROPE



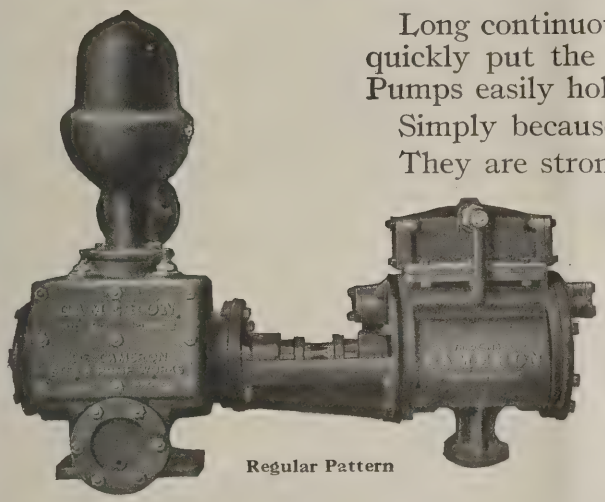
of Standard and Armored Construction. Manila and Sisal Cordage Fibreclad Wire Rope. We make Ropes for every purpose. **Write for prices.**

WATERBURY COMPANY
80 South Street, New York
Chicago San Francisco Dallas
Boston New Orleans

The Slogan of the Cameron—"Character: The Grandest Thing"

LONG LIFE IS THE BIG FEATURE OF

CAMERON PUMPS



Regular Pattern

Long continuous service under working conditions that would quickly put the average pump out of business finds Cameron Pumps easily holding their own.

Simply because Cameron Pumps are **made for hard work.** They are strong, sturdily constructed pumps, have few parts and no working parts exposed.

Their upkeep cost is consequently very low—in fact, considered from the standpoint of service, operating cost, or repair cost, they are the ideal pumps for the exacting service encountered in mine work.

The full story, with valuable pump data, in Bulletin No. 104. It's free.

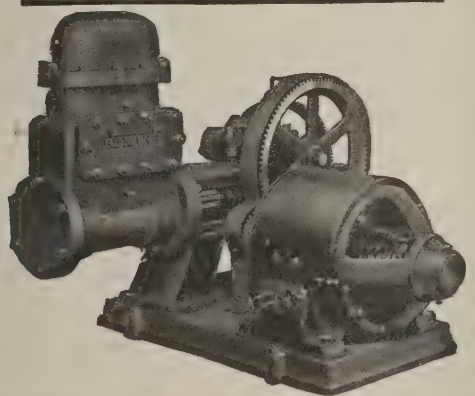
A. S. CAMERON STEAM PUMP WORKS

11 Broadway, New York

Offices the World Over

DEMING

MINE PUMPS



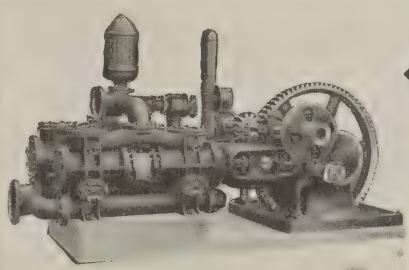
"Ajax" Gathering Pump, Size, 6′ x 6′. Capacity, 75 Gals. per Min.

Large Stocks of Deming Mine Pumps Are Carried in Pittsburgh, Chicago and Denver

The Deming Company, Salem, Ohio

Hand and Power Pumps for all uses.

General Distributing Houses:
Pittsburgh: Harris Pump & Supply Co.
Chicago: Henion & Hubbell.
Denver: Hendrie & Bolthoff Mfg. & Supply Co.

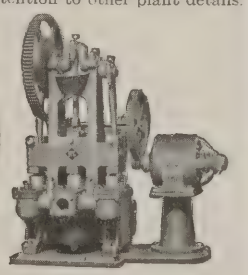


McGowan Pumping Equipment has always been designed with a view of meeting requirements of users who appreciate good pumps which afford continuous and lasting service.

Pumps affording low maintenance cost can not be built to compete with those designed for the trade and sold on price alone. An impartial investigation of McGowan Pumps will show that they are well worth the difference. They save the time of the operating engineer in looking after packing troubles, adjustments and replacements usual with pumps of the competitive class and give him the opportunity of devoting more attention to other plant details.

Worth the Difference

395—Air Compressors
405—Single and Duplex Power Pumps
485—Deep Well Steam and Power Pumps
415—Triplex Power Pumps
425—Centrifugal Pumps
305—Single Steam Pumps
315—Duplex Steam Pumps



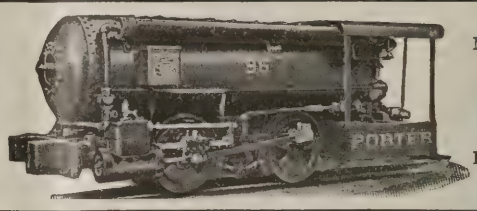
THE JOHN H. McGOWAN CO.
CINCINNATI OHIO
PUMPS IN ALL TYPES FOR ALL USES

American Blower Company, Detroit

Sirocco
TRADE MARK.

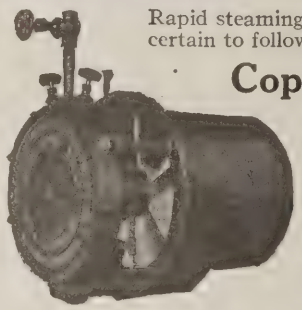
Multi-Blade Ventilating Fans
Catalog No. 30317

Morse Silent Chain
99% Efficiency
Write for Bulletin No. 1120
Morse Chain Company, Ithaca, N. Y.



Specialist Mine Locomotive
That means—built in a plant where nothing but locomotives are made. That's why PORTERS are best.
H. K. Porter Co.
410 Wood St.
Pittsburgh, Pa.

Increased Boiler Efficiency



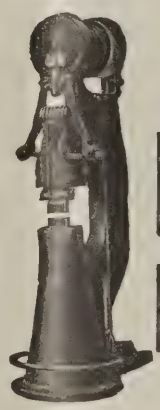
Rapid steaming of every boiler in your plant is certain to follow the installation of the

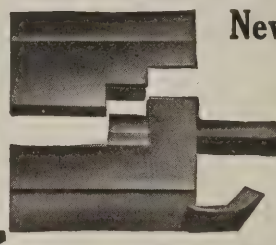
Coppus Turbo-Blower

This splendid undergrate draft equipment enables you to burn slack under the boilers without impairing the capacity of the plant. An abundant air supply is assured at all loads.
We would welcome an opportunity to prove that the Coppus uses 50% less steam than any other blower by a side by side service test in your plant. The Coppus has replaced many other blowers but no other blower has ever replaced a Coppus.
Over 100,000 boiler h.p. were equipped in one year. Write

Coppus Engineering & Equipment Company
168 Union Street, Worcester, Mass.

Do You Know That
a blacksmith and helper can sharpen 2500 bits per day with a

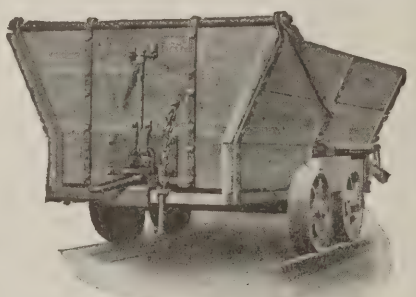




New Little Giant Power Hammer
equipped with an Edmonson Electric Bit-Die?
If you don't, it will pay you to write for proofs right this minute.

MAYER BROS. COMPANY
MANKATO, MINNESOTA, U. S. A.

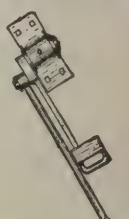
Fitted with "Correll" Automatic Opening Door Latch



This car is what is known as the "Connellsville Coke" Region Standard Car. It is equipped with the "Correll" Automatic Opening Door Latch, and Angle Bar Truck.
Let us mail catalog "A" of cars, wheels, etc.
Hockensmith Wheel & Mine Car Co.,
Penn. Station, Penna.

Frogs—Switches—Track
We Specialize in Prompt Shipments

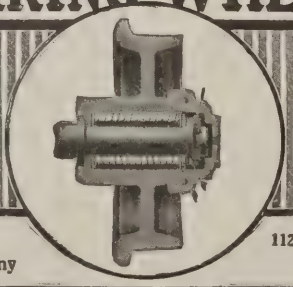




If you want any sort of track equipment talk to us about it. We'll get it to you in a hurry and it will be just what you order.
Our booklet ought to be in your files. Write for a copy.

The Cincinnati Frog & Switch Company
Manufacturers of Track Equipment for Steam and Electric Railroads, Mines and Mills
Cincinnati

HYATT ROLLER BEARING WHEELS



Reduces Power Required 50%
Write for Bulletin
Hyatt Roller Bearing Company
1124 Michigan Ave., Chicago, Ill.

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The requirements of Bituminous and Anthracite Coal Mining are fully met with Keystone National Permissible Powders.
Twenty different grades and sizes give an unbeatable combination of safety and economy.
Write for our book on "Permissible Powders."



Keystone National Powder Co., Emporium, Pa.

Carnegie Steel Company

GENERAL OFFICES: PITTSBURGH, PA.

Steel Ties for Coal Mines

Steel cross ties have many advantages over wood ties for mine use. Some of the principal advantages are:

HEAD ROOM. Track laid with steel ties results in more head room than when laid with wood.

LONGER LIFE. Steel ties will last ordinarily three or four times as long as wood ties.

FIREPROOF. Elimination as far as possible of combustible material from mines increases safety to both life and property.

SCRAP VALUE. Even after steel ties have rendered their maximum service, they have a scrap value of about one-third of their original cost.

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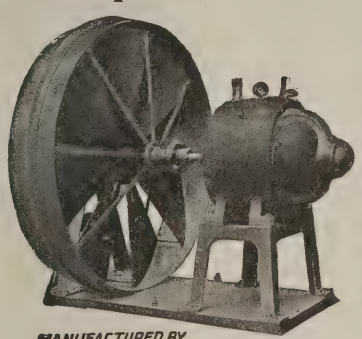
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Boston	Cincinnati	New Orleans	St. Paul
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United States Steel Products Company—Pacific Coast Departments:
Los Angeles San Francisco Portland Seattle

EXPORT REPRESENTATIVES:
United States Steel Products Company, New York, N. Y.

9-T

"Ship Two Same As Last"



That's what a satisfied customer wired us then wrote us this letter.

PREMIER POCAHONTAS COLLIERIES CO.

Premier, W. Va. Aug. 18, 1911

The J. C. Stine Company,
J. C. Stine, Mgr.,
Tyrone, Pa.

Dear Sir:—

Fan installed and doing fine work. Wired you today;—"Ship two fans same as last; rush one all possible.

Now beg to confirm same. Let one come at once if two not ready. If ready, ship two at once. Trace for delivery. Prepay to Premier, W. Va. on N. & W. Railroad. Yours truly,
(signed)
Frank P. Harman, President.

After using three fans for over 15 months he ordered two more, making five J. C. Stine fans which are giving him splendid service every day in the year.

This is not the only customer. Here's one that has six of our silent chain type. Read what he says:—

THE WHEELING & LAKE ERIE COAL MINING COMPANY.
Mt. Pleasant, Ohio, May 26, 1911

The J. C. Stine Company, Mr. J. C. Stine, Mgr.,
Tyrone, Pa.

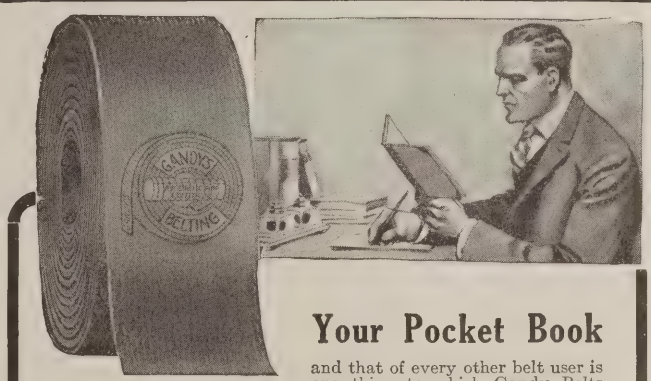
Dear Sirs:—Replying to your very kind favor of the 19th inst. with reference to a report as to how your fans are doing in our mines.

I beg to advise that I cannot sing their praises too highly as they certainly do all you claim and anyone making purchase of this fan for the purpose for which it is intended I assure you is making no mistake.

I wish to again thank you for the good treatment and good service I received from you while installing our fan. Very truly yours,
(signed)..... Michael Gallagher, Gen'l. Mgr.

These fans are made in ten sizes from 3 to 8 feet in diameter. They are the cheapest and most efficient ventilators in the world.

The J. C. Stine Company, Tyrone, Pa.



Your Pocket Book

and that of every other belt user is one thing to which Gandy Belts make a strong appeal. And it's not merely because they cost less in the first place, but because their permanence also makes them a profitable investment when you figure your belt expenses at the end of the year.

Men in practically every part of the country have told us that Gandy Belts stand up to the strenuous work required of them under even the most severe conditions.

Their experience (related in letters we can send you if you wish) is positive proof of Gandy quality.
Yet

The Gandy Belt

costs you only 1-3 the price of leather and 25% less than the price of rubber belting.

If the belt you buy hasn't the Gandy trademark, it isn't a Gandy. It is costing you more money than you need to pay, yet cannot give you better service.

We have a sample of the belting here to send you, together with full information about prices, etc.

Your request on a post card mailed to us will be given immediate attention.

The Gandy Belting Company
734 W. Pratt St., Baltimore, Md.
New York Office—36 Warren St.

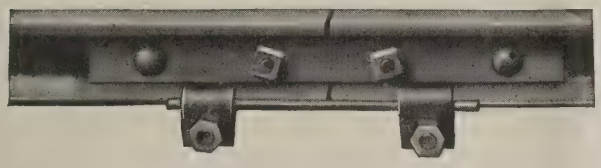
As The Curtain Rises On 1915



Marcus in N. Y. Times.

Are you doing your share to oust hard times and kill off the calamity howler?

Good business and prosperity depend upon you as much as upon *your* customers. Do *your* buying now.



Increased Rail Conductivity

means a power saving to you. Efficiently bond your rails and reduce the drop by installing

The ECONOMY Rail Bond

gives a copper to steel contact surface exceeding 6 square inches. No soldering or welding. Drawing up two bolts is all that is required. Why not send us a trial order? Write for descriptive Bulletin.

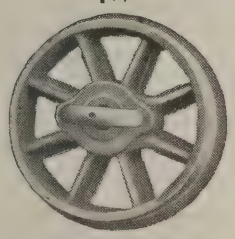
Economy Rail Bond Co., Huntsville, Mo.

A Different Wheel

Here's a wheel that's easy to oil—that holds a large amount of oil—that is easily put on and taken off.

A wheel that gives real service.

Irwin Mine Car Wheel



In this wheel the oil hole is located on center, the oil chamber is large. Features that mean ease of oiling and long time running on one oiling. The linch pin is always accessible—no trouble to remove wheel.

This wheel means smaller maintenance costs—better service. GET DETAILS TODAY.

Irwin Foundry & Mine Car Co.
Irwin, Pa.

THE WISE MEN

—not only from the "East"—but from all over the country are "Amazed" and delighted with the easy running and service they get from the

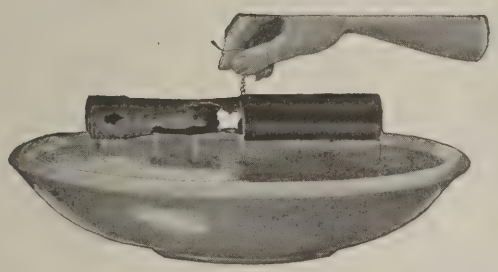
Watt Brass Bushed Wheel

It certainly is a Star—and we know it will Lead you to a perfect haulage system.

Don't fail to note the Watt ad in the Jan. 9th issue of this paper. We are showing something that will interest all coal men.

The Watt Mining Car Wheel Co.
Barnesville, Ohio

A Test You Can Make Yourself!



Coat a piece of mine pipe halfway down with HIGHLAND NON-CORROSIVE COATING and drop the whole piece in a tank of sulphuric acid.

After a time when you pull it out you find that the coated part is untouched, the uncoated, according to the time it's been left in the acid, eaten to pieces.

This proves to you what is going on in your mine all the time—if you're not protecting against corrosion with Highland Coating.

Not only pipe but all steel and iron work and concrete. Three grades of Highland Coating. **Write for Booklet.**

HIGHLAND
CHEMICAL PRODUCTS CO.
CONNELLSVILLE, PA.



In 21 States

And in over 200 mines Whitcomb Gasoline Mine Motors have absolutely proved their reliability and economy—Heavy, compact, fool-proof in operation and lasting in service, they are reducing haulage costs 10 to 50% in every instance.

Don't you think it would pay you to **find out** what they could do in your plant? **Write us.**

Geo. D. Whitcomb Co.
Box D **Rochelle, Ill.**

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Consulting and Constructing Engineers.

Designers and Constructors of complete coal mines, washers tipples, rescreening plants, etc. Electrification of Coal Mines Specialty, Examinations, report and appraisals, coal mining and other properties.

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A copy of the paper included.



BUFF Mining Transits And Levels

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Buff & Buff Mfg. Co., Jamaica Plains Station, Mass.

THE CHRISTY LOADER

saves you much in time, labor and money! It loads the most coal in best condition at lowest cost for operation and maintenance!

Do you want Booklet A?

CHRISTY BOX CAR LOADER CO.
DES MOINES, IOWA

Use your old timber over again—



Sylat Post Pullers

One Colliery Manager wrote that his mine had saved cost of machine in a single day where a roadway of old posts had to be cleared.

In addition to this economy there's safety to be considered.

Sylat Post Pullers have saved a great many lives. In two different cases coroner's juries have declared that a life would have been saved if the Sylat Post Pullers had been used. Both cases occurred within one month in a single district.

One Month's Free Trial

Write for Catalog.

W. Sylvester, Parkersburg, W. Va.

Built to stand the hard knocks of Everyday Mine Use



The new type

"M" Hubbell Lantern

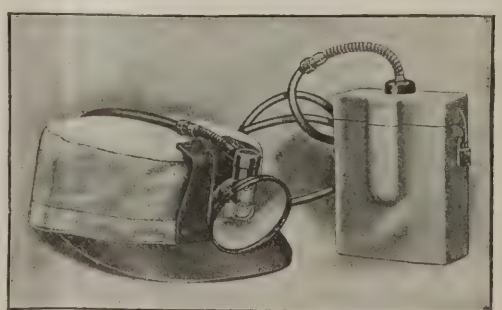
Capacity 12 hrs. Weight 4¼ lbs.

Write for booklet.

Portable Electric Safety Light Co.
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Wico Safety Electric Mine Lamp

Practically Indestructible



Approved by U. S. Bureau of Mines

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Made by Witherbee Igniter Co.

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By **Frank Richards,** Managing Editor "Compressed Air Magazine."

330 *pages, 6x9, illustrated,* $3.00 (12/6) *net, postpaid.*

A simple, practical discussion for the operator of compressed air plants and compressed air machinery. It tells all about operation and equipment from the viewpoint of the man in charge of the plant. Mr. Richards' wide experience makes him well-fitted for handling the subject. He has written a book that is of direct aid to a better understanding of the whole problem.

Simons — Compressed Air — Production —Transmission—Use (April, 1914)

By **Theodore Simons,** E. M., C. E., Professor of Mining Engineering, Montana State School of Mines; Member American Institute of Mining Engineers.

173 *pages, 6x9, fully illustrated,* $1.50 (6/3) *net, postpaid.*

A condensed manual for those who select and operate compressed air machinery. It covers the natural laws and physical principles underlying the *production, transmission* and *use* of compressed air.

The author does not attempt to give extensive descriptions of existing types of compressors, but only examples which illustrate the principles, and which enable the student and investigator to solve the theoretical problems arising in the use of compressed air.

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Part I. Production. Part II. Transmission. Part III. Use. Part IV. Air Compressors and Accessories.

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207 *pages, 6x9, 143 illustrations,* $2.00 (8/4) *net, postpaid.*

Gives a clear treatment of the fundamentals, and a comparison of systems, their advantages and limitations.

It contains clear, simple explanations and illustrations of the thermodynamic phenomena involved, together with detailed descriptions and explanations of air pumps, fans of various kinds, piston compressors of single- and multi-stage type.

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Carnegie Steel Co.

Anthracite Mine Débris
Jeffrey Mfg. Co.
Pennsylvania Crusher Co.
Williams Patent Crusher & Pulverizer Co.

Architects' Supplies
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Carnegie Steel Co.

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Jeffrey Mfg. Co.
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Atlas Car & Mfg. Co.
Carnegie Steel Co.
Enterprise Foundry & Machine Co.
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Hyatt Roller Bearing Co.
Irwin Foundry & Mine Car Co.
Lehigh Car, Wheel & Axle Co.
Stine Co., J. C.
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Cars, Mining Steel
Hendrick Mfg. Co

Castings
Falk Co.
Hockensmith Wheel & Mine Car Co.
Irwin Foundry & Mine Car Co.
Jeffrey Mfg. Co.
Link-Belt Co.
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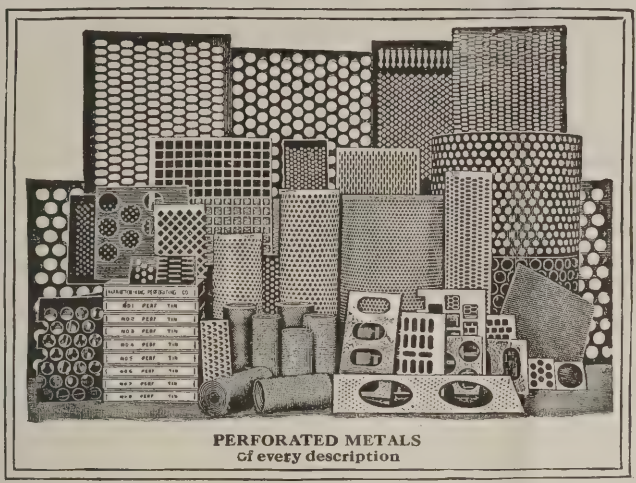
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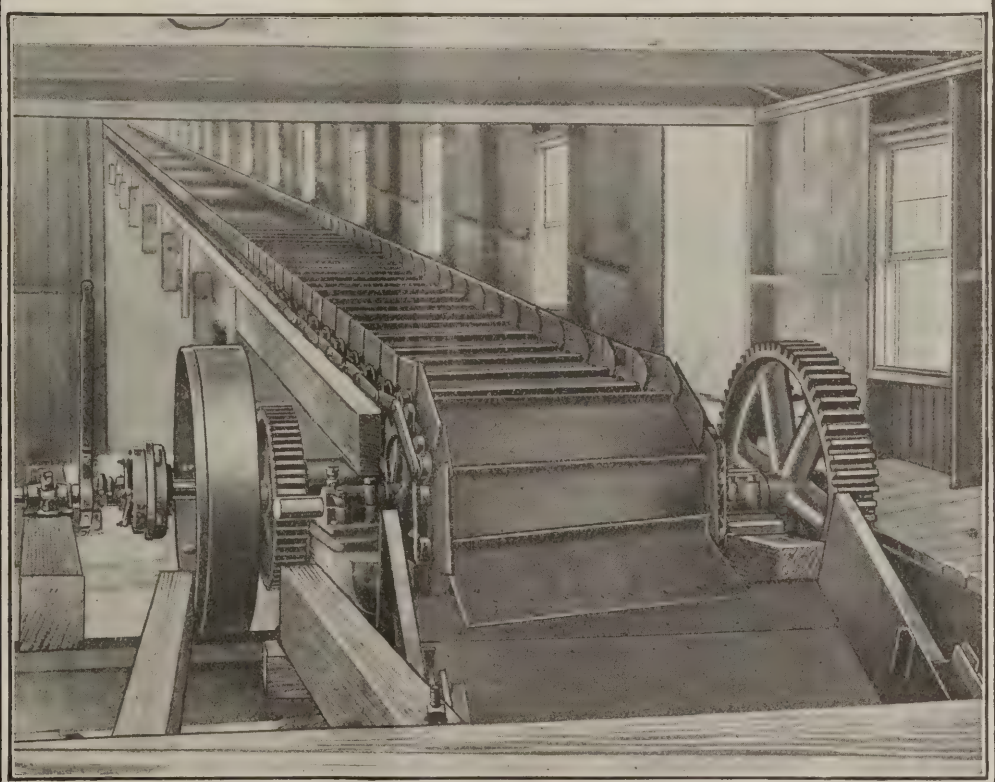
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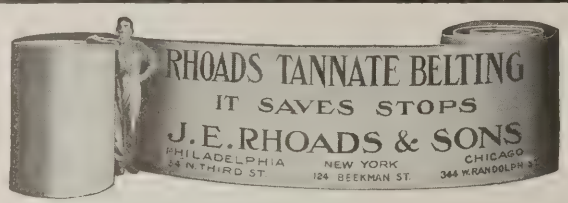
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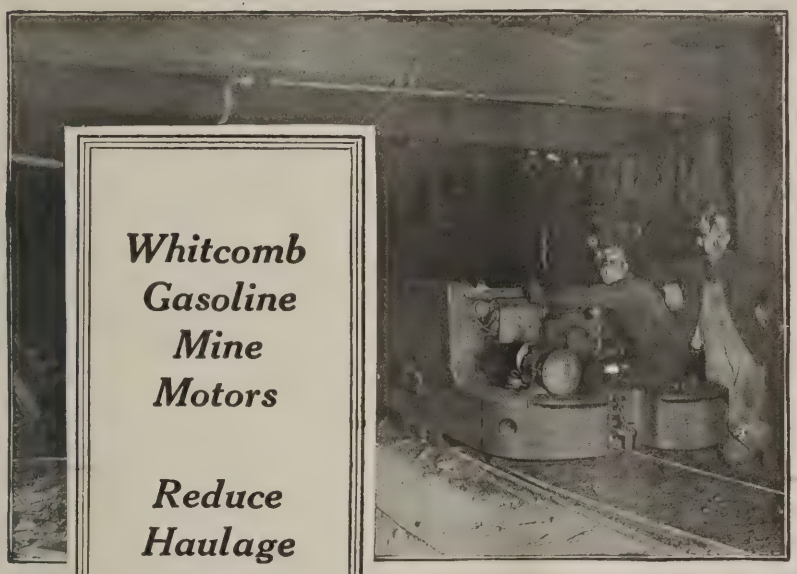
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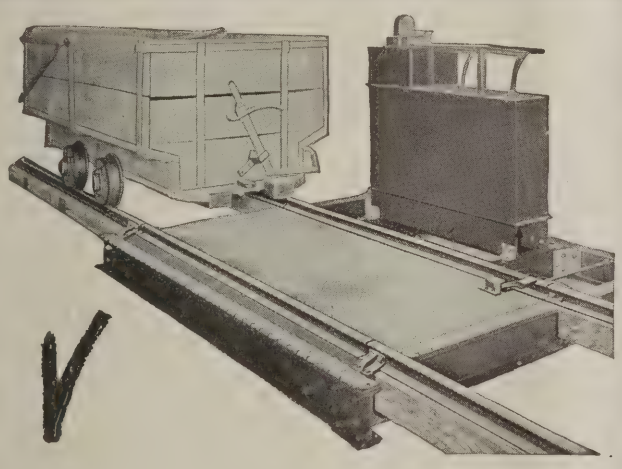
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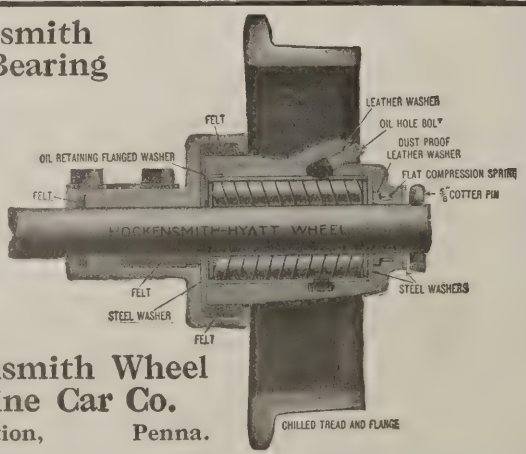


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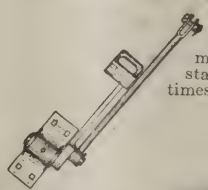


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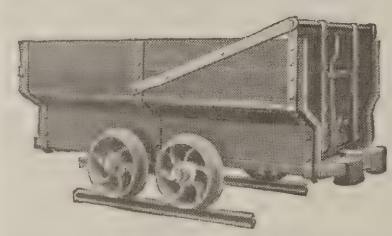


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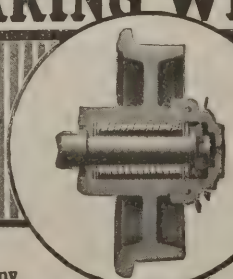
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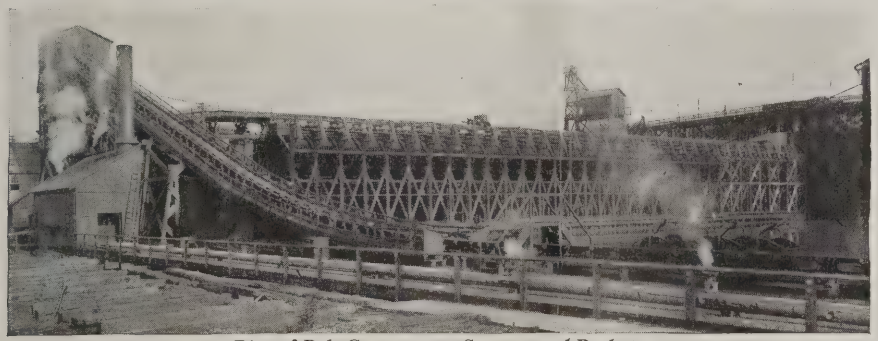
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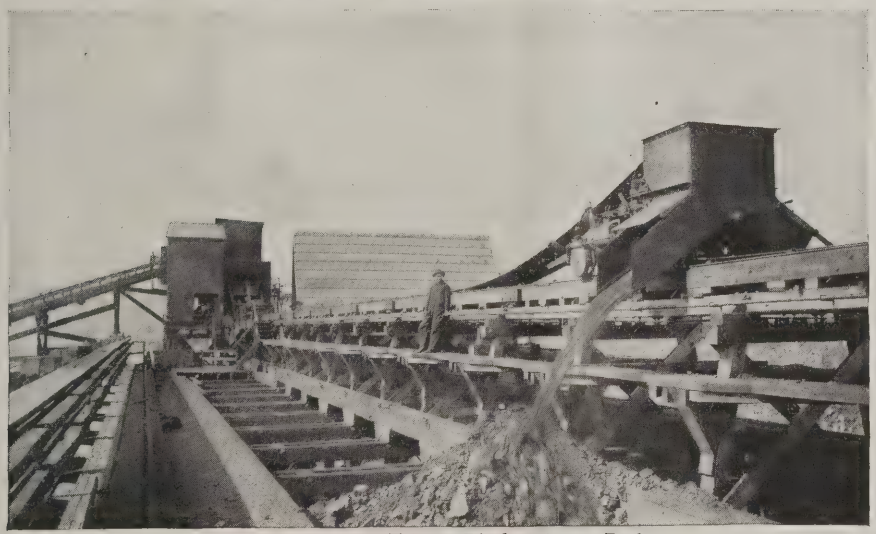
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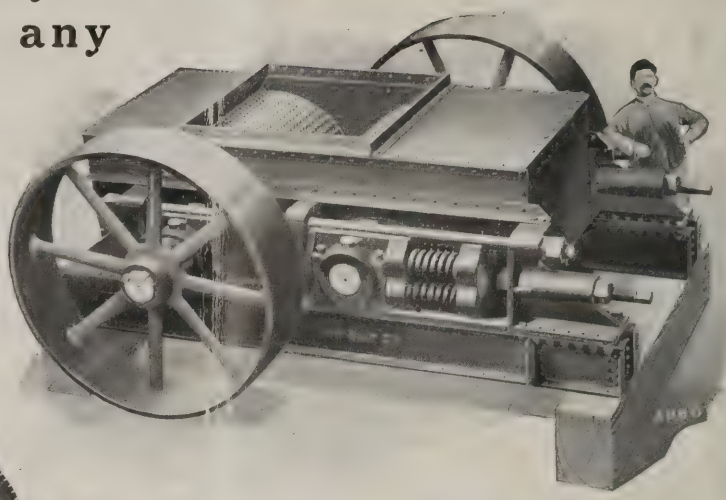
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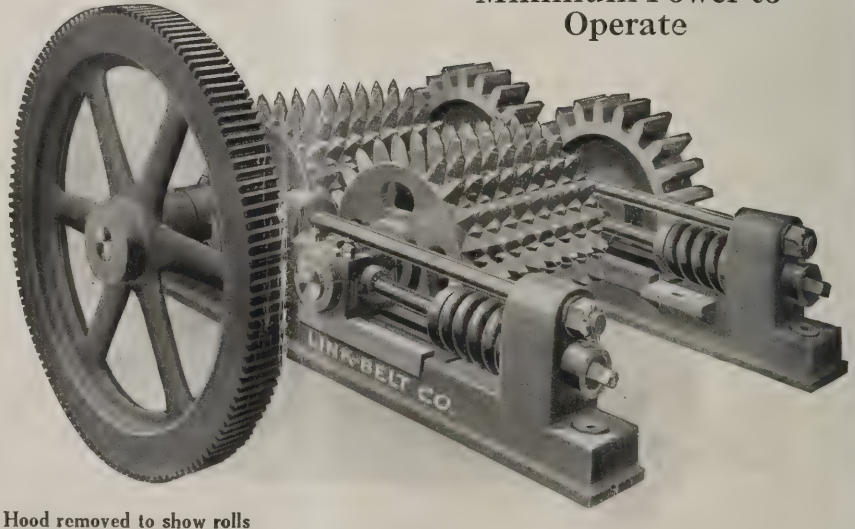
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